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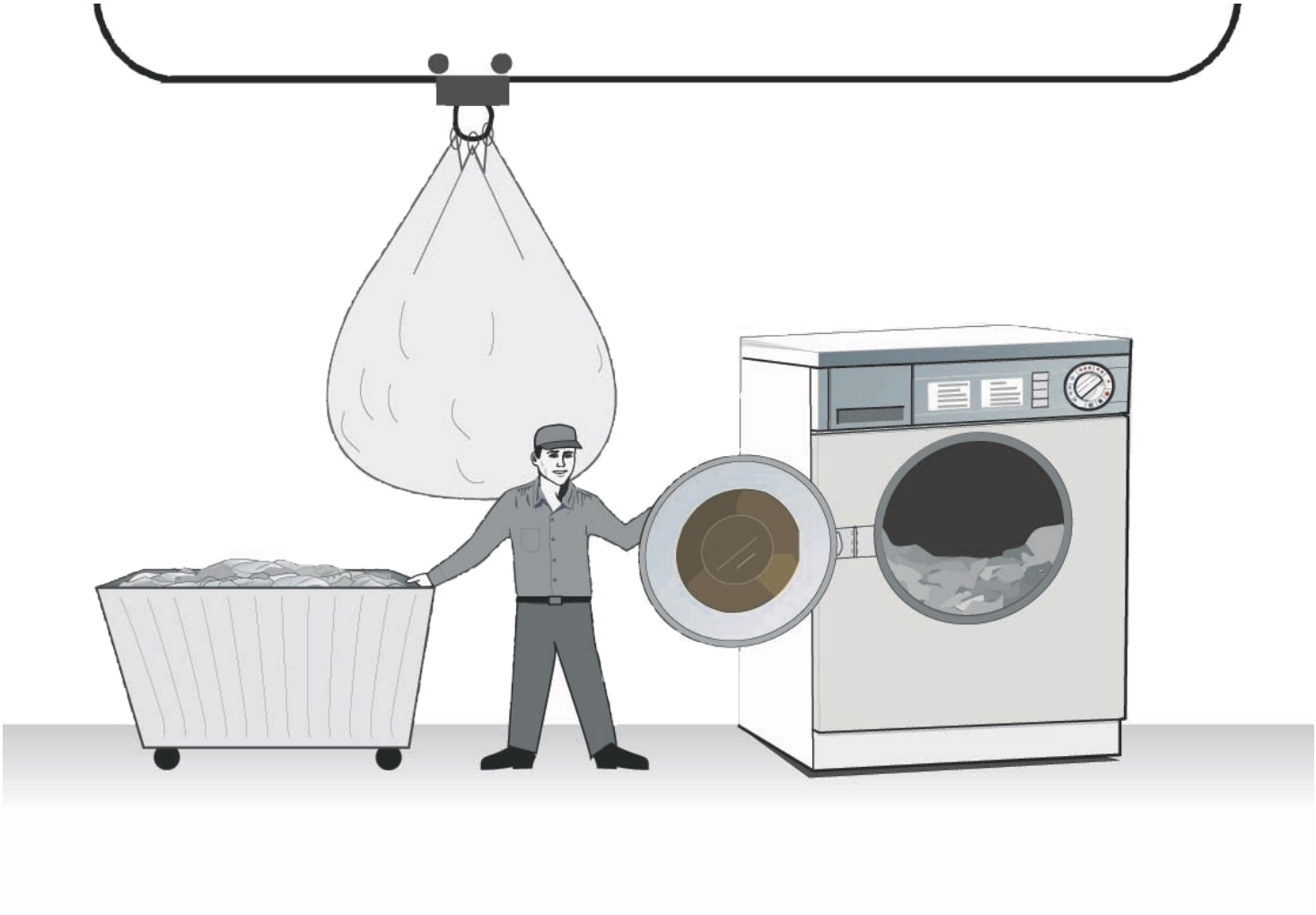
Economic Assessment for the Final Action Regarding Pretreatment Standards for the Industrial Laundries Point Source Category (Revised March 2000)



ECONOMIC ASSESSMENT FOR THE FINAL ACTION REGARDING PRETREATMENT STANDARDS FOR THE INDUSTRIAL LAUNDRIES POINT SOURCE CATEGORY (REVISED MARCH 2000)

FINAL REPORT

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FOREWORD

This document delineates the economic assessment of the final action regarding pretreatment standards for the Industrial Laundries Point Source Category. Based on revised analytical data for semivolatile organic compounds for two sampling episodes conducted in 1996 and 1998, EPA revised the document entitled *Technical Development Document for the Final Action Regarding Pretreatment Standards for the Industrial Laundries Categorical Point Source Category* in March 2000. Section One, Executive Summary, Table 1-1 and Section 1.10, have been revised to reflect the changes in benefits calculated as a result of the change in pollution reduction. Footnote 1 in Section One and Section Two, Data Sources, have been revised to reflect the change in the reference title and EPA document number. Section 10.2, as well as Tables 10-2 and 10-3, have been revised to reflect a change in the benefits calculated as a result of the change in pollution reduction, and to provide Docket Numbers for some references. Minor editorial changes also were made on pages 6-4 and 6-5.

ACKNOWLEDGMENT

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SECTION ONE

EXECUTIVE SUMMARY

1.1 INTRODUCTION

This Economic Assessment (EA) report evaluates the economic impacts of various regulatory options that the U.S. Environmental Protection Agency (EPA) considered for pretreatment standards for the industrial laundries point source category. The EA is organized into ten sections:

- Section Two presents the major sources of data used in analyzing the regulatory options
- Section Three presents a profile of the industry
- Section Four presents an estimate of the annual aggregate cost for industrial laundry facilities to comply with the rule using facility-level capital and operating and maintenance (O&M) costs
- Section Five evaluates, using a financial model, compliance cost impacts on facilities' cash flow (closure analysis)
- Section Six evaluates, using a financial model, compliance cost impacts on the financial health of firms in the industry (firm failure analysis) and also presents an assessment of the potential for impact on new sources (barrier to entry)
- Section Seven presents an assessment of impacts from the regulatory options considered on output and employment, both nationally and regionally
- Section Eight discusses impacts on employment, markets, customers, establishments other than industrial laundries that might provide some industrial laundry services, consolidation, inflation, distribution, and environmental justice
- Section Nine presents an analysis of the effects of compliance costs on small businesses
- Section Ten presents a brief comparison of costs and benefits of the regulatory options

Summaries of each of these sections are presented below in Sections 1.2 through 1.10. Table 1-1 presents a summary of all costs, impacts, and benefits, by option.

Table 1-1

Summary of Costs, Impacts, and Benefits for the CP-IL Option, by Cutoff (1993$)

Option	Annualized Posttax Cost ($ million, 1993)	No. of Facility Closures	No. of Firm Failures	Direct Employment Losses (Closures + Failures)	Other Secondary Impacts	Total Social Costs ($ million, 1993)	Total Benefits ($ million, 1993)
CP-IL no cutoff	$128.4	106	72	5,039	Negligible	$179.7	$0.07 - $0.35
CP-IL 1MM/255K	$120.9	61	72	4,405	Negligible	$171.3	$0.07 - $0.35
CP-IL 3MM/120K	$90.8	44	0	2,261	Negligible	$131.2	$0.07 - $0.35
CP-IL 5MM/255K	$53.9	2	0	235	Negligible	$77.4	$0.07 - $0.35

Note: See Table 4-1 in Section Four of the EA for a detailed description of these options.

1.2 SOURCES OF DATA

This EA presents all costs in 1993 dollars. Any costs not originally in the base year (1993) dollars have been inflated or deflated to 1993 dollars using the Engineering News Record Construction Cost Index, unless otherwise noted in that report (see the EA for details). The primary source of data for the economic analysis is the *1994 Industrial Laundries Industry Detailed Questionnaire* (Section 308 Survey). Other sources include government data from the Bureau of the Census, industry trade journals, and several preliminary surveys of the industry, including the 1989 *Preliminary Data Summary for Industrial Laundries*, the *1993 Industrial Laundries Industry Screener Questionnaire*, the *1994 Industrial Laundries Supplemental Screener Questionnaire*, and EPA's Final Development Document.[1]

1.3 PROFILE OF THE INDUSTRY

The industrial laundries industry supplies clean uniforms and textiles to industrial, commercial, and government customers. Industrially laundered items enhance workplace cleanliness and promote safety, corporate identity, and company image. For the most part, industrial laundries own the goods they process and supply them to customers on a rental basis; however, some facilities also launder customer-owned uniforms and textiles, which the industry refers to as "Not Our Goods" (NOGs). Direct sales of products can also account for a small portion of industrial laundries' business. Uniform rentals account for the largest portion of industrial laundries' customer base and revenues. Other products rented include mats, mops, shop and print towels/rags, continuous roller towels, and linen.

In general, industrial laundries operate in local or regional markets, although there are some "niche" laundries that specialize in handling particular items and that service customers over a relatively wide geographic area. Furthermore, while some localities are dominated by a single firm or handful of firms, the typical market for industrial laundering services appears to be quite competitive.

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[1]U.S. EPA, 2000. *Technical Development Document for the Final Action Regarding Pretreatment Standards for the Industrial Point Source Category (Revised March 2000)*. EPA 821-R-00-006. March.

Based on Section 308 Survey data, EPA estimates that 1,742 facilities in the United States meet its definition of an industrial laundry. These facilities vary significantly with respect to the types and volume of items they clean, the amount of wastewater they generate, the number of people they employ, and the revenues they earn, among other characteristics. As a result, it is not possible to describe a "typical" industrial laundry. In general, however, facilities that handle less than 3 million pounds of textiles per year receive smaller profits and generate less wastewater than facilities that handle larger quantities of textiles. EPA investigated three cutoffs (and used a no-cutoff scenario for comparison purposes):

- A cutoff excluding all facilities laundering less than 1 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year (this cutoff is identical to that proposed). This cutoff is called the 1MM/255K cutoff for the purposes of this EA.

- A cutoff excluding all facilities that launder between 1 and 3 million pounds of incoming laundry (total) and less than 120,000 pounds of shop and/or printer towels per calender year, in addition to those facilities laundering less than 1 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year. This cutoff is called the 3MM/120K cutoff for the purposes of this EA.

- A cutoff excluding all facilities laundering less than 5 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year. This cutoff is called the 5MM/255K cutoff for the purposes of this EA.

All the facilities investigated for exclusion from a rule are small entities under the Small Business Administration (SBA) definition of "small." EPA has selected the 3MM/120K cutoff under the CP-IL option as economically achievable.[2] Had EPA promulgated a rule, it is this cutoff and option that would have been implemented.

The 1,742 industrial laundry facilities are owned by an estimated 903 firms. A total of 830 of these firms (92 percent) are single-facility firms (i.e., firms associated with a single facility). The remaining 73 firms are multifacility firms (i.e., firms that own more than one facility). In general, multifacility firms are larger than single-facility firms and might service multiple localities. A total of 837

[2] See the preamble to the Final Action. EPA also found the 5MM/255K cutoff economically achievable.

of the 903 firms (93 percent) earn less than $10.5 million in revenues per year and therefore are small firms according to SBA Guidelines. Most of these small businesses (812) are single-facility firms.

1.4 ANNUALIZED COSTS OF COMPLIANCE

Central to the EA is the cost annualization model, which uses facility-specific cost data and other inputs to determine the annualized capital and O&M costs of improved wastewater treatment. This model uses these costs (along with an annual compliance monitoring cost) with the industry-specific real cost of capital (discount rate) over a 16-year analytic time frame to generate the annual cost of compliance for the options considered. EPA chose the 16-year time frame for analysis based on the depreciable life for equipment of this type, 15 years according to Internal Revenue Service (IRS) rules, plus time for purchasing and installing the equipment. As an alternative to installing wastewater treatment, facilities may choose, within the technology options considered, to have wastewater hauled offsite (a decision handled within the model, as discussed below). The model generates the annualized cost for each option (including the annual cost of hauling wastewater) for each facility in the survey, which is then used in the facility closure and firm failure analyses, discussed below in Sections 1.5 and 1.6. The cost estimates include zero costs for any facility meeting the definitions of the cutoffs described above.

EPA investigated two options under the three cutoffs in this EA: Chemical Precipitation (CP-IL) and Dissolved Air Flotation (DAF-IL). EPA estimates that pretreatment standards would have cost industry from $60.0 million to $148.6 million per year posttax ($1993) under the DAF-IL option, depending on cutoff and from $53.9 million to $128.4 million per year posttax under the CP-IL option. CP-IL under the 3MM/120K cutoff would have cost $90.8 million per year posttax. Most of the results in Section One, as well as in the remainder of this EA are reported for the CP-IL option only. Results for DAF-IL are similar and are reported in Appendix C.

1.5 FACILITY-LEVEL ANALYSIS

In the facility closure analysis, EPA models the economic impacts of regulatory costs on individual industrial laundry facilities, irrespective of ownership. In this part of the analysis, the model uses the annualized costs of each option, compares them to the alternative annual wastewater hauling costs (where this alternative is available), and selects the lowest of the two.

EPA then converts the annual cost for each facility[3] into a present value change in cash flow, which is subtracted from the estimated baseline present value of facility cash flow. Estimated baseline present value of facility cash flow is based on the average of three years of financial data from each facility in the Section 308 survey under an assumed no-growth scenario (i.e., the annual cash flow, calculated as the 3-year average is expected to remain the same over the 16-year period of analysis). If the change in present value of cash flow (which is derived from the adjusted annualized costs of compliance) causes a facility's estimated cash flow to change from positive in the baseline to zero or negative after implementing the requirements of the regulatory options over the 16-year period of analysis, EPA considers the facility likely to close (i.e., liquidate) as a result of the regulation. This approach is somewhat different from methodologies used in other EAs and economic impact analysis for manufacturing industries, since salvage value is not considered in the closure analysis here. For a number of reasons, outlined in the EA (see Appendix D), EPA found that using salvage value in a closure analysis for this industry is not the best way for determining whether a facility would be liquidated. Single-facility firms do not typically take salvage value into account in deciding whether to liquidate. EPA did perform a sensitivity analysis on facilities owned by multifacility firms, which showed that the results with and without using salvage value are approximately the same (see Appendix D).

Note that facilities that reported negative cash flow over the 3-year period of the survey are considered baseline closures and are not considered affected by the rule for several reasons. First, many of these facilities are nonindependent facilities owned by multifacility firms. These facilities might be

[3] At proposal, EPA's primary analysis assumed costs could be passed through to consumers and accounted for this cost passthrough in these analyses. As discussed in the Notice of Data Availability (63 FR 71054, December 23, 1998), EPA no longer uses this assumption in the primary analyses in this EA. A cost passthrough analysis is undertaken, however, in Appendix A of this EA.

transferring production (laundering services at or near cost) from other facilities owned by the same parent company, or otherwise not expected to be self-supporting by the parent. EPA analyzes the owner firms of these facilities in the firm-level analysis and as long as the owner firm can afford to install and operate compliance equipment in these non-self-supporting facilities, EPA assumes these facilities will close neither in the baseline nor postcompliance. Second, OMB guidance suggests that agencies develop a baseline that is "the best assessment of the way the world would look absent from the proposed regulation. That assessment may consider a wide range of factors, including the likely evolution of the market..." EPA's best assessment is that some facilities currently operating might not be around to install and operate the pollution control equipment. It is possible that a facility estimated to be a baseline closure might remain open, but the converse is also true—a facility projected to remain open until it is subject to the rule might actually close independently of the effects of the rule (both results might be equally possible). Thus, consistent with OMB guidance, EPA estimated postcompliance closures by counting closures that are projected to close solely due to the effect of regulatory options.

EPA estimates that the CP-IL option (DAF-IL impact results are identical and are presented in Appendix C) would have resulted in from 2 to 106 facilities closing, depending on cutoff, or 0.2 percent to 6.7 percent of all facilities in the postcompliance analysis. Under the 3MM/120K cutoff, 44 facilities (2.7 percent of facilities not closing in the baseline), would have closed.

Another key analysis EPA performs is an analysis to determine impacts on new sources, which is primarily a "barrier-to-entry analysis" to determine whether the costs of PSNS would prevent a new source from entering the market. This analysis looks at whether new industrial laundries would be at a competitive disadvantage compared with existing sources. Market effects and barriers to entry associated with cutoffs also are qualitatively investigated.

EPA is not regulating new sources under pretreatment standards, but has selected the same cutoff for new sources (the 3MM/120K cutoff) under the CP-IL option as for existing sources as an economically achievable option as discussed in the preamble to the Final Action.[4] EPA determined that costs to new facilities should be similar to costs for existing facilities. EPA has determined that no barriers to entry

[4]EPA also considers the 5MM/255K cutoff economically achievable.

would have occurred as long as the same cutoff was selected for new sources as for existing sources. In this circumstance, all sources, regardless of whether they are new or existing, would have faced similar costs and the same market factors as existing sources. EPA found that no sources identified as new in the Section 308 survey (that is, the firm identified them as beginning production during the 3-year survey period) would have closed under the CP-IL option at the 3MM/120K cutoff. Thus this regulatory option would have been economically achievable for new sources.

1.6 FIRM FAILURE ANALYSIS

In the firm failure analysis, EPA uses the compliance costs to compute a change in earnings, assets, liabilities, and working capital at the firm level (accounting for costs for multiple facilities, where applicable). These postcompliance financial figures are used in a computerized model of financial health on a firm-by-firm basis. The model uses an equation known as Altman's Z", which was developed based on empirical data to characterize the financial health of firms. This equation calculates one number, based on the financial data, that can be compared to index numbers that define "good" financial health, "indeterminate" financial health, and "poor" financial health. All firms whose Altman's Z" number changes such that the firm goes from a "good" or "indeterminate" baseline category to a "poor" postcompliance category are classified as likely to have significant difficulties raising the capital needed to comply with a regulatory option, which can indicate the likelihood of firm bankruptcy, or loss of financial independence.

EPA estimates that the CP-IL option would have resulted in 72 firms under no cutoff or the 1MM/255K cutoff failing or losing their financial independence. Under the 3MM/120K cutoff and the 5MM/255K cutoff, no firms are projected to fail. As discussed below, firm failures in this industry can have effects on employment, and these effects can approach those associated with closures, since firms that are acquired are often converted to depots with a subsequent loss of as much as three-quarters of existing employment.

1.7 INDUSTRY, NATIONAL, AND REGIONAL IMPACTS ON EMPLOYMENT AND IMPACTS ON NATIONAL-LEVEL OUTPUT

EPA undertook several different types of analyses to estimate impacts on employment in the industrial laundries industry, on the national-level economy, and on communities. EPA also estimated impacts on national-level output.

The primary analysis of employment impacts focuses on the job losses associated with facility closures and firm failures. EPA assumes that all employment is lost at facilities projected to close as a result of the regulatory options, and as noted above, EPA also assumes that 75 percent of employment is lost at firms projected to fail as a result of the regulatory options. Based on the numbers of facilities estimated to close and firms estimated to fail, EPA estimates that employment losses within the industrial laundries industry might range from 235 jobs under the 5MM/255K cutoff to 5,039 jobs under a no cutoff scenario. The selected 3MM/120K cutoff is associated with 2,261 job losses.

According to economic theory, these losses can have further repercussions throughout the economy, as industries that provide inputs to the industrial laundries industry react to the contraction in that industry and as laid off workers curb their expenditures. Using a type of analysis called input-output analysis, EPA estimates the total losses to the U.S. economy (which incorporates the losses within the industrial laundries industry). These losses, based on the closure- and failure-induced losses estimated above, range from 404 to 8,667 jobs throughout the U.S. economy, depending on cutoff. The selected 3MM/120K cutoff is associated with 3,889 jobs lost throughout the U.S. economy, based on closures and failures.

These losses do not account for gains in employment due to the need to manufacture, install, and operate pollution control equipment. Furthermore, closures and failures are not the only possible employment impacts driving national-level employment losses. Output losses (which are production-driven losses) can be different from the losses associated with closures and failures. That is, closures and failures can reduce production to levels that are greater than or less than the level of production that is the market equilibrium solution of that amount of production demanded. Production-driven losses can be seen as longer-term losses that can occur as the market reaches equilibrium, compared to the more immediate

losses associated with closures and failures. The production-driven impacts on employment can be determined at the national level and the industry level.

At the national level, input-output analysis uses the total output loss measured as the cost of compliance to estimate the total losses to the national-level economy. These same compliance costs are also used to estimate employment gains (most of which occur in industries other than the industrial laundries industry). Under the assumptions of this analysis, net losses to the national-level economy are estimated to total 3,389 to 7,900 jobs, depending on cutoff. Net output losses to the U.S. economy in dollar value are estimated to total $55.1 million to $131.9 million, depending on cutoff. The selected 3MM/120K cutoff is associated with net employment losses of 5,795 jobs and $98.04 million in net output losses. These net losses in employment and output would have had a negligible impact on the U.S. economy.

Direct losses to the industrial laundries industry can also be calculated using the gross national-level employment losses (which are based on the output losses represented by compliance costs) and a portion of employment gains. The losses thus computed would be a reasonable upper bound estimate of production-driven losses (as discussed above). The net losses estimated incorporate assumptions that no costs can be passed through to customers and some employment is gained in the industrial laundries industry to operate pollution control equipment. EPA estimates that these longer-term net losses in the industrial laundries industry might have ranged from 2,284 to 6,792 jobs lost, depending on cutoff, or somewhat greater than the losses to the industry predicted from closures and failures alone. The selected 3MM/120K cutoff is associated with losses of 4,897 jobs within the industrial laundries industry in the worst case.

EPA also undertook an alternative analysis to compute a reasonable lower-bound estimate of production-driven net employment losses using the estimate of production losses from EPA's market model. Implicit in this estimate is the assumption that some compliance costs can bef passed through to customers. Using this approach, EPA estimated that the lower-bound loss would be almost exactly offset by gains. Thus EPA believes that the longer-term net employment impacts in the industrial laundries industry would have ranged from offsetting losses and gains to a loss of 2,284 to 6,692 jobs, depending on cutoff. The selected 3MM/120K cutoff is associated with losses ranging from roughly none to 4,897 jobs.

The employment losses from closures and failures estimated for the industrial laundries industry would have fallen roughly between these two bounding estimates of longer-term losses.

EPA also determined the impacts on regional-level employment, which is estimated using facility closures and employment at those closing facilities to determine the change in unemployment rates in a county. EPA conducted a regional analysis because even if net employment effects (losses minus gains) are relatively small on a national level, an employment loss might still have a substantial negative effect on an individual community. EPA determined that closures and failures would have resulted in a change in a community unemployment rates of less than 1 percent.

1.8 OTHER SECONDARY IMPACTS

EPA investigated additional secondary impacts qualitatively and quantitatively. These impacts include impacts on domestic and international markets, impacts on substitutes for industrial laundry services, impacts on industries that might offer some industrial laundering services, impacts on consolidation, impacts on inflation, distributional impacts, and impacts on environmental justice. EPA also investigates the impact of the rule on domestic markets. The rule would have affected domestic markets to the extent that excluded facilities could have affected market share. EPA makes an assessment of the potential for effect on domestic market on the basis of pounds of laundry processed by excluded facilities to the total pounds processed by the industry.

EPA expects the regulatory options would have had a minimal impact on international markets due to the limited number of facilities near international boundaries, the relatively high transaction costs associated with border crossings, and the ability of most facilities to absorb, if necessary, the full cost of regulatory options without threat of closing or failing. Domestic markets might have been affected by the 3MM/120K cutoff since many larger firms would have faced increased costs, while many smaller firms would not; however, the need to protect small, vulnerable firms outweighs the need to minimize market effects.

EPA also investigated impacts on customers. EPA determined that even if most of the cost of CP-IL under the no cutoff scenario was passed through on only shop towels, highly affected customers, such as printers, should only experience typical cost increases of about $3,000 per year, and under a more realistic scenario, this typical cost increase would be only about $200 per year. Therefore, EPA does not expect price increases to have a major impact on customers.

EPA also investigated the likelihood that customers might substitute disposable items for laundered items or begin operating onsite laundries. Both the substitution of disposable items for laundered items and the installation and operation of onsite laundries are associated with potential negative impacts on customers that might deter them from choosing these potential substitutes. Disposable items can be more expensive to use than laundered items, might not meet quality requirements (e.g., disposable printer towels tend to be linty, and the printing industry trade organization indicated in comments that disposables are considered inferior to reusables in this business) and are, in certain circumstances, regulated under other environmental statutes. Meanwhile because of the high initial costs to install equipment on-site and the small increase in price of industrial laundry services discussed earlier, onsite laundries could require years before any cost savings might be realized. Given the disincentives towards those substitutes indicated above, EPA does not expect the regulatory options to have caused customers to substitute disposable items for laundered items or commence industrial laundering on site for industrial laundries services in any major way. The small reduction in production is more likely to have occurred due to customers delaying cleaning (rather than weekly pickups of mats, for example, some might substitute biweekly pickups) or dropping certain rental items, such as uniforms used only for image purposes. This decline in production is negligible compared to the approximate 6 percent per year growth in current years.

EPA also expects that regulatory options would have had a minimal impact on consolidation, inflation, other providers of industrial laundry services, and environmental justice.

1.9 SMALL BUSINESS IMPACTS

Had EPA promulgated a rule, no small firms (as defined by SBA, i.e., firms with revenues less than $10.5 million per year) would have closed or failed under the 5MM/255 cutoff; 39 small, single-

facility firms would have closed or failed under the 3MM/120K cutoff (39 closures out of the 44 closures predicted for all facilities and no failures, or 5.7 percent of all small firms in the postcompliance analyses), and 126 small, single-facility firms would have closed or failed under the 1MM/255K cutoff (54 closures out of the 61 closures predicted for all facilities and 72 failures, or 18.4 percent of all small firms in the postcompliance analysis). EPA believes the 3MM/120K cutoff would have provided sufficient mitigation of small business impacts, had EPA promulgated a rule. Because EPA has decided not to promulgate pretreatment standards for the industrial laundries industry, all impacts (regardless of whether significant or not) on all small firms have been mitigated.

1.10 COST-BENEFIT ANALYSIS

Because EPA had decided not to promulgate pretreatment standards for the industrial laundries industry, a cost benefit analysis pursuant to Executive Order 12866 and Section 202 of the Unfunded Mandates Reform Act (UMRA) is not required, since regulatory costs and regulatory benefits are zero. However, EPA provides a social cost and benefits comparison (see also Table 1-1 above).

EPA approximates social cost using the pretax costs of compliance (which comprise the vast majority of the social costs). Pretax costs of compliance range from $77.4 million to $179.7 million per year, depending on cutoff. Benefits, which comprise the monetized benefits of avoiding 0.03 cancer cases, and improvements in the quality of biosolids (sewage sludge) at 8 publicly owned treatment works, range from $0.07 million to $0.35 million per year. EPA's selected option, CP-IL under the 3MM/120K cutoff would have been associated with social costs of approximately $131.2 million per year and benefits of approximately $0.07 million to $0.35 million per year.

SECTION TWO

DATA SOURCES

EPA relied on several data sources to develop the industry profile and the economic and financial analyses of the technical options evaluated during EPA's consideration of pretreatment standards for the industrial laundries industry prior to the Agency's decision not to promulgate pretreatment standards for the industrial laundries point source category. The following subsections discuss the principal data sources used. Additional data sources are described in Sections Three through Ten as they are referenced. All documents and databases cited in this report, except where noted (e.g., publicly available documents), are available in EPA's decisionmaking record.

2.1 THE 1994 INDUSTRIAL LAUNDRIES INDUSTRY DETAILED QUESTIONNAIRE

EPA used the *1994 Industrial Laundries Industry Detailed Questionnaire* (hereinafter referred to as the Section 308 Survey) to obtain detailed technical and financial information from a sample of 255 establishments engaged in industrial laundering that could potentially be affected by the regulatory options. Data provided by the surveyed facilities included technical information on the quantity and types of items laundered; water use and waste characteristics; waste/wastewater treatment operations and waste minimization practices; cost of industrial laundry operations; and treatment capacity. The Survey also collected economic and financial data, such as the number of employees; industrial laundering revenues and costs; assets; liabilities; net income; ownership structure; discount rate; and market value of land, buildings, and equipment. The questionnaire collected economic and financial data at the facility, owner-company, and parent-company levels. EPA used these data extensively to develop the proposed rule for this industry.

EPA based the Survey sampling frame on two sources of population information: (1) the trade association listings, which were used to develop the population for the *1993 Industrial Laundries Industry Screener Questionnaire* (Screener Questionnaire) and (2) information from Dun and Bradstreet, which was used to develop the population for the *Industrial Laundries Industry Supplemental Screener Questionnaire* issued in 1994 (Supplemental Screener Questionnaire). See EPA's *Statistical Support*

Document for Proposed Pretreatment Standards for Existing and New Sources for the Industrial Laundries Point Source Category (Statistical Support Document) for more information on how EPA developed the survey sampling frame. EPA also sent out another screener questionnaire in 1995, the *Hotels, Hospitals, and Prisons Screener Questionnaire* (HHPs Screener Questionnaire). EPA used the information from the HHPs Screener Questionnaire to further clarify the regulatory scope of this rule.

EPA stratified the affected population according to the types of items laundered, types of wastewater treatment in place, and annual revenues.[1] Based on these strata, EPA developed "cells," which are the intersection of two sampling strata. For example, a survey could be stratified on the basis of revenue and treatment technology, which would each be considered a stratum. A cell in this example would correspond to a particular range of revenues and a treatment technology type. To select facilities to receive the detailed questionnaire, EPA took a census of all facilities that at the time of the survey had in-place treatment technologies such as air strippers, centrifuge, dissolved-air flotation, membrane filtration, pressure filtration, media filtration, and/or chemical precipitation, because these treatment technologies were considered likely options for the proposed regulation. EPA also took a census of all facilities with annual revenues less than $1 million that used dissolved-air flotation, oil/water separation, and/or chemical precipitation wastewater treatment technologies to learn more about how facilities in these sampling cells, despite their low revenues, were able to install advanced treatment systems as might be required by the regulation. In addition, EPA took a census of cells with fewer than five facilities to ensure that the most information possible on these more unusual types of facilities was collected. EPA's Statistical Support Document, provides more information on the stratification and development of survey weights for the Section 308 Survey.

2.2 GOVERNMENT DATA SOURCES

Facilities in the affected population are predominantly classified into one of four primary Standard Industrial Classifications (SICs):

[1] The sampling frame stratified facilities into four categories based on types of items laundered, three categories based on types of wastewater treatment, and four categories based on revenues.

- **SIC 7218: Industrial Launderers.** Establishments primarily engaged in supplying laundered or dry-cleaned industrial work uniforms and related work clothing, such as protective apparel (flame and heat resistant) and clean room apparel; laundered mats and rugs; dust control items, such as treated mops, rugs, mats, dust tool covers, and cloths; laundered wiping towels; and other selected items to industrial, commercial, and government users. These items may belong to the industrial launderer and be supplied to users on a rental basis, or they may be the customers' own goods. Establishments included in this industry may or may not operate their own laundry or dry-cleaning facilities.

- **SIC 7213: Linen Supply**. Establishments primarily engaged in supplying to commercial establishments or household users, on a rental basis, such laundered items as uniforms, gowns, and coats of the type used by doctors, nurses, barbers, beauticians, and waitresses; and table linens, bed linens, towels and toweling, and similar items. Establishments included in this industry may or may not operate their own laundry facilities. Establishments primarily engaged in providing diaper service are classified in Industry 7219.

- **SIC 7211: Power Laundries, Family and Commercial.** Establishments primarily engaged in operating mechanical laundries with steam or other power. Establishments primarily engaged in supplying laundered work clothing on a contract or fee basis are classified in Industry 7218.

- **SIC 7216: Dry-cleaning Plants, Except Rug Cleaning**. Establishments primarily engaged in dry-cleaning or dyeing apparel and household fabrics other than rugs. Press shops and agents for dry-cleaners are classified in Industry 7212; establishments primarily engaged in cleaning rugs are classified in Industry 7217; and establishments primarily engaged in dyeing fabrics for trade are classified in Manufacturing, Major Group 22.

The SIC codes listed above translate to a new numbering system called the North American Industry Classification System (NAICS). A translation chart for these codes is provided in Table 2-1.

EPA used U.S. Department of Commerce data for these SICs in developing the market model discussed in Appendix A. The Department of Commerce collects a wide range of industry data, including number of establishments, number of employees, annual payroll, and annual receipts, at the 4-digit SIC level. These data are reported in U.S. Census Bureau publications such as County Business Patterns and the Service Annual Survey (exact citations appear where data are used in the EA).

EPA also used other government data, such as the Bureau of Labor Statistics' producer and consumer price indexes, in developing the market model. EPA further used the indexes to inflate and deflate Section 308 Survey financial data, as reported in Sections Five and Six.

Table 2-1

Conversion From SIC to NAICS Codes

SIC	NAICS
7218: Industrial Launderers	812332
7213: Linen Supply	812331
7211: Power Laundries, Family and Commercial	812321
7216: Dry Cleaning Plants, Except Rug Cleaning	812322

2.3 OTHER SOURCES

EPA's Final *Technical Development Document for the Final Action Regarding Pretreatment Standards for the Industrial Laundries Categorical Point Source Category* (hereinafter, the Final Development Document),[2] is the major source of technical information about the industry presented in Section Three; it is also the source of capital and operating and maintenance cost estimates for the regulatory options evaluated in this EA.

EPA further supplemented questionnaire and government data with information from a number of other sources: the industry trade journals *Industrial Launderer*, published by the Uniform & Textile Service Association, and *Textile Rental*, published by the Textile Rental Services Association of America, provided details on changing laundering processes, new technologies, and industry perceptions of the industrial laundries market. In addition, EPA referenced several studies sponsored by the Uniform & Textile Service Association (formerly the Institute of Industrial Launderers) that examined the customer base for industrial laundries and the markets for wipers and mats, as well as the industry as a whole. EPA's 1989 *Preliminary Data Summary for Industrial Laundries* provided information about the overall industry. Lastly, information from investment sources, such as the equity research division of Barrington Research Associates, aided EPA in producing its financial profile of the industry. Finally, EPA obtained

[2]U.S. EPA, 2000. *Technical Development Document for the Final Action Regarding Pretreatment Standards for the Industrial Laundries Categorical Point Source Category (Revised March 2000)*. EPA 821-R-00-006. March.

some data from comments submitted to the record for both the proposal and the Notice of Data Availability. These comments and their responses can be seen in EPA's Comment Response Document.[3]

[3]U.S. EPA. *Comment Response Document for the Final Action Regarding Pretreatment Standards for the Industrial Laundries Point Source Category*. Docket No. L08312.

SECTION THREE

INDUSTRY PROFILE

3.1 INTRODUCTION

The industrial laundries industry comprises establishments engaged in supplying laundered or dry-cleaned industrial work uniforms and related textiles, such as shop towels, mats, and dust mops, to industrial, commercial, and government users. EPA would have established pretreatment standards for those industrial laundry facilities discharging wastewater to publicly owned treatment works (POTWs); there are no known industrial laundries discharging directly into receiving waters.[1] Compliance with pretreatment standards might have required industrial launderers to purchase and install wastewater pretreatment systems, send certain items offsite for laundering, or contract for offsite wastewater treatment, and would have required them to monitor pollutant concentrations in wastewater. EPA, however, has decided not to promulgate pretreatment standards for the industrial laundries point source category. This EA presents the information EPA needed to make this decision.

This section presents a profile of the industrial laundries industry as defined by EPA for the purposes of the decisionmaking process. Only facilities with laundering discharges would have been regulated; administrative offices and depots established for the purposes of marketing, retailing, and/or distributing laundered items would have been out of the scope of the regulation and were not included in the Section 308 Survey. Laundries engaged in onsite laundering at industrial facilities also would not have been covered by pretreatment standards. The rationale for omitting these facilities was discussed in detail in the preamble to the proposed rule. Some of these laundries are already covered by effluent guidelines for other industry categories (e.g., pesticides). Moreover, data from the 1995 HHPs Screener Questionnaire indicate that facilities engaged in onsite laundering at hospitals, hotels, and prisons generally do not launder items

[1] Based on data from the 1993 Screener Questionnaire and 1993 Supplemental Screener Questionnaire.

for offsite customers. Further follow-up work indicates that those onsite laundries that do launder items from off site generally do not handle "industrial" items.[2]

The purpose of this profile is to provide a baseline description of the current activities, structure, and performance of the industrial laundries industry.[3] The industry's characteristics and market structure serve as foundations for developing the methodology used elsewhere in this EA to analyze the potential impacts associated with the regulatory options considered by EPA during the decisionmaking process. Information presented in this section is drawn, for the most part, from industry and government literature on industrial laundries and from the Section 308 Survey.

Section 3.2 provides an overview of the industrial laundries industry and the processes involved in industrial laundering. Section 3.3 summarizes the structure of the industrial laundries market, and Section 3.4 gives a more detailed breakdown of industry demographics and the facilities affected by the regulation. It also provides baseline descriptive and financial information related to the industry's ability to absorb potential regulatory costs.

3.2 OVERVIEW OF THE INDUSTRIAL LAUNDRIES INDUSTRY

3.2.1 Services Provided

The industrial laundries industry was established in the period during and immediately after World War II, when the growth of the industrial sector resulted in increasing interest in services geared toward providing clean work apparel, clean work materials, and a clean work environment. Over time, as the service sector of the economy expanded, industrial laundries also became involved in providing customers

[2] Anne Jones, ERG, 1997. "Analysis of hospitals, hotels, and prisons (HHPs) database." Memorandum to the Rulemaking Record. February 21.

[3] Although some of the information (i.e., Section 308 Survey data) presented here is now dated, the survey data are still the most complete and most representative data available on the industry. Here, EPA did not resurvey industries between proposing and finalizing the rule in order to minimize reporting burdens on the industry. Where appropriate, EPA indicates the potential for change in conditions in intervening years.

with uniforms and textile goods designed to promote safety, corporate identity, and company image. As a result, industrial laundry services are currently used by a variety of industrial, commercial, and government organizations.

Industrial laundries can be found throughout the United States because of the diversity of customers they service. Facilities tend, however, to be concentrated in metropolitan areas and the more populated states (California, Texas, New York, and Florida), where the service sector is relatively large, and in the heavily industrialized states (Ohio, Illinois, Michigan, Pennsylvania, and Indiana).[4]

Industrial laundries supply customers with water-washed uniforms and related work items through a complex distribution system. (Note that some items may be water washed in series with other processes such as dry cleaning or oil treatment.[5]) The launderer gathers items from customers for cleaning and returns these items after they have been laundered and, if necessary, repaired and/or pressed. The launderer might also personalize items for some customers. For the most part, industrial laundries own the goods they process and supply them to customers on a rental basis; however, some facilities also launder customer-owned uniforms and textiles, which the industry refers to as "Not Our Goods" (NOGs). Direct sales of products also can account for a small portion of industrial laundries' business. Thus, industrial laundries might be engaged in a variety of activities in addition to the actual cleaning of work garments and associated goods.

[4] U.S. EPA, 1989. *Preliminary Data Summary for Industrial Laundries*. Washington, DC: Office of Water Regulations and Standards. September.

[5] Establishments engaged in dry cleaning only or oil treatment only are not covered by the Final IL Standards.

3.2.1.1 The Needs of Different Customers: Functional Cleaning and Cleaning for Convenience

Industrial laundries have a wide variety of customers. From the industry's perspective, "just about any type of business is a potential customer."[6] Consistent with this, data from the most recent customer profile survey conducted by the Uniform and Textile Service Association (UTSA) indicates that no single industry sector dominates the industrial laundries customer base.[7] When customers are grouped according to SIC category, only automotive dealers and service stations (SIC 55) and companies involved in automotive repair, services, and parking (SIC 75) account for more than 10 percent of industrial laundries' customers (10.1 percent each).[8] Furthermore, the 15 largest segments of the industrial laundries customer base in 1995 (listed in Table 3-1) account for less than two-thirds of all industrial laundries' customers.[9] This pattern is similar to that observed in the 1993 customer profile report: automotive services, dealers, and service stations represented the largest customer groups, but, in general, businesses in customer category constituted only a small portion of the industry's overall customer base.[10]

Blue-collar businesses at which petroleum- and carbon-based substances are used (e.g., automobile repair shops, dealers, and gas stations) are the traditional purchasers of industrial laundry services. Uniforms and textiles (especially shop towels and mats) in such environments can become heavily soiled with oil, gasoline, and grease. Printers and publishers also represent a significant portion of the customer base for industrial laundries; towels used in the print shop can become contaminated with hazardous compounds, including paint, ink, and solvents. Other businesses using industrial laundries services include the metal fabrication and chemical industries. For all these customers, industrial laundries can offer an

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[6] 1996. "The super SICs." *Industrial Launderer*. October, pp. 53-54, 56.

[7] UTSA, 1996. *Customer Profile Analysis*. Arlington, VA: UTSA. The survey database included information on 3,739 randomly selected customer accounts from 22 UTSA member companies.

[8] *Ibid.*

[9] *Ibid.*

[10] Institute of Industrial Launderers (IIL), 1993, *Customer Profile Analysis: Identification of Sources of Uniform and Textile Service Industry Customers by Product by SIC Code*. Washington, DC: IIL. (Prior to November 1993, the UTSA was known as the IIL.

Table 3-1

The Top 15 Customer Industries for Industrial Launderers, for All Products, 1995

Major SIC Group	Title	% of Customer Base
55	Automotive Dealers & Service Stations	10.1%
75	Auto Repair, Services, and Parking	10.1%
58	Eating and Drinking Places	7.5%
54	Food Stores	5.3%
17	Special Trade Contractors	3.6%
50	Wholesale Trade -- Durable Goods	3.6%
35	Industrial Machinery and Equipment	3.3%
27	Printing and Publishing	3.1%
73	Business Services	2.7%
20	Food and Kindred Products	2.4%
80	Health Services	2.3%
34	Fabricated Metal Products	2.2%
82	Educational Services	2.1%
51	Wholesale Trade -- Nondurable Goods	2.1%
59	Miscellaneous Retail	2.0%
	Total, Top 15 Customer Categories	**62.4%**

Source: UTSA, 1996. Customer Profile Analysis, Table 2. Washington, DC: UTSA.

effective means of cleaning highly soiled items for reuse. The traditional blue-collar market still accounts for approximately 50 percent of garments rented.[11]

As the industrial laundries customer base broadened from purchasers desiring simple functionality to include purchasers concerned with appearance and corporate identity, the volume of moderately to lightly soiled items laundered by the industry also grew. Eating and drinking establishments, wholesale and retail trade businesses, and food stores use industrial laundries in part because uniforms serve as a means of cultivating a more distinct public image and encouraging employee identification with the larger organization. In addition, industrial laundry services offer a convenient means of handling garments without requiring either direct garment purchase programs in the workplace or worker maintenance of clothing.

3.2.1.2 Products

Uniform rentals account for the largest portion of industrial laundries' customer base and revenues; according to UTSA's 1996 customer profile analysis, nearly 60 percent of industrial laundries' customers rent uniforms (see Table 3-2).[12] Other products rented include mats, mops, shop and print towels, continuous roller towels, and linen. These products are often "add-ons" to uniform rentals, although many customers renting mops and linen do not rent uniforms.[13]

Table 3-3 indicates the percentage of industrial laundries laundering each category of rental textiles, based on responses to the Section 308 Survey. A detailed description of the major items rented and how they are used follows:

- *Uniforms.* Traditionally, uniform rentals were geared toward meeting the need for clean work clothes in blue-collar industries. As noted above, however, once the garment rental market expanded to include customers interested in improving corporate identity and image, in addition to maintaining the cleanliness of work apparel, the number of businesses

[11] UTSA, 1996. *Op. cit.*

[12] UTSA, 1996. *Op. cit.* (Table 1).

[13] IIL, 1993. *Op. cit.*

Table 3-2

Percentage of Total Customer Base Renting Each Type of Product, 1995

Product	Percentage of Customer Base*
Uniforms	58.6%
Mats	48.3%
Mops	18.6%
Shop Towels	33.2%
Continuous Roll Towels (CRTs)	11.2%
Table and Bed Linen	4.4%
Aprons and Bath Towels	12.9%
Not Our Goods (NOG) Items	2.5%
Other Products	17.5%

* Percentages do not sum to 100 because customers may rent more than one type of product.

Source: UTSA, 1996.
Customer Profile Analysis, Table 1.
Washington, DC: UTSA.

Table 3-3

Textiles Laundered by Industrial Laundries

Textile Type	% of Laundries Handling Textile Type
Industrial Garments	82%
Shop Towels and Printer Towels	78%
Floor Mats	94%
Mops, Dust Cloths, and Tool Covers	80%
Linen Supply Garments	54%
Flatwork/Fulldry	78%
Health Care Items	37%
Fender Covers	39%
Continuous Roll Towels	53%
Clean Room Garments	2%
Other	17%

Source: Section 308 Survey (based only on facilities for which there is sufficient information).

renting uniforms more for convenience than function increased. In 1993, the uniform rental market was nearly evenly split between industrial and nonindustrial customers.[14] The automotive sales and services industries account for a significant proportion of the industrial customer base, and, as such, some of the main contaminants found in uniform laundry wastewater are oil and grease (measured as n-hexane extractable material [HEM]) and total organic carbon (TOC).[15] Uniforms rented primarily for identity and image purposes tend to be less soiled and require less intensive laundering than those rented for functional purposes.

- *Mats*. Mats are used particularly in high soil areas, such as manufacturing plants or automobile repair shops, to prevent the spread of dirt. Mat rental is thus typically geared toward providing a clean work environment. The mat rental market has been expanding in low-soil areas. Mats are increasingly used for dust control and in special applications such as scrapers, wet area/anti-slip, antifatigue, and inclines. Reflecting this expansion, the mat rental market is growing eight percent a year.[16] In low-soil situations, however, mat rental from industrial launderers might not offer customers significant advantages over purchase. The type and quantity of soils found in mats vary based on the settings in which they are used; contaminants that can be found in mat wastewater include oil and grease (as HEM), biochemical oxygen demand (BOD_5), total suspended solids (TSS), metals such as aluminum and iron, and salt and sand.[17]

- *Mops.* Mops are designed to meet the need for a clean working environment by removing soils and controlling dust. Unlike other rental items, mops are generally not "add-ons" associated with uniform rentals; customers using industrial laundry services to obtain clean mops might not rent any other products. The soils in mops handled by industrial launderers reflect the soils present at the various customer sites. Pollutants found in relatively high concentrations in mop wastewater include TSS, oil and grease (measured as HEM), and metals such as aluminum and iron.[18]

- *Shop towels and printer towels/rags.* Industrial launderers process shop towels and printer towels/rags, also known as industrial wipers, to provide customers with clean work materials. Shop towels are used primarily by the industries that comprise the traditional industrial laundries customer base (i.e., auto repair shops, machine shops, printers, etc). The towels are highly absorbent and are designed to wipe oil, grease, paint and ink, and solvents off equipment. Because of the way in which shop and printer towels are used,

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[14] *Ibid.*

[15] See EPA's Final Development Document.

[16] Millunzi, Carolyn, 1997. "Mat stats reveal product potential." *Industrial Launderer.* September, p. 91.

[17] See EPA's Final Development Document.

[18] *Ibid.*

wastewaters from the towels have generally been found to contain higher pollutant loads than the wastewaters from all other items cleaned by industrial laundries.[19] Shop and printer towel wastewater generally has been found to contain high concentrations of BOD_5, oil and grease (measured as HEM), total petroleum hydrocarbons (TPH, measured as SGT-HEM), TOC, and TSS. Shop towels are also the primary source of hazardous pollutants found in industrial laundries' effluent; they often contain small amounts of volatile organic compounds (VOCs), semivolatile organics such as tetrachlorethene, ethylbenzene, 1,1,1-trichloroethane, and toluene, and toxic metals such as copper, lead, chromium, and zinc, among other pollutants.[20] Industrial launderers therefore generally require more water and chemicals to clean shop towels than to clean other items. As a result, and in anticipation of future environmental regulation, some laundries refuse to rent or clean shop towels, while others charge by weight for shop towel cleaning to encourage customers to perform some cleaning before the towels are picked up. In one case study, a print shop using a centrifuge to extract excess solvents from shop towels found that this not only reduced compliance problems for its launderer, but it also resulted in net savings for the shop by allowing for more reuse and recycling of solvents.[21] Section 308 Survey data indicates that only 1.4 percent of industrial laundries are exclusively devoted to shop towel cleaning. There may, however, be an opportunity for industrial launderers to establish a market niche with little competition by cleaning shop towels. For example, Brent Industries, which devotes about 30 percent of its business to dry cleaning followed by water washing of shop and printer towels, has grown in the last 5 years from a single facility to three facilities and three depots, with plans for additional expansion.[22] EPA also found facilities laundering primarily shop and printer towels during site visits to industrial laundries conducted as part of the regulatory process.[23]

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[19] See EPA's Final Development Document, Chapter 5.

[20] See EPA's Final Development Document.

[21] 1995. "Printer's use of friendlier solvents pays off for all." *Industrial Launderer*. September, pp. 51-52.

[22] 1997. "Tackling the toughest textiles." *Industrial Launderer*. January, pp. 27-28, 71.

[23] *Site Visit Report*, DCN L03977; confidential business information (CBI) material in the Rulemaking Record.

3.2.2 Industry Processes

3.2.2.1 Laundering Techniques

The three primary cleaning techniques employed by industrial launderers are water washing, dry cleaning, and dual-phase laundering. Water washing is the most commonly used process; approximately 97 percent of industrially laundered items are water washed.[24] Dry cleaning, which uses solvents to dissolve soils at low temperatures, accounts for less than 1 percent of items laundered, as does dual-phase cleaning, which uses solvents and water in series on items with both water-soluble and organic solvent-soluble soils.[25] Other processes, such as oil treatment of dust mops, represent a very small portion of industrial laundries' business as well.

Water washing and dual-phase laundering are the most relevant processes of concern for a pretreatment standard, because both produce wastewater. Launderers exclusively engaged in oil treatment of mops (which generates no wastewater) or dry cleaning (which generates no wastewater) would not have been covered by pretreatment standards as defined during EPA's decisionmaking process.

EPA's Final Development Document provides a detailed description of industrial laundering processes. In general, when items to be cleaned arrive at the industrial laundering facility, they are first sorted on the basis of fabric type, color, type of garment, and soil constituents. Stains that could be set by washing are pretreated, which may involve soaking and/or application of acids, bleaches, or solvents directly to the stains. There are a variety of industrial washing machines, but regardless of the type of washer used, all water washing by industrial laundries involves the following basic steps:

- *Flush*. Soiled items are subjected to an initial rinsing, or flush, which removes loosely attached soils.
- *Break*. Alkaline chemicals are added to wash waters to swell the fibers in the cloth and facilitate soil removal. Detergents can also be added at this time.

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[24] See EPA's Final Development Document.

[25] See EPA's Final Development Document, Table 4-5.

- *Wash cycle(s)*. During the wash cycle, chemicals and detergents are added to wash waters, and the items are agitated. The amounts and types of chemicals or detergents added depend on the soils being treated. Wash cycles can be followed by the addition of bleaching, blueing, or brightening chemicals.

- *Rinse*. Between wash cycles and following the last wash cycle, items are rinsed. Chemicals can be added during this process to neutralize any remaining bleach (anti-chlor) and to reduce water pH to prevent yellowing of garments (sour). Other additives that might be applied at this time are starch, oil treatment chemicals, water conditioners, dyes, stain treatment chemicals, and bactericides.

- *Extraction*. During the extraction process, excess rinse water is removed from the items laundered. This water typically contains dissolved and suspended soils.

Cleaned items are then dried, pressed, inspected for wear, folded, and delivered back to customers.

3.2.2.2 Labor Intensity

Although much of the actual cleaning process is mechanized, industrial laundering is still relatively labor intensive. Industrial laundries require large numbers of comparatively unskilled in-plant production workers, in addition to managers, sales representatives, and delivery truck drivers. These in-plant workers maintain and operate equipment controls for washers and dryers. Additional labor is required for sorting and routing items to the appropriate customers. However, many in the industry are adopting automated sorting systems. Such systems are now installed in all stages of garment handling, from hang-up to load-out on route vehicles, including database management software.[26] At the same time, efficient garment identification for such systems is available with "on the fly" scanning using code information extraction (CIX) software.[27]

Because labor is relatively inexpensive in this industry, however, automation may make sense mainly for facilities operated by large firms that need to, for example, coordinate routing between processing facilities and depots. In addition, automation may work for certain small- to medium-sized

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[26] Hutterly, John, 1997. "Why automated sorting is ready for your plant today." *Industrial Launderer*. January, p. 31.

[27] 1997. "The escort/carrier debate." *Industrial Launderer*. April, p. 71.

facilities that are able to eliminate a second- or third-shift crew by upgrading their equipment; other larger facilities or facilities operating only a single-shift crew generally might achieve significant savings simply by utilizing existing resources more efficiently.[28] Thus, historically, equipment manufacturers have had few incentives to fund research and development in the area of laundries automation, and industrial laundries have been slow to adopt technological advancements relative to more "high tech" industries. In recent years, however, industrial launderers have shown more interest in purchasing new technology to improve quality control and increase capacity for growth, particularly as older machinery wears out.[29,30] It is, nevertheless, likely that labor will continue to be a significant input in the industrial laundering process for the foreseeable future.

3.2.3 Classification of Facilities Performing Industrial Laundering

3.2.3.1 Census Classifications

The U.S. Department of Commerce divides the laundering industry into several subcategories, each corresponding to a different four-digit SIC code. These classifications can be useful in interpreting Department of Commerce data on industry performance, employment, consumption, etc.

Although there are facilities meeting EPA's definition of an industrial laundry in almost all the SIC subcategories of the laundering industry, four SIC codes are particularly relevant for the purposes of discussion here.[31] These are SIC 7218, Industrial Launderers; SIC 7213, Linen Supply; SIC 7211, Power

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[28] Murphy, Ed, 1997. "How to avoid the high cost of plant expansion." *Industrial Launderer*. February, pp. 47-48, 50.

[29] 1996. "Association poised to meet industry's operational challenges." *Industrial Launderer*. December, pp. 13-14, 16.

[30] Hobson, David F., 1997. "Industry trend watch." *Industrial Launderer*. January, p. 72.

[31] SIC codes translate now to a new numbering system called the North American Industry Classification System (NAICS). See Section Two of this EA for the NAICS codes relevant for the industrial laundries industry.

Launderers, Family and Commercial; and SIC 7216, Dry-cleaning Plants, Except Rug Cleaning (see Section Two for definitions).

Facilities engaged in industrial laundering tend to be classified into one of these groups. SIC codes, however, do not provide an exact means of distinguishing between industrial and nonindustrial laundries. Many firms assigned a primary SIC code of 7211, 7213, or 7216 have a secondary (or even tertiary) code of 7218, and vice versa. Consequently, it would be too limiting to consider only laundries with a primary SIC code of 7218 to be industrial laundries. Furthermore, each SIC category can include independent sales, administrative, and distribution centers, as well as facilities actually involved in laundering; not all the facilities in SIC 7218 are actually laundering textiles. SIC groupings therefore are not used in this EA as a baseline for assessing possible impacts of regulatory options. Pretreatment standards would have specifically covered launderers involved in water washing of industrial textile items (although these same launderers might also have in-house sales, administrative, and distribution capabilities) and would thus have pertained to a subset of the facilities classified in several SIC subcategories, primarily SICs 7211, 7213, 7216, and 7218.

3.2.3.2 Classification of Industrial Laundries for Regulatory Purposes

Given that facilities engaged in industrial laundering can be found in all of the various SIC subcategories of the laundering industry, EPA also does not use SIC codes to determine which laundries would have been covered by pretreatment standards. The breakdown of primary and secondary SIC codes for the facilities meeting EPA's definition of an industrial laundry for purposes of the regulatory decision making process is given in Table 3-4. Data in the table are based on the Section 308 Survey. As the table indicates, although many of the facilities in this analysis are classified by the U.S. Department of Commerce as primarily industrial laundries (SIC 7218), the number of facilities that are classified primarily as linen suppliers (SIC 7213), power launderers (SIC 7211), or dry-cleaning plants (SIC 7216), but that also perform water-washing of industrial textiles, is also substantial.

As noted in the preamble to the proposed rule, industrial laundries facilities are facilities that launder industrial textile items from offsite as a business activity (i.e., that launder industrial textile items

Table 3-4

Primary and Secondary SIC Codes Reported by Industrial Laundries

PRIMARY SIC CODES	Number of Facilities	SECONDARY SIC CODES*										
		2269 Finishers of Textiles**	**5047** Medical, Dental, and Hospital Equipment and Supplies	**5085** Industrial Supplies	**5136** Men's & Boys' Clothing and Furnishings	**72** Personal Services	**7211** Power Laundries, Family and Commercial	**7213** Linen Supply	**7215** Coin-Operated Laundries & Drycleaning	**7216** Drycleaning Plants, Except Rug Cleaning	**7218** Industrial Laundries	**7389** Business Services**
72-Personal Services	1	0	0	0	0	N.A.	0	0	0	0	1	0
721-Laundry, Cleaning, and Garment Services	1	0	0	0	0	0	0	0	0	0	0	0
7211-Power Laundries, Family and Commercial	138	0	0	0	0	0	N.A.	61	0	6	61	0
7213-Linen Supply	615	0	0	0	0	0	119	N.A.	2	0	177	0
7216-Drycleaning Plants, Except Rug Cleaning	42	0	0	0	0	0	22	0	0	N.A.	20	0
7218-Industrial Launderers	926	1	7	1	1	13	11	295	0	1	N.A.	11
7219-Laundry and Garment Service**	1	0	0	0	0	0	0	0	0	0	0	0
7359-Equipment Rental and Leasing**	22	0	0	0	0	0	0	22	0	0	0	0
8980***	1	0	0	0	0	0	0	1	0	0	0	0
Totals	**1,747**	1	7	1	1	13	151	379	2	7	259	11

* Secondary SIC code included only for those facilities reporting this information. Number of facilities reporting secondary SIC codes does not equal number of facilities reporting primary SIC codes.
** Not elsewhere classified.
*** SIC code as reported by the surveyed facility. Not an actual SIC code.

Source: Section 308 Survey.

for other business entities for a fee or through a cooperative arrangement). This definition includes textile rental companies that perform laundering operations; the industrial-laundered textile items may be owned by either the industrial laundry facility or the offsite customer. Laundering means washing with water, including water washing following dry cleaning (dual-phase laundering). (The rule would not have applied to laundering exclusively through dry cleaning.) For facilities covered under the industrial laundry definition, wastewater from all water washing operations would have been covered, including the washing of linen items as long as these items do not constitute 100 percent of the items washed. Industrial textile items include, but are not limited to, shop towels, printer towels/rags, furniture towels, mops, mats, rugs, tool covers, fender covers, dust-control items, gloves, buffing pads, absorbents, uniforms, filters, and clean room garments.

3.2.3.3 Launderers Not Covered by the Effluent Guideline

Certain launderers specifically do not meet the definition of an industrial laundry for the purposes of EPA's regulatory decisionmaking process. As discussed in the preamble to the proposed rule, discharges from onsite laundering at industrial facilities; laundering of industrial textile items originating from the same business entity; and facilities that exclusively launder linen items,[32] denim prewash items, new items (i.e., items directly from textile manufacturers, not yet used for their intended purpose), any other items that come from hospitals hotels or restaurants, or any combination of these items were not to be covered by the rule.[33] In addition, the rule would not have applied to the discharges from oil-only treatment of mops.

[32] EPA defines linen items as: sheets, pillowcases, blankets, bath towels, washcloths, hospital gowns and robes, tablecloths, napkins, tableskirts, kitchen textile items, continuous roll towels, laboratory coats, household laundry (such as clothes, but not industrial uniforms), executive wear, mattress pads, incontinence pads, and diapers. This list is meant to be inclusive. See the preamble to the proposed rule for additional discussion of regulated entities.

[33] EPA added clean room items to this list later in the decisionmaking process.

3.3 THE STRUCTURE OF THE INDUSTRIAL LAUNDRIES INDUSTRY

3.3.1 Numbers and Types of Facilities and Firms

Based on Section 308 Survey data, EPA estimates that 1,742[34] facilities in the United States meet its definition of an industrial laundry. These facilities all engage in laundering of some industrial uniforms or textiles, although this is not necessarily their only or primary activity. As discussed above, the Section 308 Survey is the main source of industry information used in this EA; data based on SIC classifications generally do not coincide with the firms and facilities involved in industrial laundering activities as defined by EPA.

Given the nature of the work performed by industrial launderers, many industrial laundries are small, independently owned, single-facility firms that rent and launder textiles for customers in a specific locality or region. The local to regional focus of the industry stems, in part, from the fact that, to provide a service that involves delivering and retrieving items directly to and from the customer, the distribution area serviced by the typical industrial laundry is not very large. On average, according to Section 308 Survey data, industrial laundries service customers within 125 miles. Some "niche" laundries, which handle very specific types of items or soils (e.g., highly contaminated gloves or shop towels), have larger service areas. For example, Brent Industries, a company that rents and launders gloves and shop towels both to laundries and directly to industrial customers, provides services in 24 states.[35]

In recent years, the number of larger, multifacility industrial laundry firms has increased, in part due to changes in tax regulations. Much of this growth has occurred through industry consolidation, or expansion by acquisition, rather than through independent development of multiple plants by a single owner

[34] The number of in-scope facilities at proposal was 1,747. The difference results from EPA's decision to exclude clean room items from the scope of a rule following proposal.

[35] 1997. "Tackling the toughest textiles." *Industrial Launderer*. January, pp. 27-28, 71.

or parent firm.[36,37] After the economy rebounded from the recession of the early 1990s and the business environment improved, the rate of consolidation slowed somewhat, reflecting an apparent decline in the number of small facility owners interested in selling their companies[38] but not necessarily a decline in large firm owners' interest in expansion. Consolidation is still a factor in the current healthy economy, and it is not just large facilities acquiring small ones, as evidenced by the recent announcement that Cintas is acquiring Unitog, a $275 million firm.[39] This merger trend is in line with consolidation trends throughout the U.S. and global economies in the 1990s.

Larger, multifacility firms typically resemble their smaller, single-facility counterparts in that they operate in local or regional markets, although a few may have national accounts as well.[40,41] In competing for customers, it is generally an advantage for an industrial launderer to have a local presence and knowledge of the local business environment. As mentioned above, industrial laundries are also geographically limited because customers must, for the most part, be within easy driving distance. Larger firms may, however, have larger service areas than smaller firms because they are often more able to make use of depots for delivery purposes.

On the facility level, few significant economies of scale in industrial laundering are apparent;[42] production efficiency is more closely related to the age of a facility's technology than to size. According to

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[36] Paris, Alexander, Jr., 1994. *Equity Research: Uniform Services.* Barrington, IL: Barrington Research Associates. November 22.

[37] IIL, 1989. *Op. cit.*

[38] 1996. "Investment analyst sees healthy '96 for uniform rental with internal growth and acquisitions." *Industrial Launderer*. January, p. 12.

[39] http://www.utsa.com/ceocenter/cintas-unitogrelease.htm

[40] Paris, Alexander, Jr. 1994. *Op. cit.*

[41] 1996. "Association poised to meet industry's operational challenges." *Industrial Launderer*. *Op. cit.*

[42] The relative rarity of facilities processing less than 1 million pounds of laundry suggest some economy of scale among smaller facility sizes, but the lack of many very large facilities indicates any facility-level economies of scale tend not to continue beyond a certain point. Thus in the range of 3 million to 7 million pounds of total laundry processed, laundries might achieve the greatest facility-level efficiency.

some industry sources, efforts at consolidation are aimed more at purchasing customer accounts than achieving cost savings. Generally, according to these same sources, there is no reduction in labor needs at consolidated facilities,[43] although others have noted that acquired facilities are sometimes converted to depots with up to three-quarters of employment lost under such circumstances.[44] Nevertheless, greater operating efficiencies are likely to be present at the firm level since larger firms might experience some advantages with their greater access to capital markets and from being able to invest more heavily in marketing, technological improvements, and the development of professional management staff.

Reflecting the fact that individual industrial laundry facilities can have very different ownership structures, the Section 308 Survey classified facilities into five categories:

- A—Facilities having an owner company that is subsumed under another company or legal entity that, in turn, is owned by an ultimate parent company.
- B—Facilities having an owner company that is subsumed under an ultimate parent company.
- C—Facilities that are also owner companies (and maintain their own financial records), but that are subsumed under an ultimate parent company.
- D—Facilities having an owner company.
- E—Independent facilities (where the facility maintains its own financial records and is also the owner company).

For purposes of some of the analyses discussed in this EA, facilities are examined in two groups (A, B, and D combined, and C and E combined). Generally, ABD firms are analyzed at the owner-company level, as multifacility firms, and CE firms are analyzed as single-facility firms.[45]

[43] Knight, Lynn, ERG, 1993. "Interview and site visit with Brian Keegan, Unifirst." June 10. CBI material in the Rulemaking Record.

[44] Comment Response Document, PECON-2D, Tracking Nos. 1491, 1494, and 1495.

[45] See the Section 308 Survey for more information on firm level classification.

Table 3-5 provides a breakdown of facilities and firms by chain of ownership. The estimated 1,742 facilities correspond to 903 firms. The 912 ABD facilities are associated with 73 multifacility firms. The 830 CE facilities are single-facility firms (Section 308 Survey results).

3.3.2 The Market for Industrial Laundering Services

The industrial laundries industry operates in many small to medium-size markets, not one national market, reflecting the local to regional focus of the businesses discussed above. Although some localities are dominated by a single firm or a handful of firms, the typical market for industrial laundering services appears to be quite competitive. The general characteristics of the industry also are consistent with what might be expected in a competitive situation. Nothing suggests that individual laundries are engaging in monopolistic or oligopolistic pricing strategies (except, possibly, in certain isolated markets); furthermore, industry sources describe competition for customers as strong, particularly with regard to price.[46] Most of this competition centers around existing accounts, although the industry trade associations are encouraging industrial launderers to expand into new markets.

3.3.2.1 Competitiveness in the Industrial Laundries Market

The large number of firms engaged in industrial laundering and the relative ease with which new industrial laundries can be established makes it difficult for any one firm to dominate the market in which it operates. Thus, firms tend to be price takers, rather than price setters. This is particularly true in more densely populated urban and suburban areas, although even in more rural markets it is likely that new industrial laundries will be established to compete with existing facilities if there are profits to be made. The fact that there are generally several facilities owned by several firms in any market[47] seems to support this conclusion.

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[46] 1996. "Association poised to meet industry's operational challenges." *Industrial Launderer*. *Op. cit.*

[47] IIL, 1989. *Op. cit.*

Table 3-5

Number of Firms and Facilities by Chain of Ownership

Chain of Ownership	Total Number*
Facilities	
Type A	92
Type B	335
Type D	485
Total A\B\D	**912**
Type C	129
Type E	701
Total C\E	**830**
Total Facilities	**1,742**
Firms	
Multifacility firms	73
Single-Facility Firms	830
Total Firms	**903**

* Weighted

Source: Section 308 Survey.

The initial capital investments required to establish a new industrial laundry are relatively low, and there are no natural barriers to entering the industrial laundries market. A typical small, single-facility firm can currently be established with a relatively small capital investment and relatively unskilled labor.[48] Furthermore, facilities in related industries (i.e., engaged in other types of laundering) can be readily converted to industrial laundries because they possess some (if not all) of the necessary equipment, as well as general knowledge of the necessary skills. As their customer base and revenues have declined, for example, linen suppliers (SIC 7213) have begun offering industrial laundry products and supplies.[49]

The increase in the number of large, multifacility firms in the industry (described in Section 3.3.1) does not appear to have had a significant impact on the overall competitive structure of the industry, although some local markets are more affected than others. Concentration in the industry is not extreme, but some concentration is evident. The top five firms control about 55 percent of the market,[50] and this percentage might have grown with recent acquisitions (e.g., Cintas' acquisition of Unitog). In theory, large multifacility operations have the potential to gain a competitive edge over independent launderers because they have more resources and greater access to capital markets and thus might be able to use price pressure to increase market share. In addition, they could employ full-time professional marketing experts to try to attract customers, and they might be more able to withstand the shocks of changing market conditions and increased costs of adding environmental treatment technology. Multifacility firms still have to operate in local or regional markets, however, and typically have no advantages over small, single-facility firms with respect to knowing and being recognized in these markets. (In fact, a multifacility firm establishing a laundry in a new locality can even be at a slight disadvantage, particularly if it is building a customer base from scratch, rather than acquiring an existing facility with current accounts.) Thus, at this time, no evidence supports the conclusion that multifacility firms enjoy sufficient advantages or are large enough

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[48] According to Section 308 Survey data, single-facility firms that began operation during the survey timeframe (1991, 1992, and 1993) were estimated to have started up with a median capital investment of approximately $81,000 (measured as total assets). The range of capital investments reported by these facilities was $58,000 to $1.8 million per facility. Thus it appears that most laundry facilities can be established with a capital investment of substantially less than $1 million.

[49] IIL, 1989. *Op. cit.*

[50] 1997. "Don't count out more public company acquisitions." *Industrial Launderer*. August, p. 29.

and few enough to dominate the industrial laundries market, on the aggregate level, through oligopolistic behavior.

Evidence of the lack of differentiation among industrial launderers can be found in the attitudes and behaviors of customers in selecting a rental uniform supplier. According to a 1996 UTSA study of how customers choose a uniform rental company, customers "do not regard the selection of a supplier as a high-risk decision," apparently because they perceive no significant differences among suppliers, particularly in terms of price.[51] Such attitudes are characteristic for customers in a competitive market. Increasingly, individual firms and facilities are working to improve quality and customer service as a means of differentiating themselves from their competitors. Strong customer service is key to remaining competitive. Success in a service industry like the uniform rental industry is largely a function of fulfilling the customer's needs; therefore, intense attention to customer service is necessary to retain customers.[52] In addition, some industrial laundries have actively begun marketing add-on items such as continuous roll towels, air fresheners, and direct-sale mats to attract customers because they believe customers want the convenience of buying as much as possible from a single source.[53]

The observed behavior of individual firms in the industrial laundries industry also seems to confirm that industrial laundries markets are, on the whole, competitive. Profit margins are generally small (see Section 3.4.3), and there seem to be few opportunities for firms to earn and sustain large economic profits. This pattern is consistent with theories of perfect competition, which predict that excessive profits in an industry entice new firms to enter the market and therefore will be quickly competed away. In most of the markets serviced by industrial laundries, profits are sufficient to keep firms from exiting, but are not attractive enough to encourage many new firms to enter. Small profit margins could also be a reflection of "predatory pricing" strategies, but, in this instance, profits are relatively small at nearly all firms and, as

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[51] Levite, Caryn Adair, 1996. "Getting there first is half the sale." *Industrial Launderer*. August, p. 30.

[52] Johnson, Mark W., and Lintereur, Jacob J., 1998. "The Uniform Rental Industry." Cleary Gull Reiland & McDevitt Inc. Winter, p. 6.

[53] Koepper, Ken, 1997. "1997: The year of the add-ons? Part 1." *Industrial Launderer*. January, pp. 21-22, 24. Also, Koepper, Ken, 1997. "1997: The year of the add-ons? Part 2." *Industrial Launderer*. February, pp. 16-18.

noted above, few opportunities exist for even multifacility firms to substantially or quickly reduce costs per unit laundered relative to others in the industry. Industry experts note that the primary means by which firms can increase profits and remain competitive is to focus on improving productivity, service, and quality.[54,55]

3.3.2.2 Substitutes for Industrial Laundering

Although there are services and products that can be substituted for industrial laundering, and substitutes are of significant concern to the industry, substitutes might not currently pose the level of competitive threat to the industrial laundries industry that the industry perceives. For example, customers who rent uniforms could purchase garments outright and either establish onsite laundries or require employees to maintain their own garments. Onsite laundries often are not as efficient as industrial laundries, however, and individual workers, particularly those exposed to heavy-soil environments, might not have the equipment and chemicals needed to clean many stains at home.[56] Similarly, customers could purchase disposable shop towels and mops, but industrial laundries' products tend to be less costly, more durable, and more absorbent. In fact, for the printing industry, there are currently no real disposable alternatives to the reusable wiper towel; no disposables meet the industry's need for wipers that are both lint-free and highly absorbent.[57,58]

It is possible that disposables, particularly disposable shop towels (also known as "wipers"), might prove to be a competitive threat in the future, and, as such, they are regarded with concern by many

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[54] 1996. "Association poised to meet industry's operational challenges." *Industrial Launderer*. *Op. cit.*

[55] 1995. "Strategic analysis of the textile rental industry: 1995." *Textile Rental. Op. cit.*

[56] U.S. EPA. 1989. *Preliminary Data Summary for Industrial Laundries. Op. cit.*

[57] 1997. "Wiper market watch: The view from EPA." *Industrial Launderer*. February, pp. 61-63.

[58]Comment Response Document, PECON-7, Tracking No. 1552.

industrial launderers.[59] To date, however, disposable shop towels have not been able to gain a significant foothold in key markets because some states require that disposable textiles contaminated with hazardous soils be treated as hazardous wastes. The disposable industry argues that it is they who face a competitive disadvantage and who are struggling to gain market share, not the industrial laundries, although the industrial laundry industry argues otherwise.[60] However, the disposables industry does not believe a rule would have significantly affected demand for disposables.[61] As of the date of this report, EPA's current RCRA policy relies on EPA regions and states to determine how best to regulate solvent-contaminated reusable shop towels.[62] Environmental regulations regarding solid waste reduction also increase the cost of using disposables because this cost includes not only the cost of the textile itself but also the cost of getting rid of it once it is soiled. At this time, therefore, few good substitutes for industrial laundering of shop towels exist for many applications. In fact, the printers' trade association expressed dismay that printers would be "forced" to rely on disposables, clearly reflecting their opinion that reusable shop towels are not a suitable substitute.[63] (See Section Eight of this EA for a discussion of the potential for impacts of regulatory options considered by EPA on price and thus on substitutability.)

EPA also has examined whether increased costs as a result of environmental regulation would create incentives for customers to establish onsite laundries. To establish onsite laundries, customers would have to purchase the equipment needed for processes such as textile cleaning, drying, sorting, and pressing. Companies would typically make such capital investments only if faced with large incremental increases in the cost (price) of industrial laundering. See Section Eight for a more detailed discussion of this subject.

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[59] Dunlap, David D., and Mary Anne Dolbeare, 1996. "Wiper marketing challenges mount." *Industrial Launderer*. December, pp. 25-26, 30.

[60] Comment Response Document, PECON-7, Tracking No. 1555 and PECON-7, Tracking No. 1531.

[61] Comment Response Document, PECON-7, Tracking No.1531.

[62] EPA's Office of Solid Waste, is still investigating the possibility of regulating both disposable and reusable shop towels under one rule.

[63] Comment Response Document, PECON-7, Tracking No. 1552.

Nevertheless, major changes in laundering costs or in regulations regarding the treatment and handling of hazardous substances on cloth and disposable wipers might have implications for whether disposable products will be competitive substitutes for industrial laundering services in the future.[64] An industry study of the industrial wiper market[65] found that cloth shop towels are more economical than paper wipers, except for extremely dirty tasks requiring only one paper wiper. For cleaner tasks, quality cloth towels can be used multiple times before laundering and can be laundered up to 30 times before being disposed of.[66] Thus, changes in the price of industrial laundering could reduce the economic advantages of using cloth shop towels instead of paper in high-soil situations, but only if the price of using reusable shop towels increases substantially.

3.3.2.3 Customers and the Demand for Industrial Laundering Services

As discussed earlier, industrial laundries meet customers' needs for clean work apparel, clean work materials, and clean work environments. In other words, industrial laundering services are intermediate goods, or inputs in the production of final goods or services. Although there certainly is variation among industrial laundries' customers, the cost of laundering is most likely small relative to the cost of other inputs. See Section Eight of this EA for a detailed discussion of operating costs for major industrial laundry customers.

The *industry* demand curve for industrial laundering is downward sloping even though individual *firms* perceive an elastic demand curve (in a competitive industry each firm acts as a price taker). The industry demand curve is downward sloping as indicated by evidence provided by industry in comments. According to industry, prices for industrial laundry services have been falling. Prices are falling, at least in

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[64] Hobson, David F, 1996. "Wipers continue to be UTSA focus." *Industrial Launderer*. October, p. 114.

[65] Mullen, Jocelyn, and Carl Lehrburger, 1991. *A Solid Waste And Laundering Assessment of Selected Reusable and Disposable Products*. Report to the Textile Rental Services Association of America, Hallendale, FL, and the Institute of Industrial Launderers, Washington, DC.

[66] Koepper, Ken, 1997. "Blue ridge shop towels American style." *Industrial Launderer*. November, p. 12.

part, due to falling costs of production driven by increased productivity. Despite these declines in price, revenues have been increasing at greater than the increase in gross domestic product (GDP). This scenario (i.e., falling costs and falling prices with rising revenues) cannot occur without a downward sloping demand curve. If industry can pass through cost savings, then it can pass through cost increases. Appendix A provides a more detailed description of the demand for industrial laundering, as well as calculations of elasticity based on Section 308 Survey data and historical output and price data. As Appendix A shows, demand, with an elasticity of -0.593, is estimated to be somewhat inelastic.

3.3.3 Growth and the Industry's Trajectory

Since the 1970s and through the early 1990s, revenue growth in the industry has been comfortable, but not outstanding, slightly outpacing GNP.[67,68] Industry sources and investment analysts generally have described the industrial laundries industry as "healthy."[69,70,71] On average, industry revenue growth has exceeded inflation through the mid-1990s, and most launderers have received a small but "comfortable" profit level in this timeframe.[72] Between 1982 and 1992, for example, revenues for SIC 721 (Laundry, Cleaning, and Shoe Repair), which encompasses almost all industrial laundering facilities as well as linen suppliers and dry cleaners increased at an average rate of 4.1 percent per year (adjusted for inflation). Revenue data from the Section 308 Survey is consistent with this pattern; revenue for the estimated 1,742 facilities engaged in industrial laundering activities grew an average real rate of 4.2 percent per year between 1991 and 1993. Such growth reflects the influence of a variety of factors, including the expansion of existing customer accounts, increased efforts at marketing and the broadening of the customer base in nontraditional markets, gains in productivity, and the adoption of new technology. At the same time,

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[67] 1994. "Strategic analysis of the textile rental industry: 1995." *Textile Rental*. October, pp. 26-28, 30, 32, 34, 36, 40, 42, 44, 46-47.

[68] IIL, 1989. *Op. cit.*

[69] Hobson, David F., 1996. "Wipers continue to be UTSA focus." *Industrial Launderer*. *Op. cit.*

[70] Paris, Alexander, Jr, 1994. *Op. cit.*

[71] 1996. "Investment analyst sees healthy '96 for uniform rental with internal growth and acquisitions." *Industrial Launderer. Op. cit*.

[72] Hobson, David F., 1996. "Wipers continue to be UTSA focus." *Industrial Launderer*. *Op. cit.*

industrial laundries have reduced production costs by adopting techniques for enhanced labor productivity, improving the efficiency of water and energy use, and extending the life of rental uniforms and linens.[73]

More recently, growth is expected to substantially outpace GDP. According to an October 1997 survey by TRSA, textile rental sales increased a robust 12.7% in 1996. Industry analysts estimate that the uniform rental market is growing twice as fast as GDP, implying sustainable growth of 6-8 percent annually over the next 3 to 5 years.[74] Given this information and given the overall strength of the economy over the intervening years since the Section 308 Survey was undertaken, EPA believes that the financial health of the industry has improved since 1993.

Since the size of the customer base and the resulting amount of textiles processed factor heavily into the profitability of industrial laundries, the future growth of the industrial laundries industry depends largely on the growth of current and potential customer industries. Because of the wide variety of customers serviced by industrial launderers, no one class of customers serves as the bellwether for the industrial laundries industry. There were some earlier signs that suggested that the rate of growth in the industry might be slowing somewhat in the mid- to late 1990s. The rate of job growth among all industries nationwide slowed to approximately 1.5 percent in the early to mid-1990s (in comparison to the 2.0 to 2.5 percent growth seen during the "boom years" of the previous decade[75]), and garment rental in the heavy soil industries had declined by 1996.[76] More recent trends, however, point to growth potential even in the heavy soil industries in the coming years. One industry analyst points to one of the industrial laundries' important customer bases—automobile dealers and service stations. This industry is projected to grow substantially during the next 5 years, leading to a growing market for industrial laundries services. This source further hints at other customer industries that are growing even faster.[77]

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[73] Comment Response Document, PECON-9B, Tracking Nos. 1584 and 1585.

[74] 1998. "The Uniform Rental Industry." Cleary Gull Reiland & McDevitt, Inc. Winter, p.2

[75] 1996. "Regional trend analysis shows pockets of potential." *Industrial Launderer*. *Op. cit.*

[76] IIL, 1989. *Op. cit.*

[77] Millunzi, Carolyn. 1998. "Trends and markets for your maximum growth." *Industrial Launderer*. May, p. 61.

Furthermore, aggressive marketing to the light-soil service and retail businesses have offset some of the declines in the heavy-soil market to date. Data from the Department of Commerce, moreover, suggest that job growth in many of the primary customer industries for industrial laundering — particularly the services industries — is likely to exceed average job growth nationwide (see Table 3-6). Job growth serves as an indicator of the health of the customer industry and represents a possible opportunity for increased sales of uniforms and other products.

In general, industry analysts note that the potential market for industrial laundries' services is several times greater than the current market.[78,79,80] The growth of the service economy, for example, offers opportunities for industrial launderers to further develop the image- and identity-oriented side of their businesses. In fact, laundries that adopt formal door-to-door sales strategies, as opposed to relying on an ad hoc sales and marketing staff, find their expansion limited more by internal resource constraints than by an inability to attract customers.[81] Industrial launderers also can expand their businesses by pursuing rental contracts with the large number of employers who currently maintain onsite laundries or who require employees to clean their own work uniforms.[82] Additional market areas beyond the traditional laundry services are being pursued as well. For example, first aid supplies are now being offered by some industrial laundries[83] in addition to add-on products such as jeans, continuous roll towels, liquid hand soap, and air fresheners.

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[78] Paris, Alexander, Jr., 1994. *Op. cit.*

[79] 1996. "Association poised to meet industry's operational challenge." *Industrial Launderer. Op. cit.*

[80] 1996. "IL interview: Bob Vieno." *Industrial Launderer.* September, pp. 41-42, 46.

[81] *Ibid.*

[82] Paris, Alexander, Jr., 1994. *Op. cit.*

[83] 1999. "First Aid: Step one in rebuilding your business." *Industrial Laundries*, January, pp. 15-21.

Table 3-6

Actual 1994 Employment and Projected 2005 Employment in the Top Customer Industries For Industrial Landerers in 1995*

(in thousands)

Major SIC Group	Title	Employment (000)		Percent Change
		1994**	2005***	
55	Automotive Dealers & Service Stations	2,153	2,252	5%
75	Auto Repair, Services, and Parking	971	1,345	39%
58	Eating and Drinking Places	7,069	8,089	14%
54	Food Stores	3,289	3,930	19%
17	Special Trade Contractors	3,073	3,437	12%
50, 51	Wholesale Trade -- Durable and Nondurable Goods	6,140	6,559	7%
35	Industrial Machinery and Equipment	1,985	1,769	-11%
27	Printing and Publishing	1,542	1,627	6%
73	Business Services	6,239	10,032	61%
20	Food and Kindred Products	1,680	1,696	1%
80	Health Services	10,082	13,165	31%
34	Fabricated Metal Products	1,387	1,181	-15%
82	Educational Services	10,187	12,400	22%
59	Miscellaneous Retail	2,560	3,012	18%

* Data reflects all employees.
** Employment data from 1994 presented because 1994 data was used to project 2005 employment.
*** Projected employment in 2005 based on moderate growth assumptions.

Source: U.S. Department of Labor, 1997. "Employment by industry and occupation, 1994 and projected 2005 alternatives. Total, all occupations." Bureau of Labor Statistics (BLS), Office of Employment Projections

3.4 INDUSTRY DEMOGRAPHICS

3.4.1 All Industrial Laundry Facilities

The 1,742 facilities engaged in industrial laundering in the United States vary significantly with respect to the types and amount of items they clean, the amount of wastewater they generate, the number of people they employ, and the revenues they earn, among other characteristics. As a result, it is not possible to describe a "typical" industrial laundry. This section therefore discusses the range of industrial laundry facilities found in the Section 308 Survey database.

3.4.1.1 Types and Volume of Items Laundered

According to Section 308 Survey data, the total amount of textiles laundered annually by all industrial laundries is approximately 9.4 billion pounds, with the average industrial laundry facility processing 5.4 million pounds annually. However, volumes processed range widely from facility to facility, as illustrated by Table 3-7. Approximately 2 percent of industrial laundry facilities are quite small and wash less than 300,000 pounds of textiles per year. An additional 7 percent launder between 300,000 and 1,000,000 pounds per year. On the other extreme, 36 percent of facilities launder more than 5 million pounds per year.

Approximately 51 percent of the total volume of items washed by the 1,742 industrial laundry facilities are industrial textiles. Nonindustrial textiles such as linens, flatwork, and health care items account for the remaining 49 percent. These data reflect the fact that linen supply firms cross over into industrial laundering activities and vice versa, as well as the fact that facilities primarily engaged in linen supply activities are considered industrial laundries under the regulation if they launder even small quantities of industrial items. As Table 3-8 indicates, facilities handling 1 million pounds of textiles or more per year account for almost all (99 percent) of total annual industry production.

Table 3-7

Number of Facilities by Annual Production

Annual Production	Number of Facilities	Percent of Facilities	Total lbs Laundered Annually by Group
Less than l,000,000 lbs	167	10%	76,386,023
>=1,000,000 lbs and <2,000,000 lbs	264	15%	376,713,085
>=2,000,000 lbs and <3,000,000 lbs	211	12%	508,879,534
>=3,000,000 lbs and <4,000,000 lbs	231	13%	806,697,157
>=4,000,000 lbs and <5,000,000 lbs	254	15%	1,152,448,718
>=5,000,000 lbs and <6,000,000 lbs	144	8%	784,269,443
>=6,000,000 lbs and <7,000,000 lbs	116	7%	754,574,370
>=7,000,000 lbs and <10,000,000 lbs	116	7%	937,639,671
10,000,000 lbs or greater	245	14%	3,960,935,763
Total Number of Facilities	**1,747**	**100%**	**9,358,543,764**

Source: Section 308 Survey.

Table 3-8

Volume of Textiles Laundered by Industrial Laundries,
by Type of Textile and Production Group

Textile Type	Annual Production at the Facility Level				Total Annual Industry Production
	Less than 1 million lbs		1 million lbs or greater		
	lbs laundered	% of total vol.	lbs laundered	% of total vol.	
Industrial Garments	6,911,593	0.30%	2,282,802,624	99.70%	2,289,714,217
Shop Towels and Printer Towels	24,186,721	5.02%	457,258,414	94.98%	481,445,135
Floor Mats	7,029,910	0.39%	1,796,974,890	99.61%	1,804,004,800
Mops, Dust Cloths, and Tool Covers	1,622,980	1.30%	122,998,088	98.70%	124,621,068
Fender Covers	14,784	0.04%	36,044,709	99.96%	36,059,493
Clean Room Garments	4,929,126	29.59%	11,729,595	70.41%	16,658,721
Other Industrial Textiles*	37,255	0.85%	4,355,905	99.15%	4,393,160
Total Industrial Textiles	***44,732,370***	***0.94%***	***4,712,164,226***	***99.06%***	***4,756,896,595***
Linen Supply Garments	441,930	0.16%	273,996,866	99.84%	274,438,796
Flatwork/Fulldry	21,474,561	0.65%	3,277,523,870	99.35%	3,298,998,431
Health Care Items	5,986,931	0.81%	731,770,997	99.19%	737,757,928
Continuous Roll Towels	117,978	0.10%	117,707,097	99.90%	117,825,075
Other Non-Industrial Textiles**	3,632,253	2.10%	168,994,683	97.90%	172,626,936
Total Non-Industrial Textiles	***31,653,654***	***0.69%***	***4,569,993,514***	***99.31%***	***4,601,647,167***
Total lbs. Laundered	**76,386,023**	**0.82%**	**9,282,157,739**	**99.18%**	**9,358,543,763**

* Includes laundry bags, filters, buffing pads, and other industrial items.
** Includes family laundry, absorbents, new items, and executive wear.

Source: Section 308 Survey (based only on facilities for which there is sufficient information).

3.4.1.2 Wastewater Generated

The quantity, or flow, of wastewater generated by industrial laundering activities is related to the amount and types of items laundered, the soils contained in these items, and the water conservation measures employed by each individual facility. As such, flow, like textile production volume, also ranges from facility to facility. Table 3-9 presents a breakdown of industrial laundering facilities by flow. The average flow volume for industrial laundries is 13.9 million gallons per year of wastewater. Flow rates from facilities range from 148,000 gallons per year to 204,500,000 gallons per year. Note that flow should not be interpreted as a complete description of the industrial laundries effluent stream because it is calculated simply on the basis of the volume of water produced and not the concentration of pollutants.

3.4.1.3 Employment

An estimated 128,000 people are employed in industrial laundry facilities in the United States, according to Section 308 Survey data. Although nearly 20,000 of these people (15 percent) are engaged primarily in management and administration, most are production employees. Production employees, as discussed earlier in Section 3.2.2.2, are typically unskilled or semiskilled laborers.

Approximately 20 percent of all industrial laundry facilities have 30 employees or fewer; as indicated in Table 3-10, almost all of these small facilities (85 percent) are single-facility firms.[84] At the other end of the scale, only 1 percent of industrial laundries employ more than 200 workers. The average number of employees per facility is 73; of these, 62 are production employees and 11 are in management and administration.

Facilities with 30 employees or fewer, on average, handle fewer pounds of textiles per employee, at higher costs per pound, than facilities with more than 30 employees. This difference suggests that there might be slight economies of scale in industrial laundering. Production amounts and costs vary widely, however, particularly at facilities with more than 30 employees. Thus, any economies of scale that exist do

[84] The Small Business Administration (SBA) defines “small” on the basis of revenues. This breakdown between small and large will be discussed in detail in Section Nine.

Table 3-9

Number of Facilities by Annual Flow

Annual Flow	Number of Facilities	Percent of Facilities	Total Annual Flow by Group (gals/yr)	Percent of Total Flow by Group
Less than 1,000,000 gallons/year	32	2%	8,196,303	0.03%
>=1,000,000 and <5,000,000 gallons/year	318	18%	1,068,764,447	4.41%
>=5,000,000 and <10,000,000 gallons/year	471	27%	3,353,564,121	13.84%
>=10,000,000 and <20,000,000 gallons/year	502	29%	6,890,983,819	28.44%
>=20,000,000 and <30,000,000 gallons/year	244	14%	5,558,530,911	22.94%
>=30,000,000 gallons/year	181	10%	7,351,249,874	30.34%
Total Number of Facilities	**1,747**		**24,231,289,475**	

Source: Section 308 Survey.

Table 3-10

Number of Facilities by Employment Group

Number of Employees	Nonindependent Facilities		Single Facilities		All Facilities	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Less than 10	0	0%	39	5%	39	2%
>=10 and <30	53	6%	263	32%	316	18%
>=30 and <65	242	26%	249	30%	491	28%
>=65 and <100	374	41%	209	25%	583	33%
>=100 and <200	232	25%	63	8%	296	17%
200 or more	16	2%	6	1%	23	1%
Total Number of Facilities	**917**		**830**		**1,747**	

Source: Section 308 Survey.

not appear to be substantial, although the statistical significance of the variation in costs by facility size has not been tested.

Consistent with there being no substantial economies of scale at the facility level and with the labor-intensity of industrial laundering, the average number of workers employed at the facility level increases with production volume (i.e., facilities processing more textiles require more employees) (see Table 3-11).

3.4.1.4 Operating Costs and Revenues

Given the production and size variations discussed above, it is not surprising that industrial laundries' operating costs and revenues also span a wide range. Table 3-12 provides a breakdown of nonindependent facilities (those belonging to multifacility firms) and single facilities (those belonging to single-facility firms) by revenue group. To calculate the median operating costs and revenues for each group, EPA used Section 308 Survey data on individual facilities' and firms' operating costs and revenues. For each individual facility and firm, EPA estimated operating costs and revenues by averaging 3 years of survey data (1991, 1992, and 1993) in 1993 dollars. (Financial data in this EA are reported in 1993 dollars unless otherwise noted.)

The average industrial laundry facility has revenues of $4.3 million in 1993 dollars. On the whole, nonindependent facilities, which are part of larger multifacility firms, are slightly larger than single-facility firms in terms of both operating costs and revenues; average revenues for nonindependent facilities were $5.0 million, while average revenues for single-facility firms were $3.4 million. This reflects the fact that, on average, nonindependent facilities handle higher production volumes than single-facility firms. Moreover, the facilities that handle very small volumes of textiles (under 500,000 pounds annually) are all single-facility firms. Nevertheless, average costs and revenues for facilities handling approximately the same volume of textiles are relatively similar (see Table 3-13).

Multifacility firms also provided EPA with information on receipts at the owner-company level. Table 3-14 provides a breakdown of these firms by revenue group. Mean revenues are calculated using

Table 3-11

Average and Total Number of Employees for Facilities In Each Production Group

	Annual Production at the Facility Level			All Facilities
	Less than 1 million lbs	>=1 million lbs but <5 million lbs	5 million lbs or more	
Production Employees				
Average number of employees per facility	14	44	103	62
Total number of employees	2,394	42,040	63,848	108,282
Management and Administration Employees				
Average number of employees per facility	6	9	16	11
Total number of employees	1,037	8,797	9,932	19,766
All Employees				
Average number of employees per facility	21	53	119	73
Total number of employees	3,431	50,838	73,780	128,048

Source: Section 308 Survey.

Table 3-12

Nunber of Nonindependent and Single Facilities, Average Revenues, and Average Operating Costs for Each Revenue Group (1993 $)

Revenue Group	Number of Facilities	Average Annual Revenues per Facility*	Average Annual Operating Costs per Facility*	Avg. Operating Costs as a % of Revenue**
Nonindependent Facilities				
<$1 Million	47	$713,473	$740,604	107%
>=$1 Million and <$3.5 Million	257	$2,165,290	$1,750,122	81%
>=$3.5 Million and <$7 Million	405	$4,854,545	$4,386,794	90%
>=$7 Million and <$10.5 Million	156	$9,179,807	$8,039,859	88%
>=$10.5 Million	47	$12,909,232	$11,269,148	87%
All Nonindependent Facilities	912	$5,042,254	$4,438,798	88%
Single Facilities				
<$1 Million	182	$636,258	$601,073	97%
>=$1 Million and <$3.5 Million	292	$2,036,557	$1,777,440	90%
>=$3.5 Million and <$7 Million	258	$4,719,935	$4,305,133	92%
>=$7 Million and <$10.5 Million	81	$8,171,814	$7,211,935	88%
>=$10.5 Million	18	$15,416,262	$13,416,214	87%
All Single Facilities	830	$3,443,624	$3,080,149	92%
All Facilities				
<$1 Million	228	$651,987	$629,496	99%
>=$1 Million and <$3.5 Million	549	$2,096,840	$1,764,648	86%
>=$3.5 Million and <$7 Million	663	$4,802,161	$4,355,015	91%
>=$7 Million and <$10.5 Million	237	$8,836,064	$7,757,522	88%
>=$10.5 Million	65	$13,589,341	$11,851,605	87%
All facilities	1,742	$4,280,409	$3,791,319	90%

* Figures in 1993 $ based on average revenues and average costs over the three years from 1991 to 1993.

** Average of ratios calculated on a per-facility basis. Does not reflect relationship between average revenues and costs as reported in this table because these figures may not be based on the same average facility. Figures above 100% reflect the fact that facility costs and revenues are calculated based on a 3-year average. For some facilities, revenues exceeded costs in each of the 3 years covered by the Survey, but costs exceeded revenues on average.

Table 3-13

Average and Total Revenues and Operating Costs for Facilities in Each Production Group (1993 $)

	Annual Production at the Facility Level			All Facilities
	Less than 1 million lbs	>=1 million lbs but <5 million lbs	5 million lbs or more	
Nonindependent Facilities				
Average revenue per facility*	$758,936	$3,281,432	$6,909,441	$5,042,254
Average operating costs per facility*	$823,940	$2,829,663	$6,125,213	$4,438,798
Number of nonindependent facilities	31	417	464	912
Single Facilities				
Average revenue per facility*	$999,020	$3,029,328	$6,915,453	$3,443,624
Average operating costs per facility*	$977,181	$2,635,831	$6,371,593	$3,080,149
Number of nonindependent facilities	130	543	157	830

* Figures in 1993 $ based on average revenues and average costs over the 3 years from 1991 to 1993.

Source: Section 308 Survey.

Table 3-14

Number of Multifacility Firms and Average Revenues for Each Revenue Group (1993 $)

Revenue Group	Number of Firms	Average Annual Revenues per Firm
<$3.5 Million**	7	$1,038,204
>=$3.5 Million and <$7 Million	8	$4,644,041
>=$7 Million and <$10.5 Million	10	$8,501,095
>=$10.5 Million	48	$319,648,406
All Multifacility Firms	**73**	**$212,458,713**

* Figures in 1993 $ based on average revenues and average costs over the 3 years from 1991 to 1993.
** Firms in the <$1 million revenue group were combined with firms in the >+$1 million and <$3.5 million group to protect confidentiality.

Source: Section 308 Survey.

each firm's 3-year average in the same manner as that described above. For the single-facility firms, firm-level numbers are the same as the facility-level numbers in Table 3-12.

Based on firm-level revenues, 812 single-facility firms (97.8 percent of all single-facility firms) and 25 multifacility firms (34 percent of all multifacility firms) meet the definition of "small" used by EPA and SBA to classify small businesses under the Small Business Regulatory Flexibility Act (SBREFA),[85] for a total of 837 small businesses, or 92.7 percent of all firms.

Although the Section 308 Survey gathered information on revenues earned at the facility- and firm-level from the laundering of industrial and nonindustrial textiles, as well as the percentage of total revenues earned from laundering the various types of textile items, EPA found that responses to these questions were not always reliable nor consistent with the definitions of "industrial" and "nonindustrial" EPA used in its decisionmaking process. The data on revenues by types of textiles laundered therefore are not presented in this EA.

3.4.1.5 Price

Revenues in the industrial laundries industry really cannot be calculated with reference to a single per-unit price. Instead, in developing a pricing strategy, a laundry generally takes into consideration a variety of factors, including the original cost of the textile rented or sold, the lifetime of the textile (if rented), and the cost and frequency of required maintenance.[86] Uniforms, for example, often are priced on a "per wearer" basis, which incorporates specific assumptions about the number of changes required per week. The average weekly revenue per uniform wearer for industrial laundries in 1992 was approximately

[85] According to the SBA, firms in SIC 7211, 7213, and 7218 are "small" if they have under $10.0 million (SIC 7218) or $10.5 million (SIC 7213 and 7211) in annual revenues. EPA uses the $10.5 million cutoff for the purposes of this analysis.

[86] Antonelli, Joe, 1996. "Getting to know your uniform costs." *Industrial Launderer*. July, pp. 47-48, 50, 52.

$6.14.[87] For shop towels, prices per shop towel in the late 1980s range from under 2½ cents to over 8 cents, again reflecting the absence of any standard industry pricing pattern.[88]

Customers that purchase laundering services in large quantities (e.g. uniforms for an entire company) may be offered bulk discount prices or add-on services (such as laundering of rented mats) at no additional charge. About half of the users of rental shop towels, for example, also receive uniforms from their suppliers. For such customers, shop towels and other peripheral items may be priced to undercut competitors as part of a strategy to attract and retain uniform rental accounts because the uniform rental business tends to be extremely competitive and price sensitive.[89]

3.4.2 Industrial Laundry Facilities that Meet Cutoffs Considered by EPA for an Exclusion from a Rule

Table 3-15 highlights the fact that, as a group, facilities that were considered for exclusion from a rule have a rather different profile from the laundries industry as a whole (shown in the No Cutoff column). Small facilities generate smaller profits and substantially less wastewater on an individual facility basis. Baseline pollutant loadings from these facilities, moreover, account for a small percentage of the overall industry loadings.

In recognition of the differences between small and large facilities, EPA investigated three cutoffs (in comparison to a no cutoff scenario).

- No cutoff for the exclusion: all facilities would have been regulated. This is called No Cutoff for the purposes of this EA and is used for comparative purposes only.
- A cutoff excluding all facilities laundering less than 1 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year (this cutoff is identical to that proposed). This cutoff is called the 1MM/255K cutoff for the purposes of this EA.

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[87] IIL, 1993. *Op. cit.* In the absence of price data, revenue is assumed to be a proxy for price.

[88] IIL, 1988. *An Analysis Of The Industrial Wiper Market*. *Op. cit.*

[89] *Ibid.*

Table 3-15

Comparison of Facilities Meeting Cutoffs Considered Compared to the No-Cutoff Scenario

		Cutoff		
	No Cutoff	**1MM/255K**	**3MM/120K**	**5MM/255K**
Single-Facility Firms				
Number of Facilities	830	128	363	556
Average Revenues	$3,443,624	$833,789	$1,337,635	$2,106,280
Average Operating Costs	$2,175,648	$472,755	$827,776	$1,288,068
Average Flow Rate	6,591	5,239	15,056	23,724
Average Number of Employees	54	19	26	38
Average Total Production	3,542,459	369,967	1,109,865	1,898,181
Nonindependent Facilities				
Number of Facilities	912	8	155	396
Average Revenues	$5,042,254	$1,312,507	$1,683,637	$3,210,769
Average Operating Costs	$4,438,798	$1,255,711	$1,223,306	$2,784,947
Average Flow Rate	17,359,857	1,750,168	5,245,592	9,141,006
Average Number of Employees	91	27	37	56
Average Total Production	7,032,389	836,690	2,073,478	3,167,721
All Facilities				
Number of Facilities	1,742	136	518	953
Average Revenues	$4,280,409	$863,523	$1,440,898	$2,565,767
Average Operating Costs	$3,360,269	$521,386	$945,821	$1,910,797
Average Flow Rate	9,105,353	113,619	1,576,098	3,816,680
Average Number of Employees	73	19	29	45
Average Total Production	5,369,225	398,956	1,397,453	2,426,333

Source: Section 308 Survey data.

- A cutoff excluding all facilities that launder between 1 and 3 million pounds of incoming laundry (total) and less than 120,000 pounds of shop and/or printer towels per calender year, in addition to those facilities laundering less than 1 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year. This cutoff is called the 3MM/120K cutoff for the purposes of this EA.

- A cutoff excluding all facilities laundering less than 5 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year. This cutoff is called the 5MM/255K cutoff for the purposes of this EA.

Existing facilities laundering less than the cutoffs listed above would have been excluded from regulation. Approximately 8 to 55 percent of the facilities that otherwise meet EPA's definition of an industrial laundry (136 to 953 out of 1,742 facilities) might have been eligible for exclusion. All the excluded facilities are small entities under the Small Business Administration (SBA) definition of small entity. New facilities would also have been entitled to these exclusions.

3.4.3 Financial Conditions at the Firm Level

As mentioned earlier, there are 903 industrial laundry firms associated with 1,742 industrial laundry facilities through five general chains of ownership (identified as A, B, C, D and E in the Section 308 Survey) in the United States. Seventy-three of these firms (those linked to A, B, and D facilities) maintain financial records for multiple laundering facilities. The remaining 830 firms (those linked to C and E facilities) are associated with single facilities. Firms with A, B, and C facility ownership patterns also are associated with an ultimate parent company.

A variety of organizational structures can be found in each ownership grouping. Although most industrial laundries are structured as standard corporations, which results in the corporation paying corporate income tax, approximately 382 of the 903 industrial laundry firms (42 percent) are S corporations,[90] limited partnerships, and sole proprietorships, which are taxed at the owner-level (at rates for individual taxpayers), rather than at the firm-level. With the exception of an estimated 10 owner firms

[90] S corporations are firms that have elected to be taxed at the shareholder level, rather than at the corporate level, under Subchapter S of the Internal Revenue Code.

of type-D facilities, most of the S corporations are single-facility (CE) firms. Most industrial laundries are privately held, but some of the larger multifacility firms are publicly held.

As noted earlier, to examine the firm-level impacts of the proposed standards, EPA grouped industrial laundries into two categories on the basis of ownership category; ABD multifacility firms are analyzed separately from CE single-facility firms. Data for these analyses were taken from the Section 308 Survey database.

Table 3-16 presents average baseline summary financial data on the firms in the industrial laundry industry. Since financial conditions at multifacility firms reflect the aggregate conditions at several facilities, multifacility firms typically earn more revenue and have greater assets and financial resources than single-facility firms. This is not always true of multifacility and single-facility firms within each revenue group; earnings at single-facility firms are higher than those at multifacility firms in the $3.5 million to $7 million and the $7 million to $10.5 million revenue groups, for example. However, the average ratio of earnings before interest and taxes (EBIT) to revenues (which is used as a proxy for profit margin) is higher at multifacility firms than at single-facility firms in all revenue groups.[91]

Possible differences between the two types of firms with respect to financing capital investments are reflected in the fact that, in some revenue groups, single-facility firms have higher average total assets and owner equity, while multifacility firms have higher average total liabilities.

The baseline and postcompliance financial health of firms in the industrial laundries industry is discussed in greater detail in Section Six. Postcompliance impacts are calculated relative to baseline financial conditions.

[91] Note, however, despite slim profit margins, returns on investment in small firms are reasonable, due to the small investment required to start up and operate a laundry (see discussion in Section Nine of this EA and Table 9-1).

Table 3-16

Number of Firms and Average Financial Measures for Each Revenue Group (1993 $)

Revenue Group	Number of Firms	Earnings Before Interest and Taxes	Working Capital	Total Assets	Total Liabilities	Owner Equity*	Ratio of Earnings to Revenues**
Multifacility Firms							
<$3.5 Million***	7	$338,244	$546,696	$1,135,711	$714,855	$420,857	0.1353
>=$3.5 Million and <$7 Million	8	$200,027	$1,028,953	$2,317,731	$1,050,920	$1,265,441	0.0258
>=$7 Million and <$10.5 Million	10	$669,794	$1,795,676	$5,717,464	$2,430,647	$3,286,817	0.0470
>=$10.5 Million****	48	$11,365,961	$17,697,501	$81,211,283	$26,800,090	$54,411,216	0.0464
All Multifacility Firms****	73	$7,549,274	$11,945,014	$54,054,702	$17,979,079	$36,075,479	0.0524
Single-Facility Firms							
<$1 Million	182	$2,462	$8,680	$246,720	$198,887	$32,079	0.0008
>=$1 Million and <$3.5 Million	292	$91,310	$189,454	$827,992	$429,221	$403,588	0.0034
>=$3.5 Million and <$7 Million	258	$268,154	$560,027	$3,161,855	$903,575	$2,275,879	0.0032
>=$7 Million and <$10.5 Million	81	$1,032,098	$1,316,423	$13,077,679	$1,246,974	$11,887,875	0.0111
>=$10.5 Million	18	$2,129,316	$2,010,339	$20,246,504	$3,636,866	$16,609,638	0.0274
All Single-Facility Firms	830	$261,473	$413,148	$3,028,406	$673,667	$2,364,007	0.0040

* Owner equity is being used as a proxy for retained earnings in Altman Z" analyses of firm-level impacts.
** The ratio of earnings to revenues is a proxy for profit margin (or the ratio of earnings to sales), for comparison of multifacility and single-facility firms.
*** For multifacility firms, firms in the <$1 million revenue group were combined with firms in the >=$1 million and <$3.5 million group to protect confidentiality.
**** Two weighted firms that are statistical outliers were not included in the calculation of financial measures.

Source: Section 308 Survey.

SECTION FOUR

ECONOMIC IMPACT ANALYSIS METHODOLOGY OVERVIEW AND COMPLIANCE COST ANALYSIS

This section covers several components necessary for identifying and characterizing the potential impacts of regulatory compliance costs at the facility and owner-company levels and other potential secondary impacts for all regulatory options that were considered at the time of EPA's decision not to promulgate pretreatment standards for the industrial laundries point source category. Section 4.1 provides an overview of the methodology used in analyzing the economic impact of the regulatory compliance costs. Section 4.2 discusses the cost annualization model, which is the fundamental component of this methodology. Section 4.3 summarizes the results calculated using this model (i.e., the total annualized cost of compliance for the industrial laundries industry as a whole for each of the regulatory options considered).

4.1 METHODOLOGY OVERVIEW

Together, the regulatory analyses presented in this EA offer a comprehensive assessment of potential economic impacts of regulatory options at all relevant levels of activity. Figure 4-1 shows how the four principal models used in the EA (the cost annualization model, the facility closure model, the owner company model, and the market model)[1] relate to one another, the inputs required for these models, and the outputs they generate. At the heart of the EA is the cost annualization model, which uses facility-specific cost data and other inputs (from EPA's Final Development Document) to determine the annualized capital and operating and maintenance (O&M) costs of improved wastewater treatment. Annualized cost data feed into the facility analysis, which models the economic impacts of regulatory costs on individual industrial laundry facilities, irrespective of ownership. The firm-level analysis assesses the ability of all firms to raise the capital necessary to purchase and install pollution control equipment. This is a different analysis from that determining whether a facility's cash flow can meet the expenses associated with meeting regulatory

[1]Most market model results are provided in Appendix A. Results in the main text of this EA generally reflect an assumption that regulatory costs could not have been passed through to customers.

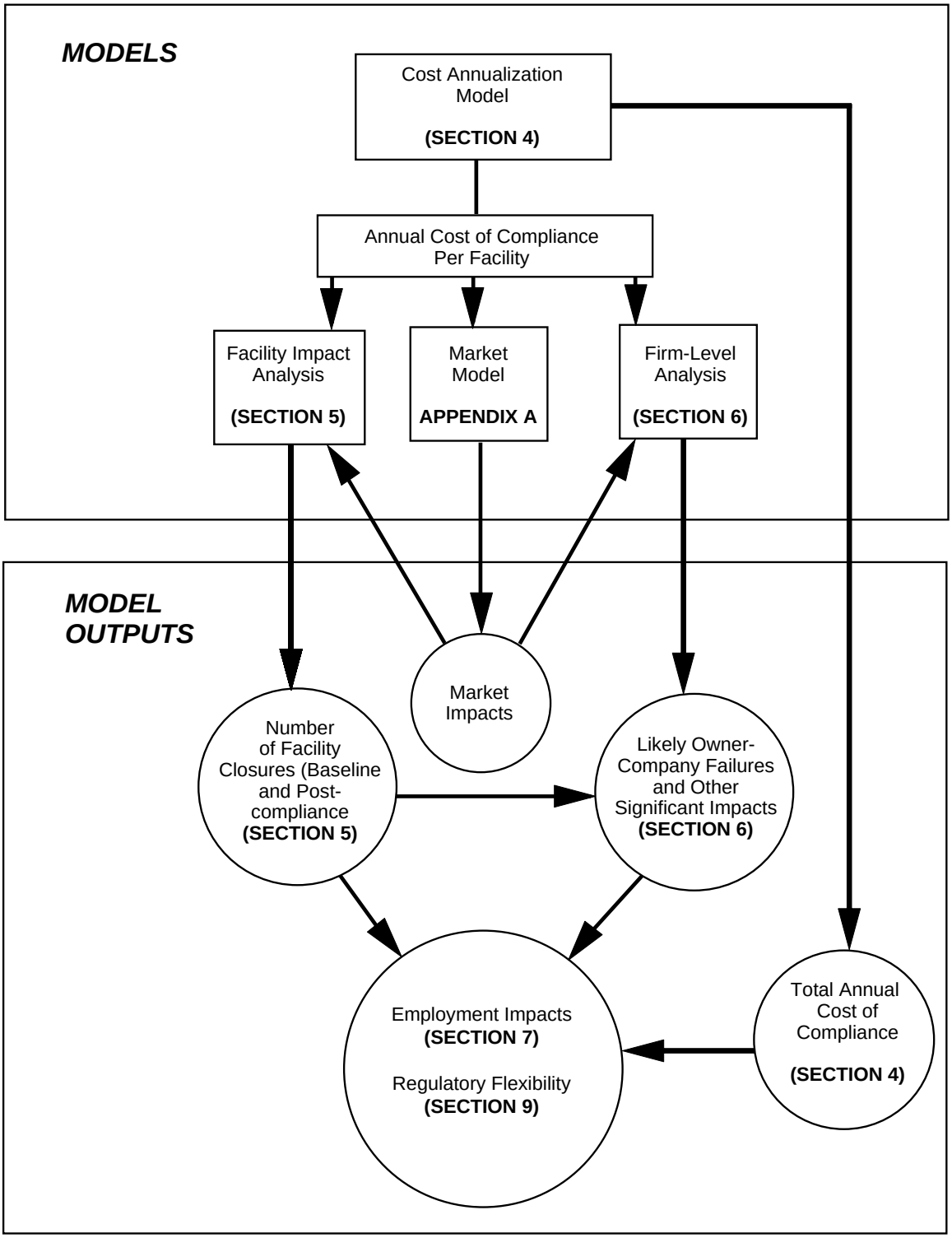

Figure 4-1. Relationships of the four principal models used in this economic analysis.

requirements. A firm or its facilities (if a multifacility firm) might be able to afford the costs of pollution control, but the firm itself might be too weak financially to attract the capital to make the purchase. The market model estimates changes in market price and quantity due to increased facility regulatory costs (see Appendix A). The EA then explores impacts on employment and other measures of community welfare. Additional analyses examine whether increased compliance costs would have affected domestic or international markets, customers, consolidation, inflation, new sources, or small businesses.

4.2 COST ANNUALIZATION MODEL

4.2.1 Purpose of Cost Annualization

The cost annualization model estimates each facility's annual compliance cost on the basis of the costs required to purchase and operate new pollution control equipment for each technology option that was considered for the industrial laundries point source category. Cost annualization calculations consider the changes in annual cash outflow for each facility due to pollution control expenditures, once the tax effects of these expenditures (e.g., depreciation tax shields) are taken into account. Pollution control expenditures can be divided between two components: the initial capital investment to purchase and install the equipment and the annual cost of operating and maintaining such equipment (O&M costs). Capital costs are a one-time expense incurred only with the acquisition of the equipment, while O&M costs are incurred every year of the equipment's operation. The engineering cost model used to estimate facility compliance costs defines both capital and O&M costs.[2]

To determine the economic feasibility of upgrading a facility, the costs of compliance must be compared to each facility's precompliance cash flow. Pollution control costs cannot be directly compared to first-year facility cash flow, however; the capital costs must be annualized, reflecting the fact that capital equipment costs are incurred only once and can be financed (i.e., spread out over the equipment's lifetime).

[2] Cost data are from EPA's Final Development Document.

In the model, EPA calculates total annualized costs by allocating the capital investment over the lifetime of the equipment, using a cost-of-capital factor to address the costs associated with raising or borrowing money for this investment, and adding in annual O&M costs. The resulting annualized cost represents the average annual payment a given company will need to make to upgrade its facility.[3] EPA investigates whether a firm can raise the capital to make the investment in the firm-level analysis.

4.2.2 Inputs, Assumptions, and Model Outputs

4.2.2.1 Regulatory Options

The engineering cost estimates that feed into the cost annualization model are based on a set of two regulatory options, each with three exclusions for small facilities considered. The two regulatory options included chemical precipitation (known as the CP-IL option) and dissolved air flotation (known as the DAF-IL option). The three exclusions (plus a no-exclusion scenario used for comparison) that were considered for both regulatory options included:

- A cutoff excluding all facilities laundering less than 1 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year (this cutoff is identical to that proposed). This cutoff is called the 1MM/255K cutoff for the purposes of this EA.

- A cutoff excluding all facilities that launder between 1 and 3 million pounds of incoming laundry (total) and less than 120,000 pounds of shop and/or printer towels per calender year, in addition to those facilities laundering less than 1 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year. This cutoff is called the 3MM/120K cutoff for the purposes of this EA.

[3] The annualized cost is analogous to a mortgage payment, which spreads the one-time investment in a home into a series of continual monthly payments. An annualized cost approach also more closely reflects how companies report expenditures on pollution control equipment. This equipment must be capitalized, not expensed according to IRS requirements: The equipment can be depreciated, but the total cost of the equipment cannot be subtracted from income in the first year (Commerce Clearinghouse, Inc., 1995. *U.S. Master Tax Guide*, 1995; and Research Institute of America, Inc., 1995. *The Complete Internal Revenue Code* [Section 169]. New York, NY: Research Institute of American, Inc., January).

- A cutoff excluding all facilities laundering less than 5 million pounds of incoming laundry (total) and less than 255,000 pounds of shop and/or printer towels per calender year. This cutoff is called the 5MM/255K cutoff for the purposes of this EA.

Other options that were analyzed at proposal, including the organics control option (OC) and various "COMBO" options, were not considered in this EA, as they played little or no role in EPA's final decisionmaking process. A description of these options can be seen in the EA for the proposal.[4] Also rejected was the DAF-TWL option and its various cutoffs, discussed in EPA's Notice of Information Availability (NODA),[5] for reasons discussed in EPA's preamble to the Final Action. EPA developed compliance costs for each facility in the Section 308 Survey database for each of the two regulatory options. EPA's Final Development Document presents the derivation of the engineering cost estimates, including capital and O&M costs, under each option. Table 4-1 presents the regulatory options addressed in this analysis and defines the technologies associated with each option. EPA has determined that the CP-IL option at the 3MM/120K cutoff is economically achievable and had the Agency promulgated a rule, would have selected this option and cutoff.[6]

4.2.2.2 The Cost Annualization Model Parameters

Table 4-2 presents the cost annualization model using assumed data for illustrative purposes. The inputs and assumptions for the analysis are listed above the spreadsheet. The first input is the *facility code* for the facility analyzed. The second line is the *type of corporate entity* (e.g., incorporated or other). The third line presents the regulatory *option* or alternative for which the annualized costs are calculated.[7] The fourth and fifth lines are the option's *capital* and *O&M* costs (from EPA's Final Development Document). For comparison purposes, costs are provided in terms of 1993 dollars.

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[4]U.S. EPA, 1997. *Economic Assessment for Proposed Pretreatment Standards for Existing and New Sources for the Industrial Laundries Point Source Category.* EPA 821-R-97-008, Office of Water, November.

[5]63 FR 71054 (December 23, 1998).

[6]See the preamble to the Final Action for EPA's rationale. EPA also found the CP-IL option at the 5MM/255K cutoff to be economically achievable.

[7] The terms "option" and "alternative" are used interchangeably in this section.

Table 4-1

The Regulatory Options

Option	Description
CP-IL	Chemical precipitation treatment of wastewater from industrial laundry items; linen wastewater does not require treatment. If untreated, the treated and untreated streams are combined prior to discharge.
DAF-IL	Dissolved air flotation treatment of wastewater from industrial laundry items; linen wastewater does not require treatment. If untreated, streams are combined prior to discharge.

Source: Final Development Document.

Table 4-2

Sample Spreadsheet for Annualizing Costs

Inputs

Survey ID:	XXXX
Option Number:	
Initial Capital Cost ($) (Line A):	$303,055
Annual O&M Cost ($) (Line B):	$68,256
Facility-Specific Nominal Discount/Interest Rate:	10.0%
Expected Inflation Rate:	2.9%
Real Discount Rate:	7.1%
Corporate Tax Structure:	1
Taxable Income ($):	$65,887,133
Marginal Income Tax Rates:	
Federal:	34.00%
State:	6.60%
Combined (Line C):	40.60%

1 Year	2 Depreciation Rate	3 Depreciation For Year (Line A*Col 2)	4 Tax Shield From Depreciation (Line C*Col 3)	5 O&M Cost (Line B)	6 O&M Tax Shield (Line C*Col 5)	7 Cash Outflow (Line A in Yr 1; Line B in Yrs 2-15)*	8 Cash Outflow After Tax Shields (Col 7*(Col 4+Col 6))
1	5.00%	$15,153	$6,152	$34,128	$13,856	$337,183	$317,175
2	9.50%	$28,790	$11,689	$68,256	$27,712	$68,256	$28,855
3	8.55%	$25,911	$10,520	$68,256	$27,712	$68,256	$30,024
4	7.70%	$23,335	$9,474	$68,256	$27,712	$68,256	$31,070
5	6.93%	$21,002	$8,527	$68,256	$27,712	$68,256	$32,017
6	6.23%	$18,880	$7,665	$68,256	$27,712	$68,256	$32,879
7	5.90%	$17,880	$7,259	$68,256	$27,712	$68,256	$33,285
8	5.90%	$17,880	$7,259	$68,256	$27,712	$68,256	$33,285
9	5.91%	$17,911	$7,272	$68,256	$27,712	$68,256	$33,272
10	5.90%	$17,880	$7,259	$68,256	$27,712	$68,256	$33,285
11	5.91%	$17,911	$7,272	$68,256	$27,712	$68,256	$33,272
12	5.90%	$17,880	$7,259	$68,256	$27,712	$68,256	$33,285
13	5.91%	$17,911	$7,272	$68,256	$27,712	$68,256	$33,272
14	5.90%	$17,880	$7,259	$68,256	$27,712	$68,256	$33,285
15	5.91%	$17,911	$7,272	$68,256	$27,712	$68,256	$33,272
16	2.95%	$8,940	$3,630	$34,128	$13,856	$34,128	$16,642
Sum	100.00%	$303,055	$123,040	$1,023,840	$415,679	$1,326,895	$788,176
Present Value		$198,702	$80,673	$640,232	$259,934	$943,287	$602,680

	Before Tax Shield	After Tax Shield
Present Value of Incremental Costs:	$943,287	$602,680
Annualized Cost:	$100,421	$64,160

Notes: This spreadsheet assumes that MACRS is used to depreciate capital expenditures.
Depreciation rates are from 1995 U.S. Master Tax Guide for 15-year property and mid-year convention.
Corporate Tax Structure: 1= corporate tax rate 2= individual tax rate.
If the company-specific discount rate is <3% or >19%, then an industry median figure of 10.0% is used.
First year is not discounted.

*Plus 1/2 of Line B in years 1 and 16.

The *life of the asset* is determined according to the Internal Revenue Code's classes of depreciable property. Fifteen-year property is assumed to have a class life of 20 to 25 years—a typical life span for the equipment considered in the costing analysis. According to the U.S. Master Tax Guide, 15-year property includes such assets as municipal wastewater treatment plants.[8] Thus, for the purposes of calculating depreciation, most components of the capital cost for a pollution control option would be considered 15-year property.[9]

The *discount rate* reflects the costs of capital for industrial laundry facilities and is used to calculate the present value of the cash flows. The discount rate used in the EA is based either on the actual cost of capital reported by each facility in the Section 308 Survey or, if these data are missing or suspect, on the mean and median discount rate (which both equal 10 percent) reported by the industrial laundry facilities in the Section 308 Survey.[10] All rates were adjusted for an inflation rate of approximately 3 percent, providing an average real discount rate of approximately 7 percent.[11]

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[8] Commerce Clearinghouse, Inc., 1995. *U.S. Master Tax Guide.* p. 322.

[9] EPA investigated the sensitivity of the analysis to changes in depreciation schedules and life of property. Only changes in life of property have any measurable impact on annual costs, but life of property is unlikely to be less than 15 years; see Jeff Cotter and Anne Jones, ERG, 1997. "Sensitivity analysis of annualized cost estimates to changes in depreciation and project lifetime." Memorandum to Sue Burris, EPA. October 25.

[10] EPA assigned a discount rate of 6 percent, the Federal Reserve prime rate for 1993, to facilities that reported a discount rate of "prime." EPA considered reported discount rates of less than 3 percent and more than 19 percent to be suspect. Discount rates in these ranges were dropped and replaced by the average of all other reported discount rates. Discount rates of less than 3 percent were thought to be too low because banks were charging a prime rate of nearly 6 percent and the Federal Reserve Bank of New York had instituted a discount rate of nearly 3 percent during the time of the Section 308 Survey effort. Prime and discount rate data are from Federal Reserve Statistics, 1994. *Public Statistical Release H-15.* Public Services, Board of Governors, Federal Reserve System, January 3. Similarly, discount rates of more than 19 percent were considered to represent a hurdle rate (the rate of return desired for a project before it will be undertaken), rather than a true discount rate. Only a few discount rates were considered suspect. Generally, these ranged from 25 to 100 percent.

[11] The inflation rate is based on changes in the Consumer Price Index between 1992 and 1994. U.S. Government Printing Office, 1996. *Economic Report of the President, 1996*. Washington, DC: U.S. Government Printing Office. February. Note that this discount rate is approximately the same as that recommended by OMB, 1996. "Memorandum for members of the regulatory working group regarding economic analysis of federal regulations under Executive Order 12866." Sally Katzen.

The final model parameters are the federal and average state *tax rates*, which are used in determining each facility's tax benefit or tax shield. A facility is allowed to reduce its taxable income by the amount spent on incremental O&M costs and by the depreciable portion of its capital equipment.[12] The tax rates used in the model represent the marginal federal tax rate appropriate to the owner firm[13] and the average state corporate income tax rate (see Appendix B). The average state tax rate is used in the cost annualization model because it can be unclear which state tax rates apply to a given facility's revenues. For example, a facility located in one state might be owned by a firm whose corporate headquarters is located in a second state and whose corporate holding company is located in a third.

4.2.2.3 The Cost Annualization Model Structure and Outputs

Two assumptions were made in annualizing compliance costs. The first assumption is that the facility owners will be using the Modified Accelerated Cost Recovery System (MACRS) to depreciate capital investments, which reduces the effective cost to the facility of purchasing and operating the pollution control equipment. The second is that a 6-month delay occurs between the purchase of pollution control equipment and its operation. The details of these assumptions and their impact on the results of the MACRS cost annualization model are presented in Appendix B.

In Table 4-2, the spreadsheet contains numbered columns in which the costs of the investment to the facility are calculated. The first column lists each year of the equipment's life span, from its installation through its 15-year depreciable lifetime.[14] Column 2 represents the portion of capital costs that can be

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[12] Commerce Clearinghouse, Inc., 1995. *U.S. Master Tax Guide*, p. 314.

[13] The cost annualization model uses the relevant marginal federal income tax rate based on the amount of taxable earnings at each facility's owner firm and applies either a corporate marginal rate or an individual marginal rate (if the firm is an S corporation or organized as another noncorporate structure). If a firm had no earnings, a marginal rate of 0 percent was used (i.e., no tax shield would be calculated).

[14] An asset's depreciable life can differ from its actual life. The pollution control equipment considered in this analysis is in the 15-year property class; however, the actual life could extend to 25 years. EPA's estimate of annualized costs is conservatively high as long as the equipment does not have to be replaced in its entirety (costs for replacement pumps and other equipment needed for maintenance have been included in O&M) in less than 16 years (see Appendix B).

written off or depreciated each year; these rates are based on MACRS, as shown in Appendix B. By multiplying these rates by the total capital cost, EPA calculates the annual amount the facility can depreciate (Column 3). These depreciable amounts are used by the firm to offset annual taxable income. Column 4 shows the tax benefit provided by the depreciation expense, (i.e., the overall tax rate times the depreciation amount for the year).[15]

Column 5 of Table 4-2 shows the annual O&M expense. These costs are constant, except in Year 1 when only half the O&M costs are incurred because the equipment is not in service through half the year.[16] Column 6 shows the tax shield or benefit provided from expensing the O&M costs. Column 7 lists the facility's total expenses associated with the additional pollution control equipment: EPA assumes that capital costs are incurred during the first year when the equipment is installed. The O&M expense is added to capital costs for all years except Year 1, in which one half of O&M costs is added. Column 8 lists the annual cash outflow minus the tax shields from the O&M expenses and depreciation because the facility will recoup these costs as a result of reduced income taxes.

Once the yearly cost to the facility has been determined, the yearly cost is transformed into a constant cost stream. The bottom line in Column 8 represents the present value of the costs over the equipment's life span. The annualized cost is calculated as the 16-year annuity (15 years plus one year)[17] that has the same present value as the bottom line in Column 8 of Table 4-2. The annualized cost represents the annual payment required to finance the capital outlay and pay for O&M after tax shields. In essence, paying the annualized cost every year and paying the amounts listed in Column 8 for each year are equivalent. In this example, the capital investment of $303 thousand and annual O&M cost of $68

[15] The tax shield amount shown is limited later in the macro programming when the present value of the tax shield is compared to the present value of baseline taxes paid by the firm. The model assigns a tax shield value equal to the lower of the two.

[16] The 6-month delay between purchase and operation plus the 15-year life is actually 16 years because a mid-year convention is used to compute the annualized cost. A 6-month delay plus the mid-year convention means that the annualization formula does not begin discounting until the end of the first year.

[17] See previous footnote on timing.

thousand (1993 dollars) result in an annualized posttax cost of $64 thousand.[18] Figure 4-2 presents the equations used to calculate present value and annual cost.

The present value of the cost for incremental pollution control is used in the facility analysis (Section Five). Results of the calculation of aggregate compliance costs are presented below in Section 4.2.

4.3 TOTAL ANNUALIZED COMPLIANCE COSTS

EPA calculates total annualized compliance costs by aggregating the annualized compliance costs for all affected facilities, based on the output of the cost annualization model. Table 4-3 presents the results of this cost aggregation by regulatory option and cutoff. Both pretax and posttax costs are shown, but only posttax costs are used to represent impacts on industry facilities, which are calculated on the basis of these posttax costs (i.e., the costs as perceived by the affected facilities after taxes are paid). These impacts are summarized in Section Five. Note that Table 4-3 reflects the zero compliance costs assigned to facilities excluded from the rule as discussed above in Section 4.2.2.1.

As Table 4-3 shows, CP-IL is associated with an annual posttax cost of $53.9 million to $128.4 million, depending on cutoff. DAF-IL is associated with a cost of $60.0 million to $136.6 million, depending on cutoff. The selected option and cutoff, CP-IL at the 3MM/120K cutoff, is associated with a posttax cost of $90.8 million per year.

[18] Note that the annualized cost can be determined in two ways. The first way is to calculate the annualized cost as the difference between the annuity value of the cash flows (Column 7) and the tax shields (Columns 4 and 6). The second way is to calculate the annuity value of the cash flows after tax shields (Column 8). Both methods yield the same value.

Table 4-3

Compliance Costs for the Regulatory Options (1993 dollars)*

Option	Total Capital Costs	Total O&M Costs	Total Pretax Annualized Costs	Total Posttax Annualized Costs
No Regulation **	$0	$0	$0	$0
CP-IL No cutoff	$528,827,868	$123,057,702	$179,687,660	$128,354,241
CP-IL 1MM/255K	$507,469,980	$116,835,047	$171,291,344	$120,884,335
CP-IL 3MM/120K	$387,491,478	$89,155,808	$131,248,498	$90,812,547
CP-IL 5MM/255K	$234,139,808	$52,866,169	$77,401,631	$53,905,645
DAF-IL No cutoff	$435,352,966	$148,560,743	$195,250,102	$136,637,259
DAF-IL 1MM/255K	$417,313,882	$142,276,538	$187,131,063	$129,428,733
DAF-IL 3MM/120K	$313,173,435	$111,909,892	$146,043,663	$98,835,405
DAF-IL 5MM/255K	$180,570,477	$69,533,822	$88,427,117	$59,963,207

Source: U.S. EPA, 1999. Facility and Firm Financial Model, and Section 308 Survey data. Capital and O&M costs from the Final Technical Report. Models and data are included in the Decisionmaking Record.

* Includes lesser hauling cost, if appropriate, thus capital costs may appear slightly lower and O&M costs may be slightly different than those shown in the Final Technical Report.

** EPA did not estimate the cost of industry's voluntary program.

SECTION FIVE

ANALYSIS OF FACILITY-LEVEL IMPACTS

This section presents the facility-level economic impact methodology and reports the results of the facility economic impact analysis (closure analysis) of regulatory options EPA investigated before making its decision not to promulgate pretreatment standards for the industrial laundries point source category. This analysis, described in Section 5.1, uses output from the cost annualization model (discussed in Section Four) to predict facility closures. Section 5.2 summarizes the results of the analysis in terms of the number of facility closures that would have occurred prior to regulatory compliance (baseline closures) and the number of facility closures that would have resulted from regulatory compliance (incremental closures). Section 5.3 discusses impacts on new sources.

EPA determined that 1,742 facilities would have been potentially affected by pretreatment standards.[1] To evaluate preregulatory (baseline) conditions at and postcompliance impacts on these facilities, EPA divided the facilities into two groups: facilities that are independently owned and operated ("single-facility firms") and nonindependent facilities, owned by firms that own multiple facilities. EPA classified facilities in these groups on the basis of each facility's response to Question 27 in Part B of the Section 308 Survey, which asked about the organizational structure of each facility.

A total of 830 of the 1,742 potentially affected facilities are classified as single-facility firms.[2] These facilities responded with a C or E to Question 27 in Part B of the Section 308 Survey. Single-facility firms are independently owned; in some cases, they may have an ultimate parent company, but for all intents and purposes, they act as independent entities.[3] In addition, these firm-facilities generally maintain

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[1] Section 308 Survey data.

[2] Discrepancies between the sum of single-facility firms and nonindependent facilities and the total number of affected facilities are caused by rounding of the survey weights assigned to each facility. Fractional facilities are created using the survey weights, but, for clarity, only integers are used to describe numbers of facilities in the text and tables of this report.

[3] As independent entities, these facilities operate as both facilities and firms. To capture both

(continued...)

their own balance sheets and income statements and pay taxes at the facility level. Of the 830 single-facility firms, from 128 to 556 firms would have been excluded from the rule (see discussion in Section Four about the various ways EPA defined cutoffs for exemptions for small facilities and Table 3-15 in Section Three) and thus would have incurred no compliance costs. All 830 of the single-facility firms are analyzed in this section of the EA.

A total of 912 of the 1,742 facilities are classified as nonindependent facilities. These facilities responded with A, B, or D to Question 27 in Part B of the Section 308 Survey. Nonindependent facilities are subordinate to multifacility owner companies and, in some cases, parent companies. Such facilities might maintain their own balance sheets or income statements, but financial statements are generally kept at the owner-company level. In addition, any corporate taxes associated with these facilities are typically paid by the owner company. Of the 912 nonindependent facilities, from 8 to 396 would have been excluded from the rule, depending on cutoff and would not have incurred compliance costs (see Table 3-15 in Section Three). All 912 of the nonindependent facilities are analyzed in this section of the EA.

Because of the very different nature of the financial reporting at single-facility firms and nonindependent facilities, the following sections discuss the analysis and results of the two types of facilities separately, then together, for the 1,742 facilities in the analysis.

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[3](...continued)
facility- and firm-level impacts for these single-facility firms, EPA evaluates them as facilities in Section Five and as firms in Section Six. Results in Section Six are incremental to the closures reported in Section Five, that is, single-facility firms reported as financially vulnerable as a result of regulatory options in Section Six are those that do not close in Section Five. EPA used this approach in reporting results because the impacts associated with closure for a single-facility firm are considered greater than those associated with a weakened financial position. In the industrial laundries industry, closures have a greater impact because those facilities that do not close can be sold to financially stronger firms (or in the case of single-facility firms owned by parent firms, might be able to rely on the parent for financial backing). Thus single-facility firms that do not close but become financially vulnerable might lose their status as independent entities, but other impacts at financially vulnerable firms, such as employment impacts, are likely to be somewhat less severe. (See Section Six for more details on impacts of firm failures in this industry.)

5.1 FACILITY IMPACT MODEL

In this study, EPA estimates facility impacts by evaluating the impact of compliance costs on a facility's cash flow. To do this, EPA compares each facility's average annual precompliance cash flow with its annualized pollution control costs. The present value of cash flow represents the value in current dollars of the expected cash flow that the facility can generate over a specified period (in this case 16 years; see below). If the present value of future cash flow is expected to be less than or equal to zero, EPA assumes that the facility would cease operation, as it would no longer be a profitable venture. Cash flow analysis is one of the most commonly used tools for financial analysis and in many instances is considered a more accurate measure of financial health than net income analysis, since net income includes depreciation as a cost even though depreciation is not a cash outlay (see, e.g., Brigham, E.F., and L.C. Gapenski, 1997. *Financial Management Theory and Practice*, pp. 40-41).

As in the EA for the proposed pretreatment standards, EPA does not use salvage value in the cash flow analysis. Salvage value is the residual value of the facility at liquidation, which can be considered to play a role in an assessment of the financial viability of a facility (i.e., the decision to liquidate would be based on whether the estimated salvage value exceeded the estimated present value of cash flow). For numerous reasons, EPA considers salvage value analysis an unreliable measure for identifying closures among single- facility firms in this industry (see Appendix D). Furthermore, it is very difficult to estimate salvage value, even where it might play a role in decision making, such as at multifacility firms. EPA did perform a sensitivity analysis using salvage value for nonindependent facilities and determined that results are nearly identical for these facilities (see Appendix D). Nevertheless, because of additional uncertainties introduced by a salvage value analysis, EPA believes that a cash flow approach, without considering salvage value, is a more realistic approach for the majority of facilities, since it will not overstate baseline closures. A salvage value approach could identify baseline closures among facilities that are not expected to be self supporting. Also note (as discussed in Appendix D) that setting salvage value equal to the market value of a facility, as suggested by commenters on the proposal, is analytically incorrect.[4] A sale at market value is not a liquidation and, as such, is not a closure as EPA defines closure. Furthermore, this approach results in a baseline closure rate of approximately 70 percent (see Appendix D). This approach is a better

[4]Comment Response Document, PECON-2C, Tracking No. 1481.

indicator of why consolidation is occurring so rapidly in this industry. In fact, if one accepts the premise that market value depends on revenue, not cash flow, it is likely that no facilities would have truly liquidated post compliance (where liquidation is seen as a forced sale of assets at well below market value).

Section 5.1.1 describes the calculations used to determine the present value of future cash flow for a facility, and Section 5.1.2 discusses how closure results are evaluated using the facility impact model. Figure 5-1 provides a schematic diagram of the methodology and components used in the facility impact analysis.

5.1.1 Estimating the Present Value of Forecasted Cash Flow

As stated previously, the present value of each facility's cash flow is equal to its future stream of cash flow in current dollars. The impact methodology uses recent cash flow and other relevant data to estimate future earnings and then applies a discount rate to derive the present value of future cash flow. The components of this analysis include: 1) estimating current cash flow; 2) estimating the present value of future cash flow, which involves establishing a time frame for the analysis, projecting cash flow during this time frame, and discounting cash flow to the present; and 3) evaluating impacts (adjusting the regulatory baseline for baseline closures and incorporating the incremental costs of the regulatory options).

5.1.1.1 Estimating Current Cash Flow

Before the present value of future cash flow can be estimated, EPA must estimate current cash flow. This figure is used, in turn, to project future cash flow. Estimating cash flow (current or future) involves two steps.

1. Determining net income, which is calculated as facility receipts minus operating costs, depreciation, interest, and taxes.

2. Reconciling net income to cash flow by adding back in depreciation.

In the closure model for the industrial laundries industry, cash flow at the 830 single-facility firms can be calculated using Section 308 Survey data on facility-level net income and depreciation.[5] At facilities that do not operate independently from an owner company (i.e., the 912 nonindependent facilities), however, neither cash flow nor net income can be determined using Survey data because taxes and interest are typically recorded only at the firm level, not the facility level, and firm-level Survey data were not sufficiently detailed to be applied to individual facilities. Thus, for nonindependent facilities, the closure model uses operating earnings (e.g., receipts minus total operating costs, including depreciation and costs unrelated to laundering; that is, depreciation is not subtracted from earnings) as an approximation of posttax facility cash flow. The remainder of this report refers to nonindependent facility "cash flow" to mean operating earnings. EPA did not attempt to determine the nonindependent facilities' share of total firm interest and taxes because the analysis would require data that even firms themselves might have difficulty estimating (since often this type of accounting is not undertaken) and, as such, may not even play a role in a firm's liquidation decision.

One factor that could affect cash flow at nonindependent facilities is the interfacility transfer of laundry among facilities owned by the same firm. Because this practice occurs in multifacility firms, the Section 308 Survey asked nonindependent facilities to report the value of shipments (including transfers)[6] to other facilities owned by the same firm. This figure was used to evaluate whether transfers might play a role in potentially overestimating baseline closures.[7] In some cases, respondents might have underestimated the value of transfers because transfers typically are valued at the cost of production (i.e., the cost of laundering the items), rather than at the market value of that service. Cash flow, therefore, could be understated at facilities that value transfers at the cost of production. This, in turn, could lead the facility impact model to overstate total facility closures. EPA's avoidance of a salvage value approach minimizes

[5] EPA adjusted net income for all firms to account for any reported extraordinary expenses or revenue. In addition, EPA used the appropriate marginal tax rate, given the firms' taxable earnings, to further adjust net income in each year in which extraordinary expenses or revenues were reported. These adjustments were made to ensure that the financial "snapshot" developed reflects typical years, not unusual ones. Very few firms reported unusual income or expenditures.

[6] Shipments may or may not generate revenues; transfers typically are shipments in which revenues are set equal to operating costs.

[7] EPA evaluated baseline closure facilities to determine whether transfers at cost play a role in the closure analysis, but the available information was insufficient to draw any conclusions.

the likelihood that facilities that launder transferred items will be classified as baseline closures. Furthermore, EPA evaluates nonindependent facilities shown to close in the baseline at the firm level to determine if the firm can afford to continue to support a facility postcompliance, under the assumption that the facility might not close in the baseline because it is not expected to be self-supporting. If the firm can afford to install and operate pollution control equipment in all of its facilities (closing or not), EPA assumes that facilities appearing to close in the baseline would have closed neither in the baseline nor postcompliance.

5.1.1.2 Estimating the Present Value of Future Cash Flow

Current annual cash flow (or its proxy, operating earnings) can be used to estimate the present value of future cash flow by setting a time frame for the analysis (16 years, as discussed in Section Four), defining any trends or cycles that the affected industry's cash flow might follow, and discounting the cash flow projected over the time frame to the present time.[8]

EPA has determined that a slightly rising cash flow forecast over the defined 16-year period (see Section Four) best fits the data provided in the Section 308 Survey, as well as that from other sources (Section Three shows that net income rises slightly in real terms between 1991 and 1993 in the surveyed facilities, and data submitted by commenters indicate that revenues have been rising rapidly in the later years of the 1990s).[9] To be conservative, however, EPA models growth in the industry as flat (thus avoiding the assumption that the industry can "grow" its way out of financial impacts). Because general industry information indicates that this industry is neither cyclical nor declining (see Section Three), EPA expects the flat cash flow growth projection to yield a reasonable estimate of the present value of future cash flow.

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[8] The cash flow period and the cost annualization period are the same to keep the annualized costs comparable to cash flow. Otherwise either cash flow or annualized costs might be overstated relative to the other.

[9]Cleary Hull Reiland & McDevitt, Inc., 1998. *The Uniform Rental Industry*. Winter, p. 2.

To represent this flat cash flow growth, EPA inflated 1991 and 1992 Section 308 Survey data to 1993 dollars using the change in the CPI for SIC 7218 and then took an average of the data for these 3 years. Constant 1993 dollars are used throughout the 16-year period of analysis, so a real (not a nominal) discount rate is used. The same cost of capital factor (discount rate) used in the cost annualization model is used to discount cash flow. All firms and facilities had at least 1 year's data on which to base the projection.

5.1.2 Evaluating Impacts

Establishing the Regulatory Baseline

OMB directs agencies to develop a regulatory baseline against which to judge impacts. OMB's guidance states:

> The benefits and costs of each alternative must be measured against a baseline. The baseline should be the best assessment of the way the world would look absent the proposed regulation. That assessment may consider a wide range of factors, including the likely evolution of the market...[10]

EPA must assess the impacts of regulatory options against a baseline that is the Agency's best assessment of the way the world would look without the regulation. If a facility's present value of cash flow is less than or equal to zero over the 16-year timeframe, EPA's best estimate is that this facility is a baseline closure independent of the impact of a regulatory option. Although it is possible that a facility estimated to be a baseline closure might remain open, the converse also might be true—a facility projected to remain open until it is subject to a rule might actually close independently of a rule. Both results might be equally likely. If EPA were to assume that all facilities that are estimated to close in the baseline were actually postcompliance closures, this would seriously overstate impacts. To avoid either seriously overstating or understating impacts, EPA has chosen to estimate postcompliance closures by counting facilities that are projected to close solely due to the effects of the regulatory options.

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[10] OMB, 1996. "Memorandum for members of the regulatory working group regarding economic analysis of federal regulations under Executive Order 12886." Sally Katzen.

Furthermore, as noted earlier in Section 5.1.1.1, EPA does assess impacts on nonindependent facilities that are estimated to close in the baseline by investigating whether the firm can continue to support the facility in the firm failure analysis. The nonindependent facilities with negative or zero operating earnings as reported in the Section 308 survey are assumed likely to be subsidized by their owners, since they are not supporting themselves currently. If they are being subsidized in the baseline, then EPA can assume they will continue to be subsidized postcompliance, as long as the firm can afford to continue to support all of its facilities postcompliance (which is analyzed in Section Six). Thus only a few single-facility firms are assumed to close regardless of any regulatory action and even fewer would have been subject to a pretreatment standard, regardless of their baseline status, under the cutoffs investigated by EPA. The number of single-facility firms classified as baseline closures thus is very small and certainly within the expected number that might close over a period of a few years. Just in the time between when the screener survey was sent out and when the Section 308 Survey was issued, some survey facilities were reported to have closed or otherwise ceased to operate.

For all of these reasons, EPA creates a regulatory baseline by evaluating the *current* baseline (represented by the data collected in the Section 308 Survey) and determining which facilities are likely to close regardless of regulatory requirements, as directed by OMB Guidance. The facilities that are not expected to close are then used to establish the *regulatory* (as opposed to the current) baseline. This regulatory baseline is the one against which incremental impacts in the postcompliance closure analysis are measured. In analysis of the *current* baseline, EPA uses the model as described above to calculate the present value of the cash flow stream over the 16-year time frame. If a facility's present value of cash flow (current baseline cash flow) is less than or equal to zero, EPA classifies that facility as a "baseline closure." These "closure" facilities are eliminated from the regulatory baseline used in the subsequent, postcompliance closure analysis either because such closures are expected to occur regardless of any regulatory action and therefore cannot be attributed to increased regulatory costs, or because the closure analysis is irrelevant, and the appropriate level of analysis is at the firm level (for nonindependent facilities that are not self-supporting).

Incorporating Compliance Costs

For the postcompliance closure analysis, EPA calculates the impacts of regulatory option costs on cash flow using the facility-specific posttax annualized costs for each regulatory option and an estimate of the depreciation allowed on the compliance investment calculated by EPA's cost annualization model (see Section Four). This figure is then subtracted from baseline cash flow to compute each facility's postcompliance cash flow. EPA assumes that no costs of compliance can be passed through to customers in computing the post compliance cash flow. After computing the postcompliance cash flow, the model notes for which facilities postcompliance cash flow is less than or equal to zero and classifies these facilities as closures. The model actually annualizes these costs and compares them to the baseline annual estimate of cash flow for simplicity and speed of model calculations, since in a zero-growth scenario, results are identical (in terms of whether precompliance cash flow is less than or equal to zero) whether annualized values or present values are used. The number of estimated closures under each cutoff is recorded by revenue size, and cutoff for all facilities. Only the CP-IL option results are presented here. Results for DAF-IL are identical and are shown in Appendix C.

Although EPA assumes no costs can be passed through, it is likely that at least some costs could have been passed through. The cost passthrough percentage is calculated in Appendix A. In this appendix, EPA conducted a market analysis of the industrial laundry industry and concluded that a portion of compliance costs (approximately 32 percent of costs) could have been passed through to industrial laundry customers as a price increase (see Appendix A). EPA believes that some costs would have been passed through to customers for the following reasons. First, although commenters insisted that the industrial laundries industry is highly competitive, this does not mean the *industry* faces a perfectly elastic demand curve, although in a perfectly competitive industry, each *firm* faces a perfectly elastic demand curve (each firm acts as a price taker). If an increase in production costs affects many to most firms in an industry, the relevant demand curve is the *industry* demand curve, which is almost always downward sloping. Data submitted by commenters support the assumption of a downward sloping demand curve. Commenters noted that production costs have been declining, as have prices, while revenues have been rising over the last couple of decades.[11] This means that the industrial laundry industry has been passing through

[11]Comment Response Document, PECON-9B, Tracking Nos. 1584 and 1585.

productivity improvements and production costs savings through to customers in the form of price reductions. The only way this can happen (other than with downward shifts in the demand curve, which could not be happening with rising revenues) is with a downward sloping demand curve. Furthermore, if industry passes through cost savings, industry would have passed through cost increases in the same way. Despite the likelihood that costs can be passed through, however, EPA recognizes that those facilities processing few pounds of laundry might only have passed through a very small part of their costs, while larger facilities might have been able to pass through most of their costs, even though overall, some average cost passthrough would have applied. Additionally, EPA recognizes that in certain markets and with certain customers, individual facilities might have been more constrained than in more typical markets if more extreme competition with substitutes is perceived. Furthermore, at higher cutoffs (e.g., the 5MM/255K cutoff), the model would most likely overstate impacts on the industry supply curve leading to overestimates of cost passthrough and price increases. For these reasons, EPA assumes that costs cannot be passed through to customers, to ensure that impacts on any one facility would not be underestimated. Appendix A presents (as a sensitivity analysis) facility closure results under the assumption that 32 percent of costs can be passed through at each facility. Under most cutoffs, impacts are substantially reduced.

5.2 RESULTS

5.2.1 Baseline Closures

Table 5-1 presents the results of the baseline analysis by type of facility and by revenue categories within each facility type. The results of the analysis indicate that 51 nonindependent facilities (about 6 percent) close in the baseline, (one is an excluded facility under all cutoffs considered) and about 96 single-facility firms (or 11.6 percent) close in the baseline. However, 39 to 74 of these single-facility firms would have been excluded facilities, depending on the cutoff examined (not including the no cutoff scenario, which is used only for comparison purposes), so a rule would have had no effect on them anyway. A total of 22 to 57 nonexcluded, single-facility firms close in the baseline, depending on cutoff, which is only about 8 percent (regardless of cutoff) of all nonexcluded, single-facility firms.

Table 5-1

Baseline Closure Analysis - All Facilities

Revenue Groups ($000)	Closures		Nonclosures		Total
	Number	Percentage of Revenue Group	Number	Percentage of Revenue Group	
Nonindependent Facilities					
Total	51	5.6%	861	94.4%	912
< $1 Million	25	52.8%	22	47.2%	47
>= $1 and < $3.5 Million	4	1.5%	253	98.5%	257
>= $3.5 and < $7 Million	21	5.3%	383	94.7%	405
>= $7 and < $10.5 Million	1	0.9%	155	99.1%	156
>= $10.5 Million	0	0.0%	47	100.0%	47
Single-Facility Firms					
Total	96	11.6%	734	88.4%	830
< $1 Million	72	39.7%	110	60.3%	182
>= $1 and < $3.5 Million	2	0.6%	290	99.4%	292
>= $3.5 and < $7 Million	22	8.7%	236	91.3%	258
>= $7 and < $10.5 Million	0	0.0%	81	100.0%	81
>= $10.5 Million	0	0.0%	18	100.0%	18

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

It is likely that many of the nonindependent facilities shown to close in this analysis are transfer facilities, or are facilities otherwise supported by their firms, and therefore probably would have closed neither in the baseline nor postcompliance as discussed above in Section 5.1.1.1. The ability of firms to afford to continue to support nonindependent facilities postcompliance is assessed in Section Six. Therefore, the number of baseline closures estimated at this stage of the analysis is 96 facilities, of which only 22 to 57 would not have been excluded anyway under the cutoffs investigated. These 22 to 57 single-facility firms amount to only 1.3 to 3.3 percent of all in-scope facilities (1,742 facilities).[12]

As discussed earlier in Section 5.1.2, none of the 147 baseline closure facilities (both excluded and nonexcluded) is analyzed in the postcompliance closure analysis. The total number of potentially affected facilities is adjusted downward to exclude facilities predicted to be baseline closures (single-facility firms) or estimated to be not self-supporting (nonindependent facilities that must be analyzed at the firm level); therefore, only facilities that are self-supporting (nonindependent facilities) and/or financially viable in the baseline (single-facility firms) are analyzed in the postcompliance analysis.[13] These facilities include 734 single-facility firms and 861 nonindependent facilities for a total of 1,595 facilities.

5.2.2 Postcompliance Closures

Tables 5-2 and 5-3 present the results of postcompliance analysis for the CP-IL regulatory option under the four cutoffs discussed in Section Four for single-facility firms and nonindependent facilities, respectively. As noted earlier, only CP-IL option impact results are analyzed in the main report. Impact results for DAF-IL are identical and are presented in Appendix C. As with the baseline results, the postcompliance results are presented by revenue categories. The results presented in these two tables

[12] Note that some nonexcluded single-facility firms that are shown to close in the baseline have ultimate parent companies that might be supporting these firms and could continue to support them postcompliance. To be conservative, however, EPA does not extend this closure analysis to parent companies, but measures baseline conditions and impacts against the most vulnerable corporate levels.

[13] As will be shown in Section Six, all multifacility firms that are not baseline firm failures can afford to install and operate pollution control equipment at all of their facilities, thus the 50 nonindependent facilities shown to close in the baseline might not close in either the baseline nor the postcompliance for the reasons outlined above in Section 5.1.1.1.

Table 5-2

Facility Closure Analysis - Single-Facility Firms*

Closures	CP_IL no cutoff	CP-IL 1MM/255K	CP_IL 3MM/120K	CP-IL 5MM/255K
All facilities (N=734)				
Closures	94	54	39	0
Percentage of all facilities	12.8%	7.4%	5.3%	0.0%
Facilities with revenues less than $1 million (N=110)				
Closures	51	14	0	0
Percentage of all facilities	6.9%	1.9%	0.0%	0.0%
Percentage of revenue group	46.3%	12.8%	0.0%	0.0%
Facilities with revenues >= $1 million and < $3.5 million (N=290)				
Closures	43	40	39	0
Percentage of all facilities	5.9%	5.5%	5.3%	0.0%
Percentage of revenue group	15.0%	13.8%	13.3%	0.0%
Facilities with revenues >=$3.5 million and < $7 million (N=236)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$7 million and <$10.5 million (N=81)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$10.5 million (N=18)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline closures. Note that results have changed from those seen in briefings based on a refinement to the model that more conservatively computes tax shield.

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

Table 5-3

Facility Closure Analysis - Nonindependent Facilities*

Closures	CP_IL no cutoff	CP-IL 1MM/255K	CP_IL 3MM/120K	CP-IL 5MM/255K
All facilities (N=861)				
Closures	12	6	5	2
Percentage of all facilities	1.4%	0.8%	0.6%	0.3%
Facilities with revenues less than $1 million (N=22)				
Closures	7	1	0	0
Percentage of all facilities	0.8%	0.2%	0.0%	0.0%
Percentage of revenue group	32.4%	6.3%	0.0%	0.0%
Facilities with revenues >= $1 million and < $3.5 million (N=253)				
Closures	3	3	3	0
Percentage of all facilities	0.3%	0.3%	0.3%	0.0%
Percentage of revenue group	1.1%	1.1%	1.1%	0.0%
Facilities with revenues >=$3.5 million and < $7 million (N=383)				
Closures	2	2	2	2
Percentage of all facilities	0.3%	0.3%	0.3%	0.3%
Percentage of revenue group	0.6%	0.6%	0.6%	0.6%
Facilities with revenues >=$7 million and <$10.5 million (N=155)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$10.5 million (N=47)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline closures.

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

indicate that single-facility firms and facilities in the revenue category of $1 to $3.5 million would the most affected group under all but the no cutoff and 5MM/255K cutoff scenarios.

As Tables 5-2 through 5-4 show, the option presented here, CP-IL is associated with 2 to 106 closures, depending on cutoff. Note that impacts drop off rapidly when the cutoff is increased to the 5MM/255K group of facilities. Under this cutoff, only 0.2 percent of the facilities would have been affected by a rule. Under the no cutoff scenario, 44 percent of the facilities with revenues less than $1 million would have closed. EPA, however, used this scenario for comparison purposes only. Under EPA's selected cutoff (3MM/120K), 44 facilities would have closed, 39 of which are single-facility firms.

5.3 IMPACTS ON NEW SOURCES

EPA's decision not to promulgate pretreatment standards applies to new sources as well. This section presents EPA's assessment of what impacts on new sources might have been had EPA decided to promulgate pretreatment standards for new sources under the same option and exclusion selected for existing sources (CP-IL under the 3MM/120K cutoff). EPA assessed impacts on new sources by determining whether the regulatory options would have resulted in a barrier to entry into the market.

EPA has found that overall impacts from the either the CP-IL or DAF-IL options would not have been any more severe on new sources than those on existing sources as long as both are subject to the same cutoff, since the costs faced by new sources generally will be similar to those faced by existing sources. Because most new sources and existing sources would have faced similar costs, EPA has determined that the CP-IL option under the 3MM/120K cutoff for new sources would not have posed a barrier to entry on the basis of competitiveness.

EPA also examined whether there would be a barrier to entry for small new sources based on disproportionate impacts measured as closures or failures. EPA investigated facilities in the Section 308 Survey that indicated they were new or relatively new at the time of the survey. Using the Section 308 Survey data, EPA expects that new sources would generally have exceeded most of the threshold size cutoffs that EPA considered for existing sources. Sixty percent of facilities identified as new exceed the 5MM/255K cutoff. The number of new source facilities coming on line each year is extremely small. Over

Table 5-4

Facility Closure Analysis - All Facilities*

Closures	CP_IL no cutoff	CP-IL 1MM/255K	CP_IL 3MM/120K	CP-IL 5MM/255K
All facilities (N=1595)				
Closures	106	61	44	2
Percentage of all facilities	6.7%	3.8%	2.7%	0.2%
Facilities with revenues less than $1 million (N=132)				
Closures	58	15	0	0
Percentage of all facilities	3.6%	1.0%	0.0%	0.0%
Percentage of revenue group	44.0%	11.7%	0.0%	0.0%
Facilities with revenues >= $1 million and < $3.5 million (N=544)				
Closures	46	43	41	0
Percentage of all facilities	2.9%	2.7%	2.6%	0.0%
Percentage of revenue group	8.5%	7.9%	7.6%	0.0%
Facilities with revenues >=$3.5 million and < $7 million (N=619)				
Closures	2	2	2	2
Percentage of all facilities	0.2%	0.2%	0.2%	0.2%
Percentage of revenue group	0.4%	0.4%	0.4%	0.4%
Facilities with revenues >=$7 million and <$10.5 million (N=235)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$10.5 million (N=65)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline closures. Note that results have changed from those seen in briefings based on a refinement to the model that more conservatively computes tax shield.

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

a three year period (1991, 1992, and 1993), according to Section 308 Survey data, laundry operations began at about only 80 facilities (and it is not absolutely clear from the data whether these facilities were actually new dischargers or were existing dischargers acquired in that year by a different firm). Over the 3-year period, this amounts to 27 new sources a year at most, or only 1.5 percent of existing facilities. Given the small level of growth in the industrial laundries industry, EPA believes that new sources are primarily replacing production from closing facilities that exit the market.

Of these facilities identified as new or relatively new facilities, EPA determined that the average revenues of this group exceeded $4 million per year, and the amount of laundry processed averaged over 5 million pounds per year. Only 24 to 32 facilities out of 80 total newer facilities (weighted), or 30 to 40 percent, would meet the size threshold for the exclusions EPA investigated for existing sources. On a yearly basis (given that these facilities started up over the 3 years of the survey) EPA estimates that 8 to 11 facilities of the size, on average, that would meet an exclusion similar to those investigated for existing sources might be started up each year. Under the 3MM/120K cutoff, 30 facilities total, or 10 per year, on average, would meet this exclusion. Overall, in the group of 80 facilities, 6 facilities (weighted), or 7.5 percent, were identified as postcompliance closures (based on a closure by one surveyed nonindependent facility). These facilities would have been exempted under all cutoffs considered. Given the above results, EPA finds that had new sources been regulated under the 3MM/120K cutoff, the rule for new sources would have been economically achievable and no barriers to entry would have occurred.

Furthermore, because both new sources and existing sources would have been provided the same exclusion, EPA avoids a situation where a level playing field would not be provided for new sources relative to existing sources. This could occur when a new smaller facility that was not excluded from the rule must complete with an existing smaller facility that was excluded under the production threshold for the rule. This competitive disadvantage could be a barrier to entry if the production threshold for new and existing sources were not the same.

SECTION SIX

ANALYSIS OF FIRM-LEVEL IMPACTS

The firm-level analysis evaluates the effects on firms of regulatory options[1] that were considered at the time EPA made its decision not to promulgate pretreatment standards for the industrial laundries point source category. It also serves to identify impacts not captured in the facility analysis. For example, some firms might have been be too weak financially to undertake the investment in the technology options considered, even though the investment might have seemed financially feasible at the facility level. Such circumstances can exist, in particular, at firms owning more than one potentially affected facility. Given the range of possible firm-level impacts, the firm-level analysis is an important component of this EA.

EPA determined that 903 firms might have been affected by a pretreatment standard. To evaluate precompliance conditions at and postcompliance impacts on these firms, EPA divided the firms into two categories—single-facility firms (described in Section Five) and multifacility firms. As with facility groupings in Section Five, EPA based firm groupings on responses to Question 27 in Part B of the Section 308 questionnaire, which asked about organizational structure. Because of the differences in organizational structure and size between two categories of firms (discussed below), results are presented separately for each type of firm.

A total of 830 firms classified themselves as single-facility firms by responding with C or E to Question 27 in Part B of the Section 308 Survey.[2] These firms operate as independent entities, although, in some cases, single-facility firms can have an ultimate parent company. As independent entities, these firms maintain balance sheets and income statements and pay corporate taxes on their own earnings. Single-facility firms also are generally smaller than multifacility firms in terms of revenues, production, and employment. Of these firms, 128 to 556 would have met a definition of a small industrial laundries

[1]Again, in this section, the CP-IL option is discussed. Impacts associated with the DAF-IL option are identical and are reported in Appendix C.

[2]As noted in Section Five, single-facility firms are both firms and facilities. To fully capture both facility- and firm-level impacts for these firms, EPA evaluates them as facilities in Section Five and as firms in Section Six.

exclusion under the various cutoffs and thus would have incurred no compliance costs. Note that 2 to 106 single-facility firms were estimated to close in the postcompliance analysis in Section Five. To avoid double counting impacts, these firms are removed from the results of the firm-level analysis. Section Nine discusses the combined impacts of closures and failures on small firms in the industrial laundries industry.

In addition to the 830 single-facility firms, EPA estimated that there are 73 multifacility firms. Multifacility firms are those whose facility representatives responded with A, B, or D to Question 27 in Part B of the Section 308 Survey;[3] these firms own and operate more than one facility and have at least one industrial laundry facility.[4] In addition, they maintain financial records for all their facilities at the firm level and typically pay corporate taxes at the firm level for all owned facilities. As noted above (and as shown in Section Three), multifacility firms tend to be substantially larger than single-facility firms.[5]

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[3] Because the Section 308 Survey was issued only to a subset of all industrial laundry facilities, not all firms owning industrial laundry facilities were identified in the survey. To estimate the total number of multifacility firms (not just those surveyed), EPA compared the survey-weighted number of nonindependent facilities (those responding with A, B, or D to Question 27) to the total number of industrial laundry facilities reported owned by the surveyed firms with nonindependent facilities. (Most surveyed multifacility firms reported owning more than one industrial laundry facility). EPA assumed that the difference between these two numbers of facilities reflects the number of facilities owned by nonsurveyed firms. In order for the two facility numbers to match, EPA would have to multiply the number of firms captured in the survey by 1.7. EPA therefore used this ratio (1.7) as if it were a statistical weight to estimate the total number of multifacility firms, multiplying each surveyed multifacility firm by 1.7. Results of the firm-level analyses for multifacility firms were likewise multiplied by 1.7. Basically, this approach embodies the assumption that the nonsurveyed firms own the same average number of industrial laundry facilities as the surveyed firms. This assumption could bias impact results, allowing impacts to be understated if smaller or more vulnerable multifacility firms are underrepresented in the survey. However, EPA believes any bias that might have been introduced is largely irrelevant given the results of the analysis, which shows that multifacility firms do not fail under any option or cutoff, so the "weight" used does not effect the results.

[4] For example, a firm owning a number of hotels and laundries might own only one laundry that meets the definition of an industrial laundry, with its remaining facilities being either hotels or linen supply laundries.

[5] Impacts on parent companies (i.e., owners of the owner companies) are not analyzed in this EA because the impacts of a given facility closure or major facility-level capital investment become more dilute as assets increase at higher levels in the corporate hierarchy. Thus EPA's analysis assumes that the impacts fall on the most vulnerable firms. Had EPA assumed that the firms in the analysis could be "bailed out" by their parent companies, impacts would most likely have appeared less. For most of the 830 single-facility firms, however, analysis at the facility level, firm level, and corporate parent level coincide.

The basic core of the firm-level analysis, both for single-facility and multifacility firms, is the Altman Z″-score analysis, a ratio analysis that employs several indicators of financial viability to assess firm-level precompliance conditions and postcompliance impacts. Section 6.1 presents an overview of this ratio analysis methodology. Section 6.2 discusses the Altman Z″-score model as it applies to the industrial laundries industry. Section 6.3 summarizes the results of the firm-level analysis in terms of the number of firms that face bankruptcy prior to regulatory compliance (baseline bankruptcies) and the number of firms that experience bankruptcy as a result of additional regulatory compliance costs (incremental bankruptcies). It also discusses the number of firms that, while considered financially healthy in the baseline, slip from the financially healthy category into an indeterminate category in the postcompliance analysis (this is considered an impact short of bankruptcy). Results are presented under an assumption that compliance costs could not have been passed through to customers. Appendix A presents an alternative analysis assuming that compliance costs could have been passed through to the industry's customers.

6.1 RATIO ANALYSIS METHODOLOGY

Ratio analyses are conducted from the perspective of creditors and equity investors who would finance a company's treatment system investment. To attract financing for a treatment system, a company must demonstrate financial strength both before and, on a projected basis, after the treatment system has been purchased and installed. The ratio analysis undertaken in this section simulates the analysis an investor and/or creditor would be likely to employ in deciding whether to finance a treatment system or make any other investment in the firm.

The baseline ratio analysis evaluates the company's financial viability before the investment, and the postcompliance analysis predicts the company's financial condition subsequent to the investment. The baseline analysis identifies companies in extremely weak financial condition, independent of pending regulatory actions. Such companies are at risk of financial failure even without the additional cost of the regulation. Firms that are projected to fail in the baseline analysis are excluded from the postcompliance

analysis. This development of a regulatory baseline is consistent with OMB guidance, as discussed in Section Five.[6]

The postcompliance analysis identifies companies for which regulatory compliance poses a threat to financial viability, although they are otherwise financially sound. Such companies could be weakened by the costs of the regulatory options. These companies are characterized as experiencing a larger impact from the regulatory options than the majority of industrial laundry firms.

For the industrial laundries industry, a ratio analysis based on the Altman Z″-score is used to characterize the baseline and postregulatory financial conditions of potentially affected firms. This method is described in more detail below.

The Altman Z-score, originally developed in the late 1960s for manufacturing firms, is a multidiscriminant analysis (MDA) used to assess bankruptcy potential.[7,8] Over the years, the Altman Z-score model has gained acceptance among financial institutions[9] and, more recently, has been used by EPA in the regulatory impact analyses for centralized waste treaters, the pharmaceutical industry, and the pulp and paper industry. A review of numerous measure of financial health concluded that the Altman's Z approach, while not perfect, is superior to other such measurement reviewed.[10] Altman's Z-score model analyzes a number of financial ratios simultaneously to arrive at a single number to predict the overall

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[6] OMB, 1996. "Memorandum for members of the regulatory working group regarding economic analysis of federal regulations under Executive Order 12866." Sally Katzen.

[7] Multidiscriminant analysis is a statistical procedure similar to regression analysis. It is used primarily to classify or make predictions in cases where the dependent variable is qualitative. In this case, the dependent variable would be "financially stable" or "financially unstable."

[8]Altman, Edward, 1993. *Corporate Financial Distress and Bankruptcy*. New York: John Wiley and Sons.

[9] See for example, Altman, 1993, *Ibid.;* Brealy, Richard A., and Stewart C. Meyers, 1996. *Principles of Corporate Finance*, McGraw Hill Companies, Inc.; and Brigham, E.F., and L.C. Gapenski, 1997. *Financial Management Theory and Practice.* Chicago: The Dryden Press, 8th edition, pp. 1064-1066.

[10] Eastern Research Group, Inc. (ERG), 1999. Review of recent bankruptcy prediction literature. Memorandum from Maureen Kaplan, ERG, to William Wheeler, U.S. EPA. February 12.

financial health of a particular firm. The advantage of the Altman Z-score model over traditional ratio analysis is its simultaneous financial consideration of liquidity, asset management, debt management, profitability, and market value. It addresses the problem of how to interpret a series of financial ratios when some financial ratios look "good" while other ratios look "bad."[11] The Altman Z-function is given in Equation 1:

$$Z = 1.2X_1 + 1.4X_2 + 0.33X_3 + 0.06X_4 + 0.999X_5 \quad \textbf{(1)}$$

where,

$$Z = Overall\ Index$$

$$X_1 = \frac{Working\ Capital}{Total\ Assets}$$

$$X_2 = \frac{Retained\ Earnings}{Total\ Assets}$$

$$X_3 = \frac{Earnings\ Before\ Interest\ and\ Taxes}{Total\ Assets}$$

$$X_4 = \frac{Market\ Value\ of\ Equity}{Book\ Value\ of\ Total\ Liabilities}$$

$$X_5 = \frac{Sales}{Total\ Assets}$$

In a later work, Altman developed two modified versions of this original model for use in evaluating privately held firms (Z′-score) and firms within a service industry (Z″-score).[12] In the original model, the market value component (X_4) uses stock price data; consequently, the Altman Z-score is only applicable to firms with publicly traded stock. The Z'-score model substitutes the book value of equity (owner equity) for the market value in X_4 and thus can be used to evaluate privately and publicly held firms on an equal basis.

[11] Brigham, Eugene F., and Louis C. Gapenski, 1997. *Ibid.*

[12] Altman, Edward. 1993. *Op. cit*.

Altman developed the Z″ function to extend the analysis to nonmanufacturing industrial firms. This revision removes the sales/asset component (X_5) to minimize the industry-sensitive aspect of asset turnover. Altman further notes that, "This particular model is also useful within an industry where the type of financing of assets differs greatly among firms and important adjustments, like lease capitalization, are not made."[13]

Because the industrial laundries industry is a nonmanufacturing industry, the Altman Z″-score is the most appropriate model to use to evaluate the financial conditions of firms in this industry. The equation for the Altman Z″-score model is shown in Equation 2:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4 \quad \textbf{(2)}$$

where,

$$Z'' = Overall\ Index$$

$$X_1 = \frac{Working\ Capital}{Total\ Assets}$$

$$X_2 = \frac{Retained\ Earnings}{Total\ Assets}$$

$$X_3 = \frac{Earnings\ Before\ Interest\ and\ Taxes\ (EBIT)}{Total\ Assets}$$

$$X_4 = \frac{Owner\ Equity}{Total\ Liabilities}$$

Each of the above ratios is further defined below.

- ***Working Capital to Total Assets*** is a liquidity ratio which measures a firm's net liquid assets relative to total capitalization.[14]

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[13] *Ibid.*

[14] Working capital is current assets minus current liabilities and is a measure of available cash on (continued...)

- ***Retained Earnings to Total Assets*** indicates the total amount of reinvested earnings and/or losses associated with a firm over its entire life, relative to total capitalization. [15]
- ***EBIT to Total Assets*** measures the productivity of a firm's assets. Earnings are total firm revenues minus total firm costs (including general and administrative costs and depreciation).

- ***Owner Equity to Total Liabilities*** is a solvency ratio that measures the firm's total indebtedness to the venture capital invested by the owners. High debt levels can indicate high levels of risk.

Taken individually, each of the ratios given above (X_1 through X_4) is higher for firms in good financial condition and lower for firms in poor financial condition. Consequently, the greater a firm's bankruptcy potential, the lower its discriminant score. An Altman Z″-score below 1.1 indicates that bankruptcy is likely; a score above 2.6 indicates that bankruptcy is unlikely. Z″-scores between 1.1 and 2.6 are indeterminate.[16] EPA treats firms with indeterminate scores as financially viable but nevertheless undertakes a separate postcompliance analysis of firms that have baseline scores in the range indicating that bankruptcy is unlikely and postcompliance scores in the indeterminate range. These firms are considered to experience some financial distress short of bankruptcy.

6.2 EVALUATING BASELINE AND POSTCOMPLIANCE RATIOS

6.2.1 Baseline Analysis

As discussed in Section Five, OMB requires EPA to establish a regulatory baseline. There are a number of firms in this analysis that are likely to fail before the rule is promulgated. As in Section Five,

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[14](...continued)
hand.

[15] For this analysis, owner equity (which is total assets minus total liabilities) is used as a proxy for retained earnings. Owner equity includes retained earnings; it also includes paid-in capital, which is the dollar amount over par in stock value. Many industrial laundries are believed to be privately held (according to the Section 308 Survey, 42 percent are S corporations or other noncorporate entities, which are typically privately held) thus owner equity will equal retained earnings in these cases.

[16]Altman, 1993. *Op. cit.*

EPA divides vulnerable firms into those likeliest to fail in the baseline vs. those likeliest to fail postcompliance as a way to avoid either overcounting or undercounting impacts.

The baseline analysis uses the Altman Z″-score model to separate financially healthy firms from those likely to fail regardless of whether the regulation is promulgated. To evaluate the baseline viability of the companies analyzed, the baseline Altman Z″-score values were calculated for each firm using Section 308 Survey data. Where sufficient data were available, 3-year average (1990-1993) financial ratios were calculated and used as the baseline ratios.[17] At a minimum, 1 year of data was available for all firms.

Those firms with baseline scores below 1.1 are considered baseline failures[18] and are removed from the analysis.[19] All other firms (including those with scores in the indeterminate range) are included in the postcompliance analysis.

6.2.2 Postcompliance Analysis

EPA undertakes postcompliance analysis for those firms found to be financially viable in the baseline analysis (i.e., those firms for which the baseline results are "bankruptcy unlikely" or

[17] Data on assets, liabilities, owner equity, and EBIT from the Section 308 Survey were inflated by the CPI for SIC 2718 and averaged over the available years of data (which ranged from 1 to 3 years).

[18] The terms "failure" and "bankruptcy" are used interchangeably in this EA.

[19] In the rare instance when single-facility firms were shown to close in the baseline in Section Five but to remain open in Section Six, these closures are also considered baseline failures because EPA assumes that single-facility firms that close in the baseline are not financially viable as firms and assigns them an Altman Z″ score of 1.00. The facilities in this group are generally firms with very strong equity positions that closed in the baseline facility-level analysis because they reported a small negative cash flow. These firms were found to have baseline Altman Z″-scores in the "bankruptcy unlikely" or "indeterminate" range, so would not have been shown to fail in the baseline without this additional consideration. This approach was taken for consistency with the baseline closure analysis, which also characterized single-facility firms that closed in the baseline as baseline firm failures.

"indeterminate").[20] The total number of potentially affected firms in the postcompliance analysis is adjusted downward to exclude the baseline bankruptcies.

Postcompliance bankruptcy predictions are based on changes in the financial status of a firm as a result of incremental pollution control costs.[21] The change in a firm's bankruptcy potential as a result of incremental pollution control costs, as predicted by the Altman Z″-score, is determined using firm-specific capital and annual O&M costs associated with each regulatory option. For the postcompliance analysis, the relevant survey data (total assets, total liabilities, and EBIT) are adjusted to reflect facility compliance costs for all facilities owned by a particular company.[22] Compliance costs for each facility owned by each company are incorporated into the analysis as follows:

- Postcompliance Total Assets = Total Assets + Capital Cost **(3)**
- Postcompliance Total Liabilities = Total Liabilities + Capital Cost **(4)**
- Postcompliance EBIT = EBIT – (Postcompliance Change in EBIT)[23] **(5)**

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[20] As noted above, EPA considers firms with Z″-scores that fall in the "indeterminate" range to be viable operations, although the financial stability of these firms might be somewhat uncertain.

[21] The pollution control costs for each option were calculated using the cost annualization model described in Section Four.

[22] To estimate firm-level impacts at multifacility firms owning nonsurveyed industrial laundry facilities, EPA assumes that the capital costs and change in EBIT associated with compliance costs for *nonsurveyed* facilities are equal to the capital costs and change in EBIT at the surveyed nonindependent facility with the median and mean annual compliance costs, whichever was higher, depending on regulatory option. Because EPA used all nonindependent facilities to compute the mean or median, costs are likely overstated at the smaller more vulnerable firms, although they could be somewhat understated at the largest firms, which tend to own the largest facilities. Multifacility firms are, however, not very sensitive to this assumption (ERG, 1999. Multifacility firm failure analysis using maximum costs. Memordandum from Anne Jones and Andrea Desilets, to George Denning, U.S. EPA, May 11). For each multifacility firm, costs and change in EBIT for surveyed facilities are summed with estimated costs and change in EBIT for nonsurveyed facilities to develop firm-level figures. The number of nonsurveyed industrial laundry facilities owned by each multifacility firm is calculated based on responses to the Section 308 Survey, which asks for the total number of industrial laundry facilities owned by the firm.

[23] These calculations assume 100 percent financing of compliance equipment through long-term debt, although tax shield on interest payments are not included (see Appendix B). Firms can choose to use working capital or debt. If choosing working capital over debt puts them in precarious financial position,

(continued...)

The postcompliance analysis is performed under the assumption that the industry could not have passed through compliance costs to its customers (an alternative analysis assuming cost passthrough is presented in Appendix A). The change in EBIT presented in Equation (5) reflects no cost passthrough.

Note that even if a firm is considered likely to fail, its facilities (as determined in the facility-closure analysis) might not close. In the cases where a firm is considered likely to fail, its viable facilities could be sold as part of the company liquidation process and operated successfully under different ownership. Also note that some facilities could be sold (and continue to operate) to raise the necessary capital to finance the installation of pollution control equipment at a firm's remaining facilities. Thus multifacility firms that are estimated to fail but that do not have facilities that are estimated to close (as discussed in Section Five) are not considered as severely affected as firms that are estimated to fail and to have to close some or all of their facilities. Single-facility firms that fail but do not close are assumed to be sold, so the primary impact to these firms is their loss of independent status. This impact is considered to be a lesser impact than closure, but is assumed to have some impact on employment in the industry (see Section Seven).[24] Single-facility firms that fail and close would not be counted here because the significant impacts to these entities are already captured in the closure analysis in Section Five.

(...continued)
then that is a poor business decision. EPA must assume firms make reasonable business decisions. Firms are assumed to incur all compliance costs for all facilities regardless of whether the facilities close in the baseline or postcompliance facility-level analyses, since liquidation and other costs associated with a facility closure will not exceed the compliance costs associated with a closing facility. Note that the postcompliance change in assets and liabilities are set to capital expenditures for modeling simplicity, thus also providing a conservative estimate of ratios (assets and liabilities are used in the denominators of Altman's Z″ ratios, so larger numbers reduce those ratios). EBIT is calculated using one year's O&M plus the third year depreciation to adjust baseline EBIT. This year's depreciation was selected, since Altman's Z″ is likeliest to identify bankruptcies over a 2- to 5-year period.

[24] Although some industry sources indicated that the acquisition of a firm or facility does not result in employment losses and that the facilities or firms are usually operated intact, others indicated that many facilities or firms might be acquired and transformed into depots with a subsequent loss of up to 75 percent of the employees (see discussion in Section Three).

6.3 BASELINE AND POSTCOMPLIANCE ALTMAN Z″-SCORE RESULTS

6.3.1 Baseline Altman Z″-Score Results

Table 6-1 presents the baseline results of the Altman Z″-score analysis, grouped according to firm type (single-facility and multifacility). The table presents the total number of firms in each of the Z″-score categories (i.e., "bankruptcy likely," "indeterminate," and "bankruptcy unlikely"), as well as the total number of firms in each Z″-score category broken down by revenue groups. As stated previously, an Altman Z″-score below 1.1 indicates that bankruptcy is likely; a score above 2.6 indicates that bankruptcy is unlikely. Z″-scores between 1.1 and 2.6 are indeterminate.

The results in Table 6-1 indicate that single-facility firms have the greatest likelihood of bankruptcy in the baseline, with nearly 19 percent of single-facility firms facing potential bankruptcy prior to the imposition of any regulatory costs. Additionally, among single-facility firms, EPA predicts that firms with less than $1 million in revenues will experience the largest number of bankruptcies in the baseline. Based on these results, note that multifacility firms appear less likely to fail in the baseline analysis than single-facility firms.

EPA analyzed an initial total of 745 firms (675 single-facility firms and 70 multifacility firms)[25] in the postcompliance analysis, the results of which are discussed in Section 6.3.2. These numbers include firms in a small industrial laundries exclusion as defined by the cutoffs, but do not include any that close or fail in the baseline. Of the firms considered in the postcompliance analysis, a number of firms fall in the "indeterminate" category postcompliance. EPA considers these firms to be viable operations in marginal financial health; as such, these firms are discussed separately in Section 6.3.3.

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[25] Note that of the 830 single-facility firms, 96 single-facility firms fail in the baseline because their facilities are predicted to close in the baseline facility-level analysis in Section Five. (As discussed above, single-facility firms that close in the baseline are assumed also to fail. Even if this assumption is not made, however, most of these 96 firms would fail based on the Altman Z″ analysis.) Thus only 59 firms fail in the baseline additional to those closing in the baseline. This totals 155 facilities, leaving 675 single-facility firms in the analysis. Additionally, 0 to 94 single-facility firms are estimated to close in the postcompliance analysis presented in Section Five, depending on cutoff. These 0 to 94 firms have been removed from the postcompliance analyses, as discussed earlier, to avoid double counting of impacts. Thus the actual number of single-facility firms analyzed ranges from 581 to 675, depending on cutoff.

Table 6-1

Baseline Firm Failure Analysis- All Firms

Firm Size or Type	Bankruptcy Likely Z''<1.1		Indeterminate 1.1<Z''<2.6		Bankruptcy Unlikely Z''>2.6	
	Number	Percentage of Revenue Group	Number	Percentage of Revenue group	Number	Percentage of Revenue Group
Multifacility Firms						
All Multifacility Firms	3	4.5%	8	11.4%	61	84.1%
By Revenue Group ($000)						
< $1 Million	0	0.0%	0	0.0%	2	100.0%
>= $1 and < $3.5 Million	0	0.0%	0	0.0%	5	100.0%
>= $3.5 and < $7 Million	0	0.0%	0	0.0%	8	100.0%
>= $7 and < $10.5 Million	0	0.0%	2	16.7%	8	83.3%
>= $10.5 Million	3	6.9%	7	13.8%	38	79.3%
Single-Facility Firms						
All Single-Facility Firms	155	18.6%	65	7.9%	610	73.5%
By Revenue Group ($000)						
< $1 Million	84	46.0%	34	18.5%	64	35.4%
>= $1 and < $3.5 Million	28	9.5%	11	3.7%	254	86.8%
>= $3.5 and < $7 Million	42	11.4%	18	7.6%	198	81.1%
>= $7 and < $10.5 Million	0	0.0%	0	0.0%	81	100.0%
>= $10.5 Million	1	0.0%	3	15.4%	14	84.6%

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

6.3.2 Postcompliance Altman Z″-Score Results — "Bankruptcy Likely"

Table 6-2 presents the results of the postcompliance Altman Z″ analysis for single-facility firms under the CP-IL option (the results for the DAF-IL option are identical and are discussed in Appendix C). As the table shows, most bankruptcies would have occurred among firms with revenues under $1 million per year with no cutoff or under the 1MM/255K cutoff. Numbers of firms potentially facing bankruptcy (or loss of independent status) total 72 under these two scenarios. Under the higher 3MM/120K and 5MM/255K cutoffs, no firm failures would have occurred.

Table 6-3 presents the results of the postcompliance Altman Z″ analysis for multifacility firms: no failures are expected under any cutoffs.

Table 6-4 combines the results for the two types of firms. As the table shows, impacts range from no to 72 failures, or 0 percent to 9.7 percent of all firms depending on cutoff. The selected 3MM/120K cutoff is associated with no firm failures.

6.3.3 Postcompliance Altman Z″-Score Results — Change From Healthy to Indeterminate Status

Table 6-5 presents the results of an analysis looking at the numbers of facilities that change from Altman Z″-scores of greater than 2.6 (bankruptcy unlikely) to less than 2.6 but greater than 1.1 (status "indeterminate"). As the table shows, 0 to 54 firms change financial status in this manner, depending on cutoff. This result is considered a potential impact of the regulatory options, but is considered a lesser impact than bankruptcy, because these firms might not have been on track to failure if a pretreatment standard had been implemented and probably would have had more time and flexibility to improve their financial condition than those firms whose scores fell in the "bankruptcy likely" category. The 3MM/120K cutoff is associated with no firms changing status from healthy to indeterminate.

Table 6-2

Firm Failure Analysis - Single-Facility Firms*

Bankruptcies	CP_IL no cutoff	CP_IL 1MM/255K	CP_IL 3MM/120K	CP_IL 5MM/255K
All single-facility firms (N=675)**				
Incremental bankruptcies	72	72	0	0
Percentage of all single-facility firms	12.1%	12.1%	0.0%	0.0%
Single-facility firms with revenues < $1 million (N=98)**				
Incremental bankruptcies	53	53	0	0
Percentage of all single-facility firms	9.0%	9.0%	0.0%	0.0%
Percentage of revenue group	90.6%	90.6%	0.0%	0.0%
Single-facility firms with revenues >= $1 million and < $3.5 million (N=264)**				
Incremental bankruptcies	0	0	0	0
Percentage of all single-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Single-facility firms with revenues >=$3.5 million and < $7 million (N=216)**				
Incremental bankruptcies	18	18	0	0
Percentage of all single-facility firms	3.1%	3.1%	0.0%	0.0%
Percentage of revenue group	8.5%	8.5%	0.0%	0.0%
Single-facility firms with revenues >=$7 million and <$10.5 million (N=81)**				
Incremental bankruptcies	0	0	0	0
Percentage of all single-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Single-facility firms with revenues >=$10.5 million (N=16)**				
Incremental bankruptcies	0	0	0	0
Percentage of all single-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline bankruptcies and baseline and postcompliance closures among single-facility firms.

** Number of facilities in each revenue group varies by the difference in postcompliance closures among options.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

Table 6-3

Firm Failure Analysis - Multifacility Firms*

Bankruptcies	CP_IL no cutoff	CP_IL 1MM/255K	CP_IL 3MM/120K	CP_IL 5MM/255K
All multifacility firms (N=70)				
Incremental bankruptcies	0	0	0	0
Percentage of all multi-facility firms	0.0%	0.0%	0.0%	0.0%
Multifacility firms with revenues < $1 million (N=2)				
Incremental bankruptcies	0	0	0	0
Percentage of all multi-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Multifacility firms with revenues >= $1 million and < $3.5 million (N=5)				
Incremental bankruptcies	0	0	0	0
Percentage of all multi-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Multifacility firms with revenues >=$3.5 million and < $7 million (N=8)				
Incremental bankruptcies	0	0	0	0
Percentage of all multi-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Multifacility firms with revenues >=$7 million and <$10.5 million (N=10)				
Incremental bankruptcies	0	0	0	0
Percentage of all multi-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Multifacility firms with revenues >=$10.5 million (N=45)				
Incremental bankruptcies	0	0	0	0
Percentage of all multi-facility firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline bankruptcies and baseline and postcompliance closures among single-facility firms.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

Table 6-4

Firm Failure Analysis - All Firms*

Bankruptcies	CP_IL no cutoff	CP_IL 1MM/255K	CP_IL 3MM/120K	CP_IL 5MM/255K
All firms (N=745)**				
Incremental bankruptcies	72	72	0	0
Percentage of all firms	9.6%	9.6%	0.0%	0.0%
Firms with revenues < $1 million (N=100)**				
Incremental bankruptcies	53	53	0	0
Percentage of all firms	7.2%	7.2%	0.0%	0.0%
Percentage of revenue group	53.5%	53.5%	0.0%	0.0%
Firms with revenues >= $1 million and < $3.5 million (N=269)**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Firms with revenues >=$3.5 million and < $7 million (N=224)**				
Incremental bankruptcies	18	18	0	0
Percentage of all firms	2.5%	2.5%	0.0%	0.0%
Percentage of revenue group	8.2%	8.2%	0.0%	0.0%
Firms with revenues >=$7 million and <$10.5 million (N=91)**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Firms with revenues >=$10.5 million (N=61)**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline bankruptcies and baseline and postcompliance closures among single-facility firms.

** Number of facilities in each revenue group varies by the difference in postcompliance closures among options.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

Table 6-5

Indeterminate Analysis - All Firms

Indeterminates	CP no cutoff	CP 1MM/255K	CP 3MM/120K	CP 5MM/255K
All firms (N=651)				
Incremental indeterminates	54	7	0	0
Percentage of all firms	7.3%	0.9%	0.0%	0.0%
Firms with revenues < $1 million (N=49)				
Incremental indeterminates	2	2	0	0
Percentage of all firms	0.2%	0.2%	0.0%	0.0%
Percentage of revenue group	1.7%	1.7%	0.0%	0.0%
Firms with revenues >= $1 million and < $3.5 million (N=226)				
Incremental indeterminates	33	2	0	0
Percentage of all firms	4.5%	0.2%	0.0%	0.0%
Percentage of revenue group	12.3%	0.6%	0.0%	0.0%
Firms with revenues >=$3.5 million and < $7 million (N=224)				
Incremental indeterminates	17	2	0	0
Percentage of all firms	2.2%	0.2%	0.0%	0.0%
Percentage of revenue group	7.4%	0.7%	0.0%	0.0%
Firms with revenues >=$7 million and <$10.5 million (N=91)				
Incremental indeterminates	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Firms with revenues >=$10.5 million (N=61)				
Incremental indeterminates	3	2	0	0
Percentage of all firms	0.4%	0.2%	0.0%	0.0%
Percentage of revenue group	4.5%	2.7%	0.0%	0.0%

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

SECTION SEVEN

INDUSTRY, NATIONAL, AND REGIONAL EMPLOYMENT IMPACTS AND TOTAL NATIONAL OUTPUT LOSSES

This section of the EA assesses the employment impacts of the regulatory options EPA considered during the pretreatment standards decisionmaking process on the industrial laundries industry, the national economy, and communities in which highly affected industrial laundries are located. It also discusses output losses to the national economy that would have been induced by revenue losses in the industrial laundries industry. Only impacts on existing sources are discussed here; Section Five discusses impacts on new sources.

EPA first examines the losses of employment in the industrial laundries industry and U.S. economy driven by the facility closures and failures that were estimated in Sections Five and Six to have occurred under the CP-IL option and the various cutoffs examined. Next EPA examines national-level employment losses and gains that would have occurred throughout the economy in response to the reallocation of expenditures had pretreatment standards been promulgated. Additionally, because closures can overstate or understate total employment losses over time (since nonclosing facilities might have expanded production to take over some of the lost production of closing facilities, if not capacity constrained, or production losses at market equilibrium might be greater than those associated with closing facilities), EPA also estimates longer-term employment losses that might have occurred in the industrial laundries industry alone. These losses are tempered by gains within that industry (due to direct hiring of pollution control equipment operators within the industry),[1] so EPA calculates a net direct loss of employment in this analysis. Finally, EPA examines regional-level losses to determine impacts on communities.

To understand the methods for estimating national- and regional-level impacts, whether driven by closures and failures or by output losses, an understanding of input-output (I-O) analysis is required. Pollution control expenditures divert investment away from production by industrial laundries (production

[1]Note that many of these operators may be transferred at least in part from production jobs at industrial laundry facilities (Knight, Lynn, ERG, 1993. "Interview and site visit with Brian Keegan, Unifirst," June 10. CBI material in the Decisionmaking Record.)

in this context is economic terminology meaning "production" of industrial laundering services), which leads to direct employment losses and to a reduction in industrial laundry production. These losses are offset by gains in employment and production in the firms that manufacture the pollution control equipment and by gains in employment related to installing and operating the equipment. Some of these gains might have even occurred in the industrial laundries industry itself. These gains and losses can be measured using I-O analysis.

To compute either regional- or national-level employment changes, output effects or direct employment losses such as facility closures must be considered. Output loss, as defined for the purposes of I-O analysis, is measured as the total production loss multiplied by the unit price of that production (price per pound of laundry), or the gross revenue loss to the industry. Industrial laundry investments in compliance equipment and the operation of the equipment translate directly into output losses in the industrial laundries industry (assuming none of these costs is passed through to customers); that is, the costs of compliance equal the output losses, which is consistent with economic theory under a zero cost passthrough scenario (perfectly elastic demand curve—see Appendix A).[2] Declines in production at industrial laundries affect the revenues of input industries (industries that supply goods and services to the industrial laundries industry). These shifts in turn eventually result in a reduction of household consumption by workers in both industrial laundries and input industries, decreasing demand for consumer products at the national level. Direct employment effects such as employment losses from postcompliance facility closures or firm failures also can be used to derive national- and regional-level impacts using direct-effect multipliers. Impacts on the industrial laundries industry are known as direct effects, impacts that continue to resonate through the economy are known as indirect effects (effects on input industries), and effects on consumer demand are known as induced effects. Such effects are tracked both nationally and regionally in massive I-O tables prepared by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). For every dollar spent in a "spending industry" (or for every employment change in the

[2]When the demand curve is perfectly elastic, the output loss, which is a function of the unit cost of compliance (cost of compliance per pound of laundry processed), simplifies to Output = (Total Cost of Compliance/Initial Quantity of Production) * Initial Quantity of Production. Thus output loss further simplifies to the total cost of compliance. Appendix A discusses some of these equations in more detail. This assumption will hold as long as the supply curve is roughly unitary (neither very elastic nor very inelastic). The loss of output occurs because the industry supply curve shifts up over all points in the curve. The industry supply curve is the aggregation of all facilities' marginal cost curves, which increase at every point when pollution control costs are added to production costs (see Figure A-1 in Appendix A).

directly affected industry), these tables identify the portion spent (or every employment change) in contributing or vendor industries and the portion spent by consumers (or employment change as a result of a change in consumption).

For example, as a result of the implementation of the CP-IL option (results of only the CP-IL option are discussed here, since the DAF results are nearly identical), an industrial laundry might have had to purchase equipment to meet the standards equivalent to chemical precipitation. One piece of this equipment could be a tank to hold wastewater. To make the tanks, the manufacturer would purchase stainless steel. The steel manufacturer would purchase iron ore, coke, energy sources, and other commodities. Thus a portion of a dollar spent by the industrial laundries industry becomes a smaller portion of a dollar spent by the tank manufacturer, and a smaller portion of a dollar spent by the steel manufacturer, and so on. These iterations are captured in BEA's I-O tables and summarized as regional and national multipliers for output (revenues). BEA also has determined average wages and the proportion of output in each industry that goes to employee earnings and, as a result, the number of employees or full-time equivalents (FTEs)[3] associated with each $1 million change in output. I-O analysis provides a straightforward framework as long as the direct effects to the industry are small and certain limiting assumptions about technology are valid (e.g., constant returns to scale and fixed input ratios).

As noted above, I-O analysis uses the multipliers derived by BEA to determine both output and employment effects. There are national-level multipliers and regional-level multipliers. National-level multipliers used here include final-demand output multipliers (which are used to estimate total U.S. economy effects when output changes in a specific industry), final-demand employment multipliers (which are used to estimate the change in total U.S. employment when output changes in a specific industry), and direct-effect employment multipliers (which are used to estimate the change in U.S. employment given a change in employment in a specific industry, for example changes in employment due to closures or failures). The regional multipliers used here are direct-effect employment multipliers (which are used to estimate a state-wide change in employment given a change in employment in a specific industry in a specific state). These multipliers will be discussed in more detail below.

[3] One FTE = 2,080 labor hours = 1 person-year of employment.

The analysis of employment and output losses (as well as related impacts) is divided into four parts. Section 7.1 presents the methodology and results for estimating the direct employment losses in the industrial laundries industry based on the facility closures and firm failures estimated in Sections Five and Six to have occurred as a result of compliance with the CP-IL option under the various cutoffs considered. This section also discusses the impacts such losses would have on the national-level economy.

Section 7.2 analyzes the national-level impacts of the CP-IL option on both labor and output using direct output effects, which produce a different estimate of employment effects than that derived using closures and failures, since output effects and economic impacts are never exactly correlated.

Section 7.3 discusses two analyses that calculate the net, direct impacts on the industrial laundries industry based on reductions in output or production (which in turn affect employment) These analyses are considered the longer-term impacts of the rule, with the impacts from closures and failures being the more immediate impacts of the rule. The first analysis uses the standard I-O analysis assumption that compliance costs equal direct output losses to compute employment losses within the industrial laundries industry. This estimate is considered a reasonable worst-case estimate. The second analysis uses production losses estimated by EPA's market model (assuming costs can be passed through) and current price to estimate the output losses in the industry, which is then used to compute direct employment losses. This analysis is considered to produce a reasonable best-case estimate of employment losses, and the two analyses together are considered reasonable bounding estimates of net, production-driven, longer-term impact.

Finally, Section 7.4 examines the regional impacts associated with employment losses and presents the methodology and results of the employment loss and community-level impact analyses. Note that the net change in employment at the national level includes the regional-level losses (i.e., national and regional losses are not additive).

7.1 INDUSTRY-LEVEL EMPLOYMENT LOSSES FROM FACILITY CLOSURES AND FIRM FAILURES

This section assesses the employment losses that might have occurred based on estimates of facility closures and firm failures presented in Sections Five and Six. According to these estimates, from 2 to 106

facilities would have been expected to close and from 0 to 72 firms would have been expected to fail, depending on cutoff. Closing facilities are associated with 235 to 3,318 FTEs, depending on cutoff, based on the analysis in Section Five and on Section 308 Survey data on employment at closing facilities (see Table 7-1). The number of FTEs associated with failing firms range from 0 to 2,294, of which EPA estimates as many as 75 percent might be lost in the process of firm acquisitions.[4] Thus from 0 to 1,721 FTEs might have been lost as a result of firm failures. Therefore, total losses might have ranged from 235 to 5,039 FTEs.

As noted above in the introduction, these direct effects are associated with indirect and induced employment effects, which can be estimated using BEA's national-level direct-effect employment multiplier for the industrial laundries industry (1.7201)[5]. Total employment losses to the U.S. economy associated with the employment losses occurring in the industrial laundries industry due to closures and failures are estimated to have been 404 to 8,667 FTEs, depending on cutoff (see Table 7-1). The 3MM/120K cutoff is associated with direct losses of 2,261 FTEs and direct, indirect, and induced losses of 3,889 FTEs. This latter number, while a national-level figure, does not account for output-based losses (which can be different from losses calculated on the basis of facility closures and firm failures, as discussed above), nor does it account for possible employment gains due to the need for operating pollution control equipment. Output-based employment losses and gains in the national-level economy are discussed in Section 7.2.

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[4] Based on comments from industry (see Comment Response Document, PECON-2D, Tracking No. 1494), EPA has revised its methodology for calculating the short-term employment effects by assuming that failures can also contribute to employment losses. Comments received indicated that as much as 75 percent of employment might be lost if a failing firm is acquired and turned into a depot instead of continuing to operate.

[5] U.S. Department of Commerce, 1992. Table A-2.4—Total Multipliers, by Industry Aggregation, for Output, Earnings, and Employment. *Regional Input-Output Modeling System (RIMS II)*. Washington, DC: BEA, Regional Analysis Division, (RIMS II National Multipliers).

Table 7-1

Employment Losses in the U.S. Economy Based on Closures and Failures in the Industrial Laundries Industry

Option	Employment Losses Based on Facility Closures	Employment Losses Based on Facility Closures Plus Failures	Percent of Industry Employment	Direct Effect Employment Multiplier	Total Closure-Based FTE Loss	Total Closure Plus Failure-Based FTE Loss
No Cutoff	3,318	5,039	3.9%	1.7201	5,707	8,667
1MM/255K	2,684	4,405	3.4%	1.7201	4,617	7,576
3MM/120K	2,261	2,261	1.8%	1.7201	3,889	3,889
5MM/255K	235	235	0.2%	1.7201	404	404

Source: EPA, 1999, Firm and Facility Financial Model and Section 308 Survey Data. Multiplier is from Department of Commerce, 1992, op. cit.

7.2 NATIONAL-LEVEL OUTPUT AND EMPLOYMENT IMPACTS

7.2.1 Introduction

To comply with the CP-IL option, facilities might have needed to install and operate pollution control systems. The costs for these systems would have reduced output and employment in the industrial laundries industry and increased output and employment in the sectors that manufacture, install, and operate pollution control equipment.

Despite the fact that employment losses and gains associated with pollution control expenditures tend to act as counterbalances, there are differences in the national-level economy under baseline and postcompliance scenarios. Baseline and postcompliance labor effects differ primarily because the industrial laundries industry is substantially more labor-intensive than the various pollution control industries. Furthermore, the output multiplier for the industrial laundries industry is greater than those for the pollution control industries, so output losses might exceed output gains.

7.2.2 Methodology for Estimating National-Level Output and Employment Impacts

EPA estimates two categories of national-level impacts associated with the CP-IL option: impacts on output in the economy as a whole (in dollars) and impacts on national employment (in FTEs).

7.2.2.1 National-Level Output Losses and Gains

The loss in national-level output associated with output loss in the industrial laundries industry is estimated using the pretax capital and O&M costs of compliance (not adjusted for cost passthrough), which were presented in Section Four, Table 4-3, for each of the regulatory options. The pretax costs are used because I-O multipliers are based on changes in revenues, which are pretax numbers.

BEA industry 72.0201, which corresponds to SIC 721 and 725 (laundry, cleaning, garment services, and shoe repair), is the detailed industry category that most closely matches the industrial laundries industry. The national-level output multiplier estimated by BEA for this industry grouping is 3.7134 (RIMS II National Multipliers).[6] This multiplier represents the total dollar change in national output for all industries for each dollar change in the output of the industrial laundries industry. Using the BEA multiplier and the output loss to the industry (equivalent to the pretax compliance costs to the industry, as discussed above), EPA estimates losses throughout the national economy in the following way:

Option Compliance Cost x 3.7134 = National-Level Output Loss

EPA also estimates the output gains in the economy using the following output multipliers[7] for the pollution control industries:

- For capital material costs: BEA Industry 42.0800 (pipes, valves, and pipe fittings); BEA Industry 40.0600 (fabricated plate work);[8] and BEA Industry 49.0100 (pumps and compressors), with a weighted output multiplier of 3.0516.[9] Capital material costs are assumed to be 85 percent of the total capital costs estimated for each option.

- For installation costs: BEA Industry 11.0000 (construction — new and maintenance and repair), with a multiplier of 3.1957. Installation costs are assumed to be 15 percent of total capital costs estimated for each option.

- For operating costs: (1) Labor: BEA Industry 72.0201 (laundries), with a multiplier of 3.7134 (assumes that operators for pollution control equipment will be hired by the affected industry); (2) Materials: BEA Industry 27.0406 (chemical and chemical preparations, not elsewhere classified) with a multiplier of 2.9083; (3) Energy: BEA

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[6] Department of Commerce, 1992. *Op cit.*

[7] *Ibid.*

[8] Includes tanks.

[9] The weighted multiplier is developed assuming that 20 percent of capitol costs is piping, 10 percent is pumps, and 70 percent is tanks. These breakdowns, as well as those discussed in the following bullets, are developed on the basis of discussions with EPA's technical contractor (telephone conversation between Anne Jones, Eastern Research Group, Lexington, MA, and Wendy Grome, Eastern Research Group, Herndon, VA, June 3, 1997). These same assumptions are applied to the development of the employment multiplier breakdown discussed later.

Industry 68.0100 (electric services [utilities]), with a multiplier of 2.2370. Labor, materials, and energy costs are assumed to make up one-third each of operating costs.

Gains are calculated using the cost share assigned to an industry (e.g., O&M cost/3 x 2.9083 = national-level output gain associated with the materials portion of O&M cost). When all the gains associated with pollution control industries are aggregated, EPA can estimate the total output gains attributable to the CP-IL option. To determine a net loss or gain, EPA then compares the losses and gains in the economy.

7.2.2.2 National-Level Employment Losses and Gains

In calculating national-level employment impacts, the Agency uses a similar approach to that used to calculate output effects. Based on industrial laundries industry output, BEA (RIMS II National Multipliers) has estimated a final-demand multiplier for national-level employment of 83.3. This number represents the total change in the number of jobs in all industries nationally for each $1 million change in output delivered to final demand by the industrial laundries industry.[10] Therefore, to calculate employment impacts, EPA divides the output loss of the industrial laundries industry, measured as the annual pretax compliance cost, by $1 million and multiplies this figure by BEA's employment multiplier.[11]

EPA believes that this approach will yield a possible worst-case estimate of employment losses nationwide because the Agency is assuming costs are not passed through to customers. Customer industries generally have much lower multipliers (on the basis of number of employees per $1 million output). Customer multipliers are easily half of the 83.3 employees per $1 million output of the industrial laundries industry.[12]

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[10]Employment impacts calculated using a final-demand multiplier include direct, indirect, and induced effects.

[11] Losses are deflated to 1992 dollars because BEA's national multipliers are based on 1992 data. EPA uses *Engineering News Record*, 1997. "Construction Cost Index," March 31, for deflating.

[12] The difference in output multipliers between the industrial laundries and its customer industries is not so extreme, thus the overestimate of the national-level employment loss may be proportionately

(continued...)

Employment gains are estimated using the final-demand multipliers for each of the pollution control industries listed above. These multipliers are:

- For capital material costs: BEA Industry 42.0800 (pipes, valves, and pipe fittings); BEA Industry 40.0600 (fabricated plate work); and BEA Industry 49.0100 (pumps and compressors), with a weighted average final-demand employment multiplier of 31.4.[13]

- For installation costs: BEA Industry 11.0000 (construction — new and maintenance and repair), with a multiplier of 21.5.

- For operating costs: (1) Labor: BEA Industry 72.0201 (laundries), with a multiplier of 83.3 (assumes that operators for pollution control equipment will be hired by the affected industry); (2) Materials: BEA Industry 27.0406 (chemicals and chemical preparations, not elsewhere classified) with a multiplier of 23.7; and (3) Energy: BEA Industry 68.0100 (electric services [utilities]), with a multiplier of 15.8.

EPA computes employment gains by multiplying the appropriate industry shares of the pollution control costs times the appropriate multiplier. After aggregating all gains, EPA compares national-level losses and gains to compute the net employment change resulting from the CP-IL option. This net change can then be compared to national-level employment to gauge the magnitude of employment impacts on the national economy.

7.2.3 National-Level Output and Employment Impacts

The sections that follow present the national-level output losses and employment losses calculated on the basis that direct output losses equal compliance costs in Sections 7.2.3.1 and 7.2.3.2.

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[12](...continued)
greater than the overestimate of the national-level output loss.

[13]Weighting is the same as that used for the output gains analysis.

7.2.3.1 National-Level Output Losses

Table 7-2 shows the total gross, national-level output losses associated with the CP-IL option. Using the output multiplier of 3.7134, EPA estimates national-level output losses would have ranged from $287.4 million to $667.3 million per year, depending on cutoff.

Table 7-3 shows the total gross national-level output gains associated with purchasing, installing, and operating pollution control equipment. The national-level output gains are estimated to total $232.3 million to $535.4 million per year with a net annual loss of national-level output of $55.1 million to $131.9 million per year, depending on cutoff (see Table 7-4). At most, this is 0.001 percent of 1993 gross domestic product ($6.6 trillion),[14] thus EPA believes this loss would have had a negligible effect on the national-level economy.

7.2.3.2 National-Level Employment Losses

Table 7-5 presents the national-level employment losses associated with potential lost industrial laundries industry output. EPA converts the industry output losses into millions of 1992 dollars[15] and multiplies these losses by the employment multipliers to determine total annual employment losses of 6,169 to 14,322 FTEs, depending on cutoff. Note that the losses estimated here for national-level employment losses exceed those estimated using facility closures and failures in Section 7.1. At most, this is only 0.01 percent of total U.S. employment of 120.3 million persons in 1993.[16]

Table 7-6 presents the national-level employment gains associated with the output gains in the pollution control industries. These gains total 2,780 to 6,422 FTEs, depending on cutoff. The CP-IL option therefore is associated with a net loss of 3,389 to 7,900 FTEs, depending on cutoff (see Table 7-7).

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[14] U.S. Government Printing Office, 1997. *Economic Report of the President, February, 1997.* Washington, DC: U.S. Government Printing Office.

[15] BEA's RIMS II National Multipliers are based on 1992 data.

[16] U.S. Government Printing Office, 1997. *Op. cit.*

Table 7-2

Annual National-Level Output Losses (millions, 1993 dollars)

Option	Total Estimated Output Loss in the Industrial Laundries Industry	Output Multiplier	National-Level Output Losses
No Cutoff	$179.70	3.7134	$667.30
1MM/255K	$171.29	3.7134	$636.07
3MM/120K	$131.25	3.7134	$487.38
5MM/255K	$77.40	3.7134	$287.42

Source: Output loss is from U.S. EPA, 1999. IL Facility and Firm Financial Model (included in Decisionmaking Record). Output multiplier is from U.S. Department of Commerce, 1992. Table A-2.4--Total Multipliers, by Industry Aggregation, for Output,Earnings and Employment. Regional Input-Output Modeling System (RIMS II). BEA, Regional Analysis Division.

Table 7-3

Annual National-Level Output Gains (millions, 1993 dollars)

Item	No Cutoff	1MM/255K	3MM/120K	5MM/255K
Total Capital Cost (Annualized Over 16 Years at 7%)	$55.98	$53.72	$41.02	$24.78
Capital Materials Cost (85% of Total Cost)	$47.58	$45.66	$34.87	$21.06
Capital Materials Multiplier	3.0516	3.0516	3.0516	3.0516
Output Gain (Capital Materials)	$145.20	$139.35	$106.40	$64.28
Installation Cost (15% of Total Cost)	$8.40	$8.06	$6.15	$3.72
Installation Cost Multiplier	3.1957	3.1957	3.1957	3.1957
Output Gain (Installation)	$26.83	$25.75	$19.66	$11.88
Total O&M Cost	$123.06	$116.84	$89.16	$52.87
Labor Share (33.3%)	$41.02	$38.95	$29.72	$17.62
Labor Multiplier	3.7134	3.7134	3.7134	3.7134
Output Gain (Labor)	$152.32	$144.62	$110.36	$65.44
Materials Share (33.3%)	$41.02	$38.95	$29.72	$17.62
Materials Multiplier	2.9083	2.9083	2.9083	2.9083
Output Gain (Materials)	$119.30	$113.27	$86.43	$51.25
Energy Share (33.3%)	$41.02	$38.95	$29.72	$17.62
Energy Multiplier	2.237	2.237	2.237	2.237
Output Gain (Energy)	$91.76	$87.12	$66.48	$39.42
Total Output Gain	$535.41	$510.12	$389.34	$232.28

Source: Capital and O&M costs are from EPA's Final Technical Report. Multipliers are derived as discussed in the EA.

Table 7-4

Net Annual National-Level Output Losses (millions, 1993 dollars)

Option	Total Annual Loss	Total Annual Gain	Net Loss in National-Level Output
No Cutoff	$667.30	$535.41	$131.88
1MM/255K	$636.07	$510.12	$125.95
3MM/120K	$487.38	$389.34	$98.04
5MM/255K	$287.42	$232.28	$55.14

Source: Tables 7-1 and 7-2.

Table 7-5

National-Level Employment Losses (FTEs)

Option	Total Annual Output Loss in the IL Industry ($ MM 1993)	Loss in 1992 Dollars ($ MM 1992)	Output Employment Multiplier	Total Output-Based FTE Loss
No Cutoff	$179.70	$171.94	83.3	14,322
1MM/255K	$171.29	$163.89	83.3	13,652
3MM/120K	$131.25	$125.58	83.3	10,461
5MM/255K	$77.40	$74.06	83.3	6,169

Note: Employment losses for firm failures are assumed to be 75% of total employment.
Source: Output loss is from Table 7-1. Employment multiplier is from U.S. Department of Commerce, 1992. Table A-2.4--Total Multipliers, by Industry Aggregation, for Output, Earnings and Employment. Regional Input-Output Modeling System (RIMS II). BEA, Regional Analysis Division.
1993 dollars are deflated to 1992 dollars using the Engineering News Record's Construction Cost Index (0.9568).

Table 7-6

National-Level Employment Gains (FTEs) (Millions, 1992 Dollars)

Item	No Cutoff	1MM/255K	3MM/120K	5MM/255K
Total Capital Cost (Annualized over 16 years at 7%)	$53.56	$51.40	$39.25	$23.71
Capital Materials Cost (85% of total cost)	$45.53	$43.69	$33.36	$20.15
Capital Materials Employment Multiplier	31.4	31.4	31.4	31.4
Employment Gain (Capital Materials)	1,429	1,372	1,048	633
Installation Cost (15% of total cost)	$8.03	$7.71	$5.89	$3.56
Installation Cost Employment Multiplier	21.5	21.5	21.5	21.5
Employment Gain (Installation)	173	166	127	76
Total O&M Cost	$117.74	$111.79	$85.31	$50.59
Labor Share (33.3%)	$39.25	$37.26	$28.44	$16.86
Labor Employment Multiplier	83.3	83.3	83.3	83.3
Employment Gain (Labor)	3,269	3,104	2,369	1,405
Materials Share (33.3%)	$39.25	$37.26	$28.44	$16.86
Materials Employment Multiplier	23.7	23.7	23.7	23.7
Employment Gain (Materials)	930	883	674	400
Energy Share (33.3%)	$39.25	$37.26	$28.44	$16.86
Energy Employment Multiplier	15.8	15.8	15.8	15.8
Employment Gain (Energy)	620	589	449	266
Total Employment Gain	6,422	6,114	4,666	2,780

Source: Capital and O&M costs are from Final Technical Report; multipliers are from U.S. Dept. of Commerce, op cit.

Table 7-7

Net Annual National-Level Employment Losses (FTEs) Based on Output

Option	Total Annual Losses Based on Output	Total Annual Gain	Net Loss (Gain) in National-Level Employment Based on Output
No Cutoff	14,322	6,422	7,900
1MM/255K	13,652	6,114	7,538
3MM/120K	10,461	4,666	5,795
5MM/255K	6,169	2,780	3,389

Source: From Table 7-5, Section 308 Survey data, and closure and failure results from EPA, 1999, Facility and firm financial model.

National-level (civilian) employment in 1993 was 120.3 million persons.[17] This loss is thus at most 0.01 percent of total national employment. EPA therefore believes that the options considered would have had a negligible impact on national-level employment.

7.3 DIRECT LONGER-TERM EMPLOYMENT IMPACTS IN THE INDUSTRIAL LAUNDRIES INDUSTRY

7.3.1 Methodology for Estimating Longer-Term Impacts on Employment

There are two ways to compute net direct employment losses in the industrial laundries industry. The first way is to calculate employment losses based on closures and failures, which was discussed in Section 7.1 and the second way is to compute losses based on production losses.

As noted above, employment losses associated with postcompliance facility closures or failures could overstate or understate production- or output-driven losses[18] in the industrial laundries industry, since closures and failures are different measures than output. Although impacts such as closures or failures are somewhat correlated with output losses, since higher compliance costs tend to increase such impacts, they are not exactly correlated and will not produce the same estimate of employment impacts (other than by chance). Furthermore, the analysis in Section 7.1 did not account for employment gains.

EPA thus conducts two analyses that both incorporate employment gains, but which define reasonable upper and lower bounds of output-driven employment losses within the industrial laundries industry. The first analysis is based on output effects estimated assuming that direct output losses equal compliance costs, as was done above in the national-level analysis. This output loss was used to generate the national-level employment loss in Section 7.2, which includes indirect and induced losses. In this section, the indirect and induced losses are removed from the estimate to derive the direct losses to the

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[17] *Ibid.*

[18] Output is revenues; production loss is equated with output using price (price times production equals revenues). Output and production are used interchangeably here since they can be equated with each other.

industry, and the analysis also uses gains in labor associated with operating pollution control equipment to calculate net losses (or gains) in employment

To estimate direct losses only (losses only in the industrial laundries industry), EPA multiplies total national-level employment losses (which are shown in Table 7-5) by the inverse of the national-level direct-effect employment multiplier (1.7201). The direct-effect multiplier represents the change in total (direct, indirect, and induced) employment for each unit change in direct employment; its inverse, therefore, represents the direct employment change portion of total employment impacts. Direct losses can be compared to total industry baseline employment to gauge the magnitude of employment impacts within the industry.

As with the national-level analysis described above, employment losses in the industry might be offset by employment gains, because it is likely industrial laundries will hire workers (or transfer workers from productive operations) to operate the pollution control equipment installed. However, since industrial laundries might opt to contract out the operation of pollution control equipment (and thus another industry might be credited with some of the employment gains), EPA makes the conservative assumption that 50 percent of the labor component of the operating costs of compliance does not contribute to employment gains within the industrial laundries industry.[19] These gains can then be subtracted from the losses estimated above to calculate a reasonable worst-case estimate of longer-term, production-driven, net employment losses (or gains).

EPA's second analysis is identical except that instead of assuming that the output loss equals the compliance cost, the analysis uses the estimated production losses calculated using the market model valued at the current price to reflect the reduction in output that would have affected employment in the industrial laundries industry alone.[20] To do this, EPA first calculates output loss using the loss of production

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[19] EPA assumed previously in the national-level analysis that all operating labor is industrial laundries employment because on a national level, it matters very little which industry is picking up the gains in employment associated with operating pollution control equipment, since any of the industries that might experience these gains have similar multipliers. It makes a substantial difference, however, in this analysis whether the industrial laundries industry or another industry is credited with these gains.

[20] This approach is consistent with how the I-O tables are created; price is held constant, and

(continued...)

calculated using the market model (see Appendix A, Table A-3) valued at current price. EPA then calculates the output-driven employment loss at the national level (which includes direct, indirect, and induced losses) in the same manner as was done above. Then, using the inverse of the national-level direct effect employment multiplier, EPA calculates the direct employment component. The Agency then adjusts for gains (as above) and calculates the reasonable best-case estimate of longer-term, production-driven, net employment losses (or gains). The results of these two analyses can be considered reasonable bounding estimates of production-driven employment impacts in the industry.

7.3.2 Longer-Term Employment Impacts

To determine output-driven losses, EPA's first analysis takes the national-level employment losses (computed assuming direct output losses equal compliance costs) and calculates the direct employment losses that would be experienced by the industrial laundries industry. As shown in Table 7-8, the direct component of the losses calculated is estimated to range from 3,586 to 8,326 FTEs. The 3MM/120K cutoff is associated with losses totaling 6,082 FTEs.

The losses computed do not account for gains in employment in the industrial laundries industry. Employment gains that would have been expected due to the need to operate the pollution control equipment, as shown in Table 7-6, are estimated to be 1,405 to 3,269 FTEs. If 50 percent of these gains are assumed to be employment gains in the industrial laundries industry itself, gains are estimated to range from 702 to 1,635 FTEs, depending on cutoff (see Table 7-8). Thus the total net losses associated with industrial laundries range from 2,884 to 6,692 FTEs, which is 2.2 percent to 5.2 percent of the estimated 128,000 FTEs employed in the industrial laundries industry (see Table 7-8). These net losses are greater than the total losses associated with facility closures and firm failures. The 3MM/120K cutoff is associated with a net loss of 4,897 FTEs. Thus over the longer term (under the assumptions of direct output losses equaling compliance costs) EPA estimates that employment losses would not have been offset substantially by gains and that some additional employment losses at nonclosing/nonfailing facilities and

[20](...continued)
output is allowed to vary.

Table 7-8

Direct Employment Losses in the Industrial Laundries Industry (FTEs) Based on Output Losses Assuming Zero Cost Passthrough (Reasonable Worst-Case Analysis)

Option	Total Output-based FTE Loss	Total Direct FTE Loss	Total Direct FTE Gain	Net Direct FTE Loss	Percent of IL Industry Employment
No Cutoff	14,322	8,326	1,635	6,692	5.15%
1MM/255K	13,652	7,937	1,552	6,385	4.91%
3MM/120K	10,461	6,082	1,184	4,897	3.77%
5MM/255K	6,169	3,586	702	2,884	2.22%

Source: Output-based FTE loss is from Table 7-4. The final-demand employment multiplier is from U.S. Dept. of Commerce, op cit. Total FTE Gain is from Table 7-5 assuming that 50 percent of labor gains occur within the industrial laundries industry. Net Direct FTE Loss uses the direct-effect employment multiplier, 1.7201, from U.S. Dept. of Commerce, op cit.

firms might have occurred (production-driven losses include losses from closures and failures). This is considered a reasonable worst-case estimate of production-driven losses.

EPA's second analysis, considered a reasonable best-case analysis uses an alternative estimate of direct output loss, which is calculated for the industrial laundries industry using production losses estimated in Appendix A using the market model and assuming costs can be passed through to customers. This output loss is estimated to be $13.9 million to $32.0 million annually (1992 dollars) or 0.2 percent to 0.4 percent of the $7.5 billion in 1993 industrial laundries revenues (see Section Three). This output loss would result in a nationwide employment loss of 1,157 to 2,663 FTEs, depending on cutoff (see Table 7-9). These numbers, however, include the direct, indirect, and induced employment losses, as well as losses that might be offset by gains within the industrial laundries industry. Given the total national-level loss of employment calculated using this direct output loss estimate, the inverse of the direct-effect multiplier can be used to calculate the direct employment losses, as was done above. Thus the direct component of the losses calculated is estimated to range from 672 to 1,548 FTEs. The 3MM/120K cutoff is associated with an estimated 1,135 FTEs lost.

As above, employment gains (assuming 50 percent of operating labor accrues to the industrial laundries industry) are also used to calculate the net effect on employment. Gains are estimated to range from 702 to 1,635 FTEs, depending on cutoff (see Table 7-9). Thus the total net gains associated with industrial laundries range from 30 to 87 FTEs, which is 0.02 to 0.07 percent of the estimated 128,000 FTEs employed in the industrial laundries industry (see Table 7-9). Given the assumptions of EPA's market model and the uncertainties associated with these assumptions (see Appendix A), these results can be interpreted as employment losses and gains possibly offsetting each other over time. Because gains would not necessarily have occurred in the same geographic location nor at the same time as losses, these gains might not prevent employment disruptions, even though over time, under the assumptions of this analysis, no net loss of employment might occur. Furthermore, because employment losses would have been expected from closures or closures plus failures, EPA concludes that some nonclosing facilities might have experienced employment gains under the assumptions of this analysis. As discussed, this estimate is considered to be a reasonable, longer-term, best-case estimate, and the two estimates combined are considered reasonable bounding estimates of the longer-term, production-driven, net employment impacts on the industrial laundries industry. The 3MM/120K cutoff can be considered to result in as few as no

Table 7-9

Direct Employment Losses in the Industrial Laundries Industry (FTEs) Based on Market Model Predictions of Production Losses (Reasonable Best-Case Analysis)

Option	Total Estimated Production Loss	Output Loss Based on Production Loss ($ million 1993)	Output Loss ($ million 1992)	Final-Demand Employment Multiplier	Total FTE Loss	Total Direct FTE Loss	Total Direct FTE Gain	Net Direct FTE Loss	Percent of IL Industry Employment
No Cutoff	41,305,874.12	$33.41	$31.96	83.3	2,663	1,548	1,635	(87)	-0.07%
1MM/255K	39,402,880.46	$31.87	$30.49	83.3	2,540	1,477	1,552	(75)	-0.06%
3MM/120K	30,291,231.68	$24.50	$23.44	83.3	1,953	1,135	1,184	(49)	-0.04%
5MM/255K	17,943,475.25	$14.51	$13.88	83.3	1,157	672	702	(30)	-0.02%

Source: Output Loss in 1992 dollars is from Appendix A. The final-demand employment multiplier is from U.S. Dept. of Commerce, op cit. Total FTE Gain is from Table 7-5 assuming that 50 percent of labor gains occur within the industrial laundries industry. Net Direct FTE Loss uses the direct-effect employment multiplier, 1.7201, from U.S. Dept. of Commerce, op cit.

employment losses to as many as 4,897 jobs lost over the longer term, with the more immediate losses totaling 2,261 jobs as a result of facility closures and firm failures.

7.4 REGIONAL EMPLOYMENT IMPACTS

7.4.1 Introduction

In the previous section, EPA estimated the employment impacts associated strictly with the industrial laundries industry, subtracting out employment losses that were expected to be offset by gains for operating pollution control equipment within the industry and calculating the net direct-effect only.[21] These market based effects would have been spread out throughout the economy and thus would have little to no regional effect.

The losses that might have some measurable effect at the community level are those associated with closures and failures, because these losses tend to be larger and possibly could have been concentrated in one location. EPA is concerned with the impacts of dislocation, even if other laundries in the region hire the displaced workers from closing facilities (most likely after some delay); thus the analysis discussed below uses the full loss of employment at closing and facilities to assess community-level impacts.

7.4.2 Regional-Level Impacts Methodology

The employment losses of concern in the regional-level analysis consist of employee layoffs associated with the facility closures estimated in the facility closure analysis. Section 308 Survey data on annual employment hours is used to calculate direct employment losses associated with facility closures and failures that might have occurred under the options considered (the CP-IL option is discussed here) on an FTE basis.

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[21] The only employment gains assumed to offset losses at the regional level are those associated with the labor required to operate pollution control systems. All other gains are assumed to be unlikely to occur either in the same locations as losses or at the same time as losses (e.g., immediate hiring of laid-off workers by other industrial laundry facilities in the area might not occur).

These losses are those direct employment losses associated with the CP-IL option that might have had a significant impact on a region's economy. The direct employment losses, however, are only a fraction of the employment losses that might affect a region's economy; as discussed earlier, there are indirect and induced losses of employment also to consider. These indirect and induced losses can be estimated on a regional basis using BEA multipliers for the affected state. Note, however, that because these multipliers are derived for an entire state, they will most likely overstate the impacts within a smaller region (e.g., county or metropolitan statistical area [MSA]). The specific multiplier used is the direct-effect multiplier for the state in which the surveyed closure occurs.

The direct-effect multiplier shows the number of total jobs lost in all industries given one job lost in the subject industry. For example, BEA tables show that one job lost in the industrial laundries industry in the state of California will result in a total of 1.5119 jobs lost in all industries throughout the state. Thus the calculation is:

Direct Employment Loss x Direct-Effect Multiplier = Total Direct, Indirect, and Induced Losses

The significance to the community of employment losses is measured by their impact on the community's overall level of employment. Data necessary to determine the community impact include the community's total labor force and employment rate. The community employment information used in this analysis is from the Census Bureau's web page,[22] as estimated by the Bureau of Labor Statistics. For the purposes of this analysis, the community is defined as the MSA (if urban) or county (if rural) in which the facility is located and is assumed to represent the labor market area within which residents could reasonably commute to work. An increase in the unemployment rate equal to or greater than 1 percent (e.g., from a 5 percent to a 6 percent unemployment rate) is considered significant. The change in the unemployment rate is computed as:

Current Unemployment Rate-[(Current Unemployment + Postcompliance Employment Losses)/Labor Force]

[22] Http://www.census.gov/statab/USA96.

Statistical weights complicate the analysis. Many closing facilities or failing firms that were surveyed have fairly high weights. Because the sampling strata are not geographically based, it is highly unlikely that any more than a few facilities represented by the closing facility would be located in the survey facility's county or be grouped in any way geographically. EPA assumes no more than three facilities (where the facility weight exceeds 3) would close in the same county.

7.4.3 Results of the Regional-Level Community Impact Analysis

Table 7-10 presents the total number of closing facilities surveyed in the Section 308 Survey, their weighted employment losses, and the state in which they are located, along with the appropriate direct-effect multiplier for the state. The total number of direct and other losses are also presented. The change in the unemployment rates ranges from less than 0.01 percent to 4.4 percent, depending on which facilities close or fail and assuming that no more than 3 closing facilities represented by the facilities in this table are located in the same county. The greatest change in the unemployment rate, 4.4 percent, is associated with Facility 3, which closes only if no cutoff is considered. Under the 3MM/120K cutoff, the greatest change in unemployment rate is estimated to be 0.5 percent. Thus EPA believes community-level employment impacts under the 3MM/120K cutoff or above would have been negligible.

Table 7-10

Facility-by-Facility Employment Loss

Facility	Number of Employees	Cutoffs Facility Closes Under	Survey Weight	Direct Losses	State	Regional Multiplier	Total Losses	Change in Unemployment Rate*
Facility 1	24	No	6	138	DE	1.2856	177	0.14%
Facility 2	8	No	22	179	MI	1.3903	249	0.01%
Facility 3	20	No	6	115	TX	1.5361	177	4.40%
Facility 4	15	No	1	21	VA	1.4516	30	0.03%
Facility 5	14	No	6	81	NM	1.3731	111	1.73%
Facility 6	20	No	2	43	MA	1.4476	62	0.02%
Facility 7	32	No	1	42	KY	1.5031	63	0.73%
Facility 8	11	No	1	15	MN	1.4533	22	0.08%
Facility 9	16	No, 1MM	1	22	AR	1.4530	32	0.15%
Facility 10	29	No, 1MM	1	40	WI	1.3909	56	0.03%
Facility 11 (f)	75	No, 1MM	18	1,380	IN	1.4743	2,035	0.25%
Facility 12 (f)	20	No, 1MM	22	448	CA	1.5119	678	0.00%
Facility 13 (f)	15	No, 1MM	31	465	OH	1.4593	679	0.30%
Facility 14	28	No, 1MM	11	316	IN	1.4743	466	0.59%
Facility 15	14	No, 1MM	1	18	CT	1.4313	26	0.01%
Facility 16	18	No, 1MM	1	25	CO	1.4405	36	0.02%
Facility 17	34	No, 1MM, 3MM	1	44	IN	1.4743	65	0.18%
Facility 18	30	No, 1MM, 3MM	13	390	NY	1.3224	516	0.49%
Facility 19	60	No, 1MM, 3MM	26	1,540	TX	1.5361	2,366	0.04%
Facility 20	37	No, 1MM, 3MM	1	51	KS	1.4557	74	0.03%
Facility 21	116	All	1	131	MD	1.4092	185	0.04%
Facility 22	81	All	1	104	CA	1.5119	158	0.04%

(f) = facility that fails but does not close.
* Assuming a maximum of three facilities represented by the surveyed facility close or fail in the same county.

Source: Section 308 Survey data on numbers of FTEs at closing and failing facilities and firms. Closing facilities and failing firms are identified using EPA, 1998. IL Facility and Firm Financial Model, Notice Version. Multiplier is from U.S. Department of Commerce, 1992. Table A-2.4--Total Multipliers, by Industry Aggregation, for Output, Earnings and Employment. Regional Input-Output Modeling System (RIMS II). Bureau of Economic Analysis, Regional Analysis Division.

SECTION EIGHT

OTHER IMPACTS

8.1 INTRODUCTION

In this section of the EA, EPA investigates other potential impacts associated with the regulatory options considered for pretreatment standards, including impacts on markets, both foreign and domestic, impacts on the customers of industrial laundries services (including the potential for customers to substitute other products for industrial laundries services), impacts on the market for disposables of EPA's decision not to promulgate pretreatment standards, impacts on consolidation in the industrial laundries industry, impacts on establishments other than industrial laundries that might launder industrial textile items from offsite sources, impacts on inflation, and distributional impacts and environmental justice (which addresses who would ultimately bear the costs and reap the benefits of a regulation).

8.2 IMPACTS ON MARKETS

8.2.1 Impacts on Foreign Markets/Trade

Unlike a manufacturing industry, the industrial laundries market, with a few exceptions, is made up of numerous small, local to regional market areas, with facilities each having a distinct radius of service, limited by the cost of transportation. Thus impacts on foreign markets and trade are limited to areas of the United States that are near foreign borders. Most industrial laundries are located in small urban to large urban areas. This further limits the numbers of border localities likely to be served by industrial laundries, since most border areas in the United States are not associated with major urban centers, with a few exceptions such as the Seattle area, Southern California, the Detroit area, and El Paso, Texas. EPA thus believes that the number of industrial laundries facing foreign competition is very small.

A requirement to meet pretreatment standards could have put some industrial laundry facilities at a slight disadvantage relative to foreign facilities in certain border areas, but there are a number of factors

that likely would have mitigated this disadvantage. It is likely that the U.S. and non-U.S. markets do not strongly overlap in border areas because the transaction costs of clearing customs can be high. Even in areas, such as in, say, Southern California (San Diego/Tijuana), where border crossings are frequent, pickup and delivery of items across international boundaries could involve substantial paperwork, searches, and other delays.

Additionally, EPA considered certain options (i.e., CP-IL under the 3MM/120K or 5MM/255K cutoff) that were economically achievable and limited impacts on small firms. In so doing, these options would have had acceptable impact on facilities and firms, even if they had not been able to pass costs through to customers. Thus facilities near borders, had they been competing with foreign facilities, would have been able to continue to price their services competitively with little risk of facing closure or failure as a result. Thus EPA would not expect pretreatment standards to have resulted in major impacts on foreign markets, given the limited involvement of this industry in foreign markets, given the relatively high transaction costs of doing business in international markets, and given that EPA would have considered a rule that would allow nearly all facilities and firms to absorb the cost of a rule, if necessary to maintain competitiveness in a foreign market, without facing severe impacts.

8.2.2 Impacts on Domestic Markets

Had EPA promulgated pretreatment standards for the industrial laundries industry, it would have included a cutoff excluding a large portion of small facilities. Had a rule been promulgated with the selected 3MM/120K cutoff, a large portion of small firms might have gained a competitive advantage over larger firms. At this cutoff, however, only a few major impacts were estimated to have occurred, thus most larger firms would have been able to absorb all costs of compliance and remained price competitive with smaller firms, without risking severe impacts. EPA views the need to mitigate impacts on small firms to be greater than the need to prevent a competitive advantage to some (larger) firms. Furthermore, smaller firms generally tend to be at somewhat of a disadvantage in comparison with larger firms even before any regulatory impacts are considered (see for example the discussion in Section Three, where EPA identifies various cost efficiencies that large, multifacility firms can achieve and that small firms often cannot).

Thus, an exclusion would have slightly reduced the relative competitive advantage of larger firms relative to smaller ones.

8.3 IMPACTS ON INDUSTRIAL LAUNDRIES CUSTOMERS

8.3.1 Financial Profile of the Customer Base

As discussed in Section Three, a variety of customers purchase industrial laundries' services for a number of reasons. For some customers, particularly those in the manufacturing and automotive service industries and print shops, industrially laundered textiles facilitate workplace cleanliness; industrial laundries provide and launder protective clothing and employee uniforms, work materials (e.g., shop and print towels), and items geared towards soil minimization and removal (e.g., mats and mops). In addition, customers purchase industrial laundering services in the interest of enhancing employee appearance and corporate image and identity; especially in the service industries, uniform and mat rental programs promote company cohesion and brand recognition.

Because of the many different types of companies that use industrial laundries, it is not possible to develop a single financial profile of the industrial laundries customer base. Overall, the health of industrial laundries' customers is good. The service sector, in particular, has experienced a fair amount of growth in recent years. Despite some regional manufacturing job losses, moreover, the industrial laundries industry remains optimistic about prospects for future business from traditional, blue-collar customers.[1,2]

Table 8-1 contains average financial statistics for the 14 industry groups that correspond roughly to 14 of the 15 major industrial laundries customer groups discussed in Section Three.[3] The figures in the

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[1] 1996. "Regional trend analysis shows pockets of potential." *Industrial Launderer*. October, p. 85-86, 88-89.

[2] 1996. "Job growth trends show industry's pockets of potential." *Industrial Launderer*. November, p. 53-54, 56, 58.

[3] The industrial laundries customers discussed in Section Three were grouped according to SIC code. The industry groupings used by the Internal Revenue Service in the Corporation Source Book of

Table 8-1

Average Financial Statistics for Active Corportions in 14 Industrial Laundries Customer Industries (1993 $)*

(in thousands)

ESIC Group**	Industry Title	Average Assets	Receipts		Deductions			Average Receipts minus Deductions
			Avg. Total Receipts	Avg. Business Receipts	Avg. Total Deductions	Avg. "Other" Deductions***	Pct. "Other" Deductions***	
39	Automotive Dealers & Service Stations	$1,350	$5,687	$5,593	$5,631	$172	3.06%	$56
7500	Auto Repair & Services	$540	$798	$760	$783	$101	12.86%	$15
42	Eating and Drinking Places	$472	$869	$836	$850	$128	15.10%	$19
38	Food Stores	$1,439	$5,057	$4,971	$4,983	$240	4.82%	$74
08	Special Trade Contractors	$314	$976	$967	$955	$77	8.05%	$21
5089	Wholesale Trade: Other Durable Goods	$1,331	$3,039	$2,994	$2,990	$200	6.69%	$50
24	Machinery, except Electrical	$9,769	$11,513	$10,574	$11,174	$1,197	10.71%	$338
16	Printing and Publishing	$3,478	$3,346	$3,181	$3,128	$457	14.59%	$218
54	Business Services	$703	$985	$930	$949	$173	18.19%	$36
09	Food and Kindred Products	$25,822	$26,926	$25,723	$25,765	$2,476	9.61%	$1,161
23	Fabricated Metal Products	$3,101	$4,541	$4,436	$4,309	$304	7.06%	$232
8200	Educational Services	$321	$643	$625	$625	$145	23.15%	$18
5190	Wholesale Trade: Misc. Nondurable Goods	$1,065	$2,963	$2,922	$2,910	$179	6.16%	$53
43	Miscellaneous Retail Stores	$625	$1,481	$1,452	$1,454	$114	7.86%	$27

* Numbers from 1994 tax year, deflated to 1993 dollars using the Producer Price Index for Finished Goods.

** The Internal Revenue Services groups industries according to their primary Enterprise Standard Industrial Classification (ESIC) code. ESIC codes correspond closely with, but do not match, SIC codes.

*** Does not include cost of goods, compensation of officers, salaries, repairs, bad debts, rent, taxes, interest, contributions or gifts, amortization, depreciation, depletion, advertising, pension, employee benefits, and net loss (noncapital assets). Expenses for industrial laundering services would be in this "other" category.

Source: U.S. Internal Revenue Service, 1994. "Balance sheet, income statement, tax and selected items by major and minor industries, size of total assets." Tax Year 1994 Source Book, Statistics of Income: Active Corporation Income Tax Returns, July 1994-June 1995. Washington, DC: U. S. Internal Revenue Sevice.

table are estimated based on corporate income tax return data provided by the Internal Revenue Service (IRS). Since such data does not reflect the financial situation at S corporations and sole proprietorships, the average costs and revenues calculated herein may be overstated, and total costs and revenues are understated.

8.3.2 Impacts of Price Increases on Customers

The costs of industrial laundering, like the costs of employee wages and benefits, raw materials, telephone and utilities, legal and accounting services, etc., are expenses incurred in the production of goods and services at customer companies. For the most part, however, industrial laundering does not appear to represent a substantial portion of overall operating costs, relative to other costs. The IRS data cost category in which costs for industrial laundering is captured is the "other deductions" category.[4] According to IRS data, "other deductions" constitute between 3 and 23 percent of total annual expenses at 14 of the major customer industries for industrial laundries (see Table 8-1). Given that "other deductions" includes a number of other miscellaneous costs aside from those for industrial laundering, the actual percentage of total annual costs devoted to textile cleaning and rental is estimated to be quite small on average.

EPA does not expect the cost of pretreatment standards would have substantially affected industrial laundries' customer industries. Relative to other operating costs, the cost of industrial laundering services is quite small. As such, an increase in costs is not likely to have a major impact on the bottom line at customer industries. The following analysis in Section 8.3.2.1 provides a worst-case estimate and a reasonable estimate of impacts among customers, and Section 8.3.2.2 discusses the potential for impacts on competition with substitutes had EPA promulgated pretreatment standards.

Statistics of Income are based on the Enterprise Standard Industrial Classification (ESIC), which corresponds closely with, but does not match, the SIC. An ESIC group corresponding to SIC 80 (Health Services) could not be found, so only 14 industry groups are mentioned in this section.

[4] "Other deductions" are expenses other than the cost of goods, compensation of officers, salaries and wages, repairs, bad debts, rent paid on business property, taxes paid, interest paid, contributions or gifts, amortization, depreciation, depletion, advertising, pension and profit sharing, employee benefit programs, and the net loss associated with noncapital assets.

8.3.2.1 Increases in Production Costs

The potential for increased production costs among customer industries appears to be of the most concern to the printing industry, based on comments received (see Comment Response Document, PECON-6 Tracking Nos. 1514-1521). According to the printing industry's trade association, a typical medium-size printing firm would use 100,000 towels per year. If it is assumed that a large majority of the cost of pretreatment standards would have been passed through to users of shop towels/rags, a price increase of 10 percent might reflect this assumption. This 10 percent price increase would mean that the average cost of shop towels would rise from $1.60 per pound (cited in the Comment Response Document, PECON-9A, Tracking No. 1576, which was submitted by the industrial laundries trade associations) to $1.76 per pound. Under this assumption, $76.8 million of compliance costs (or 85 percent of the entire cost of the CP-IL option under the 3MM/120K cutoff) would have been passed through on 480 million pounds of shop towels (480 million pounds of shop towels were processed by the industry in 1993 according to the Section 308 Survey). If there are 5 shop towels per pound (a higher ratio would lead to lower estimates of impact), a medium-size firm would be using 20,000 pounds per year of shop towels (based on a usage rate of 100,000 shop towels per year). The baseline cost of this item is estimated at $32,000 per year per year at $1.60 per pound. Postcompliance, this cost (at $1.76 per pound) would be $35,200, or an increase of $3,200.[5] If the average "other deduction" shown in Table 8-1 for the printing and publishing industry corresponds reasonably well to the "other deduction" amounts typical for a medium-size firm, this increase of $3,200 per year would amount to 0.7 percent of this category of deductions ($457,000 on average for the industry), or 0.1 percent of total deductions ($3.128 million on average).

EPA believes that a more realistic cost increase, however, likely would have been in hundreds of dollars rather than in thousands of dollars. The market model, discussed in Appendix A, is not sufficiently detailed to predict cost increases on individual product lines, so the precise cost passthrough on shop towels

[5]EPA is unsure of how the trade association calculated increases of $13,000 per year based on a 0.4 percent increase in price predicted in the EA for the proposal (see PECON-6, Tracking No. 1516 in the Comment Response Document). EPA suspects that the commenter calculated the impact by setting 0.4 percent to 0.4 and multiplying typical current costs, rather than setting 0.4 percent to 0.004. A cost increase of $13,000 per year triggered by a price increase of 0.4 percent would lead to an estimated baseline cost of shop towel cleaning at a medium-size firm of $3.25 million per year. A price increase of 40 percent would result in a cost increase of $13,000 per year based on a baseline laundering cost of $32,500, or approximately the baseline laundering cost that EPA has estimated above.

cannot be calculated. However, if it is assumed that costs can be passed through only on 5 billion pounds of laundry (excluding linens and other items not considered for regulation) and that the 32 percent cost passthrough applies (as calculated in Appendix A), $41 million would be passed through under the CP-IL option with no cutoff, and the price per pound increase would be about $0.01. At a facility using 20,000 pounds of shop towels per year, the cost increase at this medium-size printer would amount to $200 (a 0.6 percent increase over baseline laundry costs).

EPA believes the estimated worst-case impact on a medium-size firm (in terms of the percent increase in "other deductions") is also a worst-case scenario for small firms (since numbers of towels would drop proportionately with size of firm and costs of production) and would also be a worst-case scenario for other customers of industrial laundries. This result would be a worst-case result for other customers, since industrial laundries probably could not have passed through such a large portion of costs, and price increases would probably have been spread over more pounds of industrial laundry. Thus price increases on any one type of laundry probably would have been much less than that estimated for this analysis and impacts on customers would more likely resemble those estimated in the second analysis discussed above.

8.3.2.2 Potentials for Substitution

EPA believes pretreatment standards also would have been unlikely to cause customer industries to switch from industrially laundered textiles to substitute products. As discussed in Section 3.2.2.2 and here, among current customers of industrial laundries, few perfect (or, in some cases, even close) substitutes to the products and services provided by industrial laundries currently exist. Reusable textiles are typically more durable than disposables, so customers for industrially laundered items such as industrial uniforms, mats, and mops, which are subject to heavy use, do not have many disposable alternatives. With respect to wipers and shop towels, moreover, the quality of the single-use shop towels now on the market might not be high enough for use by the printing industry because printers require towels that are both durable and generate little lint.[6] As the printing industry trade association notes in comments on the proposal (PECON-

[6]1997. "Wiper market watch: The view from EPA." *Industrial Launderer*. February, p. 61-63.

7, Tracking No. 1552 see the Comment Response Document), if reusables are no longer available in certain market areas "the printer will be forced to either use disposable towels or launder on-site, neither of which is an attractive or cost effective option." Customers in the automotive industry might place more emphasis on price than quality in the selection of towels, but in industrial settings it has been found to be more economical to use cloth towels than paper wipers for all but a dirty task that would require only one paper wiper.[7] Furthermore, the possibility that a disposable wiper might be considered hazardous waste under RCRA could further deter the substitution of disposables for industrial laundry services.

Another possible substitute for industrial laundry services is onsite laundries, which EPA would have excluded from coverage by pretreatment standards for industrial laundries. However, a number of major disincentives would exist. As the industry itself notes, industrial laundries currently are encountering substantial success converting OPLs to rental customers.[8] "These converts are being won with the argument that professional laundering in a textile rental plant meets their needs in a cost-effective and environmentally responsible manner with an additional advantage of worker safety."[9] Many of these converts are likely to have fully depreciated their laundry equipment, but, apparently, the industrial laundries industry has been proving that their current operations are more efficient than many OPLs, even if O&M costs alone are considered. As EPA noted in its response to PECON-13, Tracking No. 1598, in the Comment Response Document, economies of scale at a facility level are not great, except that it is likely that very small facilities (particularly those processing under about 1 million pounds of laundry per year) are not prevalent, and are probably not very cost-effective relative to larger facilities (in the range of 3 million to 7 million pounds per year of laundry processed). Because OPLs are likely to be smaller than many of the smallest industrial laundries, it is not a surprise that the industrial laundries industry is making substantial inroads into this market area.

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[7] Mullen, Jocelyn, and Carl Lehrburger, 1991. *A Solid Waste and Laundering Assessment of Selected Reusable and Disposable Products*. Washington, DC: Textile Rental Services Association of America and IIL.

[8]TRSA, 1999. *1999 Strategic Analysis of the Textile Rental Industry*. http://www.trsa.org /public/trsa_mag/sapub.htm.

[9] TRSA, 1999. *Op cit.*

Furthermore, establishing an onsite laundry would involve capital investment, and given that EPA believes that for most types of laundry, the estimated average postcompliance price increase would most likely not be large, it is likely that the "payback" period for an onsite laundry might be too long to interest most customers. Furthermore, an increase in pollutant loads at a facility that installs an onsite laundry may necessitate additional changes in the facility's NPDES permit if it is a direct discharger or its pretreatment permit issued by the local POTW if it is an indirect discharger. A POTW might even initiate local limits (where none were previously required to be met) or might impose a surcharge. Thus EPA believes, although a rule might have slowed conversions of OPLs to rental customers at the margin, a rule would have probably not have encouraged current customers to switch to OPLs.

Other possible substitutes for industrial laundry services would be for customers to drop industrial laundry services and, for example, require employees to purchase and launder their own clothing, or to reduce the frequency of pickup and laundering of certain items. Customers who use uniform rentals and related services for image reasons rather than strictly for cleanliness might be the likeliest to choose the former route if faced by higher prices, since image reasons for using industrial laundering services might not be as compelling and might more likely to be targeted for cost-cutting measures than a need to remove stains that cannot be easily cleaned. However, home laundered items, even though sufficiently cleaned might suffer variability in the quality of the final appearance of the article (e.g., poorly ironed), making this route unacceptable to a firm looking for a proper image. Thus home laundering is also not a perfect substitute for industrial laundry services. Items such as mats might be targeted for reduction in frequency of pickup and laundering. Even this substitution is not likely to result in much of a move away from industrial laundries services as is reflected in EPA's results from the market model, presented in Appendix A, which indicate that production in the industrial laundries industry might be reduced about 0.2 to 0.5 percent. These reductions are associated with the lower demand for laundry services at the higher, postcompliance price and would represent the move by some customers towards some of the substitutes discussed above. This small percentage reduction in industrial laundries production might be unobservable, however, in the overall growth of the industry, which is currently averaging better than 6 percent per year.[10]

[10] TRSA, 1999. *Op cit.*

Industry has argued that customers would be very sensitive to a change in price, but there really are two price sensitivities being discussed. EPA agrees that customers are very price sensitive in comparing industrial laundries services among industrial laundries firms, but in many cases (such as the printing industry), are less price sensitive when comparing industrial laundries services to substitutes. Because the industrial laundries industry is very competitive, customers would be generally indifferent to a choice between industrial laundries services provided by one firm and those provided by any other firm. However, substitutes for industrial laundries services such as OPLs, home laundering, and disposables are not perfect substitutes for industrial laundries services, as discussed above. The fact that substitutes are not perfect for some key customers is clearly stated by the printing industry trade association in the quote cited above. Thus EPA still believes that many customers would not have been very sensitive to small price increases, particularly where substitutes are least likely to be perceived as equivalent to industrial laundries services (e.g., the printing industry and heavy soil industries for whom OPLs or home laundering do not provide adequate soil removal) or where the industrial laundries service makes up a very small percentage of operating costs (such as at a business that uses only a personalized mat rental service).

EPA does concede that some customers would have been more sensitive to small price increases, but the ability of the market to be disaggregated among various product lines, services, and perhaps even groups of customers makes it likely that price increases would have fallen on those items whose demand is the most inelastic. As noted in the Comment Response Document, PECON-9A, Tracking Nos. 1579 and 1584, the industry recognizes a vast array of products and services as distinct markets, thus the industry would have been able to maximize cost passthrough while minimizing impacts on production (and thus substitution) by the ability to distinguish these different markets.

8.4 IMPACTS OF A DECISION NOT TO REGULATE THE INDUSTRIAL LAUNDRIES INDUSTRY UNDER PRETREATMENT STANDARDS ON THE MARKET FOR DISPOSABLES

EPA's decision not to promulgate pretreatment standards for the industrial laundries industry will not adversely affect the disposables industry. First, this decision merely perpetuates the status quo. The disposables industry will be no worse off than at present. Second, even if the effect of this decision is compared to what might have been had EPA promulgated pretreatment standards, EPA's analyses show

that no major changes in the market for reusables vs. disposables would have occurred. The industrial laundries industry has indicated, in comments to the rule, that it is able distinguish a wide variety markets based on regions, products, and customers (Comment Response Document, PECON-9A, Tracking Nos. 1579 and 1584) and thus would have been able to practice finely tuned price discrimination. Thus the industry would have gauged the sensitivity of customers to changes in prices that might lead to customers converting to disposables and would have avoided raising prices for particular products or customers or in certain regions to a level that might encourage this conversion. Third, the disposables industry itself concurs that had EPA promulgated a rule, there would have been no marked changes in the market for disposables vs. reusables: "we do not expect [pretreatment standards] to significantly impact demand for our members' products" (Comment Response Document, PECON-7, Tracking No. 1531).

8.5 IMPACTS ON CONSOLIDATION IN THE INDUSTRIAL LAUNDRIES INDUSTRY

The industrial laundries industry, by all accounts, has been and is in a moderately to rapidly consolidating phase, as have many firms in other industries in the U.S. and global economies of the 1990s. EPA believes that pretreatment standards for the industrial laundries industry would not have had a major effect on consolidation on the industry, primarily because of impacts on demand for facilities. Although a rule might have had an effect on the "supply" of firms and facilities offered for sale, it would also have had an effect on demand for those firms and facilities, since multifacility firms would be engaged in purchasing and installing pollution control equipment and generally would, at least for a while, have less capital available for acquisitions. Appendix D addresses the issue of consolidation in more detail, showing that at current market prices for facilities in this industry (which, according to comments from industry--see the Comment Response Document, PECON-2C, Tracking No. 1481--is set on the basis of revenues, not cash flow), over 70 percent of facilities in the industry might currently consider selling to maximize return on investment.

8.6 IMPACTS ON OTHER ESTABLISHMENTS THAT MIGHT LAUNDER INDUSTRIAL TEXTILE ITEMS

It is possible that pretreatment standards, in theory, could have had an impact on hotels, hospitals, prisons, and other establishments (e.g., manufacturing facilities) that could potentially launder industrial textile items from offsite sources. As developed by EPA, any such standards would have required that any wastewater generated from the laundering of industrial textile items from offsite sources by such establishments might be required to be treated before discharge. EPA believes that any impacts to such establishments from pretreatment standards would have been minimal. For more details, see the discussion in the EA for the proposal.

8.7 IMPACTS ON INFLATION

If all costs under a 3MM/120K cutoff scenario were to have been passed through to the ultimate consumer (including costs passed through by customers of industrial laundries), the entire $90.8 million per year cost of pretreatment standards (CP-IL option costs) would fall directly on consumers. This cost as a portion of GDP is, however, minuscule: 0.001 percent of 1993 GDP.[11] Therefore, even under an assumption of a 100 percent cost passthrough to ultimate consumers, pretreatment standards would have been highly unlikely to have had any noticeable effect on inflation.

[11]U.S. Government Printing Office, 1997. *Economic Report of the President, February 1997.* Washington, DC: U.S. Government Printing Office.

8.8 DISTRIBUTIONAL IMPACTS AND ENVIRONMENTAL JUSTICE

Because any potential price increases in the services offered by the industrial laundries industry might have affected a wide segment of the manufacturing, service, and trade industries (see Section Three), the impacts on ultimate consumers will be felt primarily to the extent that these potential price increases affect inflation. The groups most affected by the potential distributional impacts of pretreatment standards therefore would have been those most affected by general inflation: the elderly and others on fixed income and those in the lowest socioeconomic strata, including children. As noted above, however, the effect on inflation would have been negligible. Thus the impacts to these more vulnerable groups would also be negligible.

The benefits of pretreatment standards, had EPA promulgated a rule, would have been very small, and thus little to no measurable benefits would have accrued to any disadvantaged groups. Although EPA has decided not to promulgate pretreatment standards for the industrial laundries industry, the Agency believes that any environmental inequities that currently exist due to discharge of pollutants by industrial laundries are very small. Additionally, the Agency expects that many of the pollutants that remain uncontrolled because of EPA's decision not to promulgate pretreatment standards will be reduced through industry's voluntary program and through a possible rule governing reusable and disposable shop towels that is expected to be proposed by the Office of Solid Waste under the Resource Conservation and Recovery Act (RCRA). EPA believes industry's voluntary program and a potential shop towel rule would eliminate any possible very small inequities that might remain.

SECTION NINE

SMALL BUSINESS ANALYSIS

9.1 INTRODUCTION

This section examines the projected effects of the costs from incremental pollution control on small entities. EPA acknowledges that small entities have limited resources and is aware of its responsibility for avoiding burdening such entities unnecessarily. Although EPA has decided not to promulgate pretreatment standards for the industrial laundries point source category, EPA presents information that could have been used to prepare a final regulatory flexibility analysis (FRFA).[1] Despite the fact that EPA's decision not to promulgate the rule means that a formal regulatory flexibility analysis performed in accordance with the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), is not required, this section generally includes much of the content typical of a regulatory flexibility analysis to ensure that all aspects of a small business analysis are addressed in Section 9.2, below.

9.2 SMALL BUSINESS ANALYSIS COMPONENTS

To analyze small business impacts, EPA has undertaken all components of an analysis typically performed to meet Section 603 of the RFA, which requires that a FRFA must contain the following:

- State the need for and objectives of the rule.
- Summarize the significant issues raised by public comments on the initial regulatory flexibility analysis (IRFA) and the Agency's assessment of those issues and describe any changes in the rule resulting from public comment.
- Describe the steps the Agency has used to minimize the significant economic impact on small entities consistent with the stated objectives of the applicable statutes, including a

[1] See U.S. EPA, 1997. *Interim Guidance for Implementing the Small Business Regulatory Enforcement Fairness Act and Related Provisions of the Regulatory Flexibility Act.* February 5.

statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each one of the other significant regulatory alternatives to the rule considered by the Agency which affect the impact on small entities was rejected.

- Describe/estimate the number of small entities to which the rule will apply or explain why no such estimate is available.

- Describe the projected reporting, recordkeeping, and other compliance requirements of the rule, including an estimate of the classes of small entities that will be subject to the requirements of the rule.

9.2.1 Need for and Objectives of the Rule

The rule was proposed under the authority of Sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act, 33 U.S.C. Sections 1311, 1314, 1316, 1317, 1318, and 1361. Under these sections, EPA sets standards for the control of discharge of pollutants for the Industrial Laundries Industry Point Source Category. The decision to regulate or not to regulate was considered pursuant to a Consent Decree entered in NRDC et al. v. Reilly (D.D.C. No. 89-2980, January 31, 1992), and the decision is consistent with EPA's latest Effluent Guidelines Plan under Section 304(m) of the CWA (see 61 FR 52582, October 7, 1996).

The objective of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." To assist in achieving this objective, EPA issues effluent limitations guidelines, pretreatment standards, and new source performance standards for industrial dischargers. Sections 304(g) and 307(b) authorize EPA to issue PSES and PSNS for all pollutants. In this case, however, for a variety of reasons, which are discussed in the preamble to the Final Action, EPA has decided not to promulgate pretreatment standards for the industrial laundries point source category.

9.2.2 Significant Issues Raised by Public Comment

The significant issues raised by public comment that specifically address small business concerns are as follows:

- **EPA ignored SBA's definition of small business**. EPA adhered to SBA's definition of small in evaluating the industry. The commenter is confusing SBA's requirements to evaluate small entities based on its definition (or a definition it agrees to) of small business and the RFA's requirements to consider how to mitigate impacts on small entities if such impacts can be mitigated under the constraints imposed by the Clean Water Act. EPA is not required to craft an exclusion from a rule based on entities defined as small under SBA definitions; that is, EPA is not required to exclude all firms defined as small by SBA from regulation. EPA's development of an exclusion at proposal took into account what firms and facilities would be the most highly affected by a rule, all of which were small, but these were only a fraction of all small business. EPA continued to investigate cutoffs for small business, but even though the Agency believed it could construct an economically achievable rule that would mitigate impacts on some small firms, the Agency chose not to promulgate a pretreatment standard for the industrial laundries point source category (for reasons other than economic achievability and impacts on small business).

- **Economic indicators other than closures and failures are better indicators of impact**. EPA disagrees. First, EPA used the standard measure of impact defined in its guidance on undertaking analyses under SBREFA. This impact measure is the revenue test, the results of which can be seen in the EA for the proposal. This guidance and EPA's guidance for performing regulatory flexibility analyses state that other measures might be used in a regulatory flexibility analysis, including closures and bankruptcies. The comment fails to provide EPA with the other measures believed to be better indicators. EPA has continued to use facility closures and firm failures as impact measures for small business analysis purposes.

- **A 10 percent bankruptcy rate is not acceptable**. EPA has been concerned with the number of bankruptcies estimated to occur as a result of the options considered. Both closures and bankruptcies were considered when EPA crafted its small production cutoffs for an exclusion to a pretreatment standard during the final decisionmaking process as presented in Section Six of this report. EPA's selection of the 3MM/120K cutoff would have resulted in a rule that would have eliminated the likelihood of firm failures among all firms.

- **The impact of a rule would be more severe than EPA has predicted (analyses are in error), and impacts will disproportionately affect small businesses.** EPA, as described in detail in the Comment Response document, believes that the analyses as now undertaken do not underestimate impacts. EPA's selection of the 3MM/120K cutoff would have resulted in a rule that would have been economically achievable and that would have minimized impacts on small firms, but decided instead not to promulgate pretreatment standards for the industrial laundries point source category.

- **Impacts on consolidation need to be addressed**. EPA evaluated the effects of the rule on consolidation and found that a rule would not have had much impact on consolidation. First, the pressures to consolidate in this industry are already very strong. Second, a rule would have affected both supply and demand of laundry facilities. More facilities might have been interested in being purchased, but fewer multifacility firms would have been interested in acquiring facilities, at least for a while, since capital for acquisitions most

likely would have been tied up in purchasing and installing pollution control equipment. The net effect on consolidation might have even been to reduce consolidations temporarily. The effect of a rule on consolidation is discussed in more detail in Section Eight and Appendix D of this report.

- **Higher cutoffs for an exclusion are needed.** EPA investigated higher cutoffs than that selected for proposal, as shown in Sections Five, Six, and Seven of this report. As these analyses show, EPA's selected cutoff, which was higher than the cutoff selected at proposal, resulted in impacts that are less than those which would have occurred under the lower cutoff selected at proposal (measured as closures plus failures) EPA also examined the pollutant load reductions, or lack of reductions, that would have occurred at these cutoffs.

- **EPA should not use the results of its impact analyses to devise cutoffs.** EPA did exactly what it should have done as regulatory flexibility guidance suggests for determining ways to mitigate impacts--identify the impacts, then use those impacts, if falling on small businesses, to define a highly affected group to assess mitigation measures. EPA used the best tools it had available to define this highly affected group. If the Agency could not use the method it did use to define cutoffs (both at proposal and in the final decisionmaking process), EPA might not have had any method at all by which to define cutoffs that could mitigate impacts. EPA continued to use closures and failures to identify impacts and define cutoffs in its final decisionmaking process.

- **Impacts due to shifts to substitutes need to be addressed**. EPA determined that shifts to substitutes would have been small had EPA promulgated a rule and did discuss this in Section Eight of the EA for the proposal. The issue is again discussed in Section Eight of this report.

- **EPA did not meet the requirements of an IRFA.** EPA disagrees. All IRFA requirements were discussed in the EA for the proposal.

9.2.3 Steps Used To Minimize Impacts

EPA investigated two methods for minimizing impacts. The first method was to define an exclusion based on size (amount of laundry processed each year), which is presented in detail in earlier sections of this report. The second method was to consider a no-regulation option. The primary purpose of EPA's decision not to regulate was not associated with mitigating impacts on small entities, because EPA believed the Agency could have constructed a rule, using either the 3MM/120K or 5MM/255K cutoff, that mitigated impacts on small firms. EPA's decision not to regulate, however, clearly avoids any impacts on small entities from pretreatment standards. The complete rationale for EPA's decision to reject the

regulatory options and to decide not to promulgate pretreatment standards for the industrial laundries point source category is presented in the preamble to the Final Action.

9.2.4 Estimated Number of Small Business Entities to Which the Regulation Would Have Applied

The section begins with a discussion of the definition of "small business" for the purpose of undertaking a small business analysis, then summarizes the data available for the estimated number of small business entities and the methodology used in calculating that estimate.

9.2.4.1 Definition

The RFA and SBREFA both define "small business" as having the same meaning as the term "small business concern" under Section 3 of the Small Business Act (unless an alternative definition has been approved). The latter defines a small business at the business entity or company level, not the facility level. The analysis, then, needs to determine whether an industrial laundry facility is owned by a small business entity, not whether the facility itself may be considered "small."

The definition of "small" generally is defined by standards for each SIC code as set by the Small Business Administration (SBA). As discussed in the industry profile (see Section Three), the industrial laundries industry is covered by a number of SIC codes. The predominant SIC codes also are discussed in Section Three. In SIC code 7218, SBA defines "small" as firms with revenues of less than $10 million per year; for SIC 7211 and 7213, "small" is defined as less than $10.5 million per year. Less than $10.5 million per year in revenues is the definition EPA is using for this analysis.

9.2.4.2 Estimated Number of Small Business Entities

EPA sent the Section 308 Survey questionnaire to a sample of industrial laundry facilities. The sampling frame for the questionnaire was stratified on the basis of facility characteristics, including facility

revenues (see Section Two and EPA's Final Development Document). Therefore, it is possible to estimate statistically the number of facilities, but the same statistical approach cannot be used to estimate the number of companies or business entities, other than single-facility firms. For single-facility firms, the number of business entities is the statistically weighted total number of single-facility firms. For multifacility firms, EPA used a different approach, which was described in detail in Section Six. Using both sets of estimates, EPA calculates that there are 837 total small industrial laundry firms out of 903 firms (92.7 percent). These 837 firms are estimated to own 900 facilities.

When baseline failures/closures are removed from the analysis (see Section 5.1.2 of this EA for a discussion of how EPA establishes the baseline against which to measure impacts), EPA estimates that there are 675 single-facility firms, of which 659 (97.6 percent) are defined as small (see EPA's rationale on removing baseline closure and failures from the analyses in Sections Five and Six of this EA). EPA also estimates that there are 70 multifacility firms, only 25 of which (35.7 percent) are defined as small. Thus, EPA estimates that out of the 745 total in-scope industrial laundry firms in the postcompliance analysis, 684 (91.8 percent) are defined as small.

Not all of these firms would have been affected by pretreatment standards, however, had EPA promulgated a rule. EPA investigated several size cutoffs for excluding groups of small facilities for excluding from coverage by a rule. The three cutoffs that EPA investigated included industrial laundry facilities that process fewer than 1 million water-washed pounds of laundry per year and fewer than 255,000 pounds of shop towels and printer towels/rags per year (the 1MM/255K cutoff group), a group that included the 1MM/255K cutoff group and added facilities that process fewer than 3 million water-washed pounds of laundry per year and fewer than 120,000 pounds of shop towels and printer towels/rags per year (the 3MM/120K cutoff), and a group of facilities that process fewer than 5 million water-washed pounds of laundry per year and fewer than 255,000 pounds of shop towels and printer towels/rags per year (the 5MM/255K cutoff). EPA investigated excluding these groups because these facilities are associated with small to very small pollutant loads, yet, financially, are somewhat vulnerable to very vulnerable to potential impacts from pretreatment standards. Under the 1MM/255K cutoff, 128 facilities (16 percent of all small, single-facility firms, regardless of baseline status) would have been excluded single-facility firms, under the 3MM/120K cutoff, 363 (45 percent of small, single facility firms) would have been excluded

single-facility firms, and under the 5MM/255K cutoff, 556 (69 percent of all small single-facility firms) would have been excluded single-facility firms.

Had EPA promulgated a rule, no small firms would have closed or failed under the 5MM/255 cutoff; 39 small, single-facility firms would have closed or failed under the 3MM/120K cutoff (39 closures and no failures, or 5.7 percent of all small firms in the postcompliance analyses), and 126 small, single-facility firms would have closed or failed under the 1MM/255K cutoff (54 closures and 72 failures, or 18.4 percent of all small firms in the postcompliance analysis). At the 3MM/120K cutoff, the 518 facilities excluded would have been associated with 62 closures or 12 percent of all excluded facilities, and 72 failures out of 363 excluded firms, or 20 percent of all excluded firms.

Small firms were profiled in detail in Section Three, which presents the number of firms and the financial profile of all firms broken down into detailed revenue categories. Table 9-1 summarizes these financial characteristics, showing the differences between those classified as small (including those in the excluded group) and those classified as large and provides some additional comparative measures of financial health: a pretax return on assets ratio and a pretax return on equity ratio for both small and large firms.[2] As the table shows, the typical small firm generally has smaller earnings, working capital, total assets and liabilities and owner equity than the typical large firm, but the small size does not necessarily mean less healthy financially. Both small and large firms, on average, show strong returns on assets and equity, pretax. Furthermore, small firms might even have slightly better ratios than the larger firms, although the differences seen might not be statistically significant. (Additional detailed information on comparative financial health between small and large firms was presented in Section Three.)

9.2.5 Description of Reporting, Recordkeeping, and Other Compliance Requirements

Because EPA has decided not to promulgate pretreatment standards for the industrial laundries point source category, incremental compliance requirements will not apply.

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[2] Pretax returns are based on earnings before interest and taxes. Pretax returns are used here for comparative purposes because many small firms do not pay corporate taxes.

Table 9-1

**Number of Firms and Average Financial Measures,
by Firm Size (1993 $)***

Revenue Group	Number of Firms*	Earnings Before Interest and Taxes	Working Capital	Total Assets	Total Liabilities	Owner Equity**	Ratio of Earnings to Owner Equity**	Ratio of Earnings to Total Assets
Less than $10.5 million	741	$276,075	$464,271	$2,951,787	$639,930	$2,312,024	0.2874	0.1327
$10.5 million or greater***	66	$8,825,605	$13,383,059	$64,444,134	$20,429,506	$44,014,645	0.2845	0.1064
All firms***	807	$956,214	$1,491,997	$7,843,677	$2,214,247	$5,635,852	0.2872	0.1306

* The 96 single-facility firms estimated to be baseline closures in Section 5 have been excluded from this analysis.
** Owner equity is being used as a proxy for retained earnings in Altman Z" analyses of firm-level impacts.
*** Two weighted firms that are statistical outliers were not included in the calculation of financial measures.

Source: Section 308 Survey.

SECTION TEN

COST AND BENEFITS OF EPA'S DECISION

10.1 REQUIREMENTS OF EXECUTIVE ORDER 12866 AND THE UNFUNDED MANDATES REFORM ACT (UMRA)

This section has been prepared to comply with Executive Order 12866, which requires federal agencies to assess the costs and benefits of each significant rule they propose or promulgate. Although EPA has decided not to promulgate pretreatment standards for the industrial laundries point source category, this section reviews the major requirements associated with cost-benefit analyses and discusses EPA's decision in relationship to these requirements. It also presents a brief comparison of costs and benefits of regulatory options considered. The methodologies for calculating costs and benefits are the same as those presented in the EA for the proposal. For the most part, this section discusses only results, which change slightly due to changes in inputs such as costs of compliance and number of surface water reaches improved.

The principal requirements of the Executive Order are that the Agency perform an analysis comparing the benefits of the regulation to the costs that the regulation imposes, that the Agency analyze alternative approaches to the rule, and that the need for the rule be identified. Wherever possible, the costs and benefits of the rule are to be expressed in monetary terms.

This section also has been prepared to comply with UMRA. Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), P.L. 104-4, establishes requirements for federal agencies to assess the effects of their regulatory actions on state, local and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefits analysis, for proposed and final rules with "federal mandates" that may result in expenditures to state, local and tribal governments, in the aggregate, or the private sectors, of $100 million or more in any one year.

Before promulgating an EPA rule for which a written statement is needed, section 205 of UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted.

Before EPA establishes any regulatory requirements that might significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

Up through the final decision, EPA complied with requirements of both EO 12866 and UMRA. The Agency presented the costs and benefits of the proposed rule in the EA for the proposal and detailed how the proposal met the requirements of both EO 12866 and UMRA. Now that EPA has decided not to promulgate pretreatment standards for the industrial laundries point source category, the calculation of costs and benefits is substantially simplified. Because no regulation is promulgated, EPA's decision will result in no regulatory costs and no regulatory benefits as calculated under either EO 12866 or UMRA. The industry's voluntary program will result in some costs and benefits, but as they are not driven by any regulation, the Agency is not required to measure these costs and benefits. Industry believes their voluntary program will be significantly more cost-effective than any rule EPA might have devised.[1]

Thus the decision does not result in a federal mandate that might result in expenditures of $100 million or more for either the public or the private sector in any one year, and there will be no

[1]UTSA, TRSA, 1999. Joint Comments of the Uniform and Textile Service Association and the Textile Rental Services Association in Response to Notice of Data Availability. Written Memorialization of Oral Comments Provided to EPA Prior to February 8, 1999. Docket No. W-97-14.

disproportionate budgetary effects on any particular areas of the country, particular types of communities, or particular industry segments. Furthermore, EPA has selected the "least costly, most cost-effective, and least burdensome alternative." This satisfies section 203 of the UMRA. EPA's selection of a no-regulation option from among various options is consistent with the requirements of the UMRA in terms of costs, cost-effectiveness, and burden.

10.2 COSTS AND BENEFITS OF REGULATORY OPTIONS

In this section, EPA presents the costs and benefits of the CP-IL option under the three cutoffs considered--1MM/255K, 3MM/120K, and 5MM/255K. Costs for DAF-IL are higher (see Table 4-3 in Section Four) and benefits of DAF-IL are the same as those for CP-IL, ranging from $0.07 to $0.35 million ($1993).

10.2.1 Total Social Costs

As discussed in the EA for the proposal, total social costs that can be monetized include primarily the pretax costs of compliance. EPA estimated two additional very small cost categories in the EA for the proposal. These two cost categories included the costs to administer a permitting program (costs to governments only, since costs of permitting from industry's perspective are included in the costs of compliance) and costs of administering unemployment benefits (the benefits themselves are a transfer payment and are therefore not a social cost). EPA has not precisely estimated these last two costs, but estimates that they would sum to less than $3 million per year at the 1MM/255K cutoff, and less than that for the other two cutoffs. For the purposes of this approximate comparison of costs and benefits, EPA uses the pretax costs of compliance as a reasonable proxy for total social costs.

Table 10-1 presents the total social costs of the rule approximated for the 1MM/255K, 3MM/120K, and 5MM/255K cutoffs. The social costs range from $77.4 million to $171.2 million per year. The 3MM/120K cutoff is associated with a cost of $131.2 million per year.

Table 10-1

Approximate Total Annual Social Costs of the CP-IL Regulatory Option and Cutoffs

Cutoff	Total Social Costs (million $1993)
1MM/255K	$171.3
3MM/120K	$131.2
5MM/255K	$77.4

Source: Table 4-3 in Section Four.

10.2.2 Benefits

As in the EA for the proposal, EPA measured the human health, recreational, nonuse, and POTW benefits. See the EA for the proposal for a detailed discussion of these benefit categories and methodologies; also see the *Water Quality Benefits Analysis for the Final Action Regarding the Pretreatment Standards for the Industrial Laundries Point Source Category* (WQBA)[2] for more information on how the results were derived.

Monetized human health benefits would be nominal under all CP-IL cutoffs. Cancer cases would be reduced from far less than one cancer case per year in the baseline (0.03 cancer cases would be avoided, measured from a baseline of 0.10 cancer cases). EPA's use of a hazard ranking score to evaluate noncancer effects found no noncancer effects would occur. Based on an estimated monetary value of cancer cases avoided ($2.1 million to $11.4 million per cancer case avoided; see the EA for the proposal), cancer cases avoided under all cutoffs would be valued at $0.06 million to $0.34 million per year.

For recreational benefits, EPA estimates that out of 30 exceedences of ambient water quality criteria (AWQC) for protection of human health and/or aquatic life on 12 reaches, the regulatory options under consideration would have eliminated 16 exceedences on these reaches, but would not have eliminated all the exceedences on any one of the 12 reaches adversely affected by industrial laundry discharges under the baseline scenario. However, EPA does not consider industrial laundry discharges to be a nationwide problem. Further, EPA expects that the benefits realized from a rule could be realized under the existing pretreatment program, where EPA will work with any POTW that is not meeting its water quality-based permit limit to impose controls as necessary to meet that permit limit.[3] EPA also

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[2] U.S. EPA. *Water Quality Benefits Analysis for the Final Action Regarding the Pretreatment Standards for the Industrial Laundries Point Source Category.* Docket No. L15050.

[3] In fact, EPA looked at the one reach used to model baseline exceedences and found that, in fact, it was used by a POTW that treats over 5 million gallons a day and thus has authority to issue local limits.

notes that the voluntary program, if successful, or the efforts of the OSW to regulate shop towels under RCRA might also realize these same benefits.

EPA also estimates biosolids quality at 8 POTWs would be improved. EPA estimates this benefit to be valued at $0.005 million to $0.009 million.[4]

Table 10-2 presents a summary of these benefits. As the table shows, the total benefits associated with the CP-IL option under all cutoffs is $0.07 million to $0.35 million, which is primarily the value of human health benefits.

10.2.3 Comparison of Costs and Benefits

Table 10-3 compares the cost of the CP-IL option under the three cutoffs considered to the monetized benefits of this regulatory option. As the table shows, the 3MM/120K cutoff is associated with costs totaling $131.2 million compared with benefits totaling $0.07 to $0.35 million per year.

[4] U.S. EPA. *Water Quality Benefits Analysis for the Final Action Regarding the Pretreatment Standards for the Industrial Laundries Point Source Category*. Docket No. L15050.

Table 10-2

Monetized Benefits by Category

Category	Monetized Benefit
Reduced Cancer Cases	$0.06 - $0.34 million
Improved Recreational Fishing	-
Nonuse	-
Sewage Sludge Improvement	$0.005 - $0.009 million
Total	**$0.07 - $0.35 million**

Source: EA for the proposal and the WQBA.

Table 10-3

A Comparison of Annual Cost and Monetized Benefits of the CP-IL Option

Cutoff	Total Social Cost (million $ 1993)	Monetized Benefits ($1993)
1MM/255K	$171.3	$0.07 - $0.35 million
3MM/120K	$131.2	$0..07 - $0.35 million
5MM/255K	$77.4	$0.07 - $0.35 million

Source: Table 10-1, EA for the proposal, and the WQBA.

APPENDIX A

MARKET MODEL METHODOLOGY AND RESULTS

In this Appendix the economic impact analysis of potential pretreatment standards considers the possible changes in market price and industry output that could result from increased pollution control costs. EPA uses a market model comprising an industry supply and demand curve to estimate changes in market price and quantity due to potential standards using the CP-IL option under all cutoffs. This appendix describes EPA's market model methodology for the industrial laundries industry. Section A.1 presents an overview of the model used to estimate the economic impacts of the regulation. Section A.2 provides a description of the methodology used for estimating preregulatory market conditions (i.e., the market supply and demand equations, the methodology used to construct the variables in the model, and the methodology for estimating preregulatory price and quantity). Section A.3 presents the methodology used to estimate the postregulatory market conditions. Section A.4 presents the results of the pre- and postregulatory analyses. Section A.5 presents the results of impact analyses (facility-level and firm-level analyses) assuming costs can be passed through to customers.

A.1 OVERVIEW OF THE INDUSTRIAL LAUNDRIES MARKET MODEL

A market *demand* curve shows the relationship between market price and the quantity demanded, while a market *supply* curve shows the relationship between market price and the quantity supplied. The market is in equilibrium when the market price is such that the quantity demanded by industrial laundering customers is equal to the quantity that industrial launderers are willing to supply. Quantity, in this case, refers to pounds laundered. EPA assumes that the industrial laundries market is in equilibrium with the supply and demand curves that determine preregulatory market price and quantity prior to the implementation of pretreatment standards. The postregulatory scenario will show a shift in the market equilibrium due to a shift in the supply curve resulting from industry cost increases associated with the

potential standards.[1] Figure A-1 illustrates industry demand and supply curves under preregulatory and postregulatory conditions, showing these shifts.

Although the discussion in this section focuses on market supply and demand, it is important to consider firm-level conditions, because these conditions influence market conditions. As shown in the industry profile, the industrial laundries industry is, in most markets, considered a competitive industry. As such, firms in this industry can be viewed as price takers, in that each firm takes the market price as given and has no ability to influence that price. In effect, each firm in this industry faces a horizontal demand curve: at any level of output the firm faces the same market price.[2] Given the market price, each (competitive) firm maximizes its profits by producing at a level where marginal cost is equal to price. Thus, the marginal cost curve also represents the supply curve for the individual firm under most circumstances.

Increased pollution control costs cause each firm's marginal cost curve (i.e., its supply curve) to shift upward because the cost of production has increased at each point on the marginal cost curve. When the marginal cost curve shifts up, the competitive firm responds with a lower level of production at each price level to maximize its profits.[3] The market supply curve, which is the sum of the individual firm supply curves, also shifts upward and to the left, from S_1 to S_2 (see Figure A-1), resulting in an increase in the equilibrium market price for industrial laundering services. Ultimately, when the market adjusts to the impact of increased pollution control costs due to a regulatory option, market equilibrium will reflect a higher price and lower quantity than the preregulatory price and quantity. The industry now faces a new market price of P_2 and supplies Q_2 of industrial laundering services.

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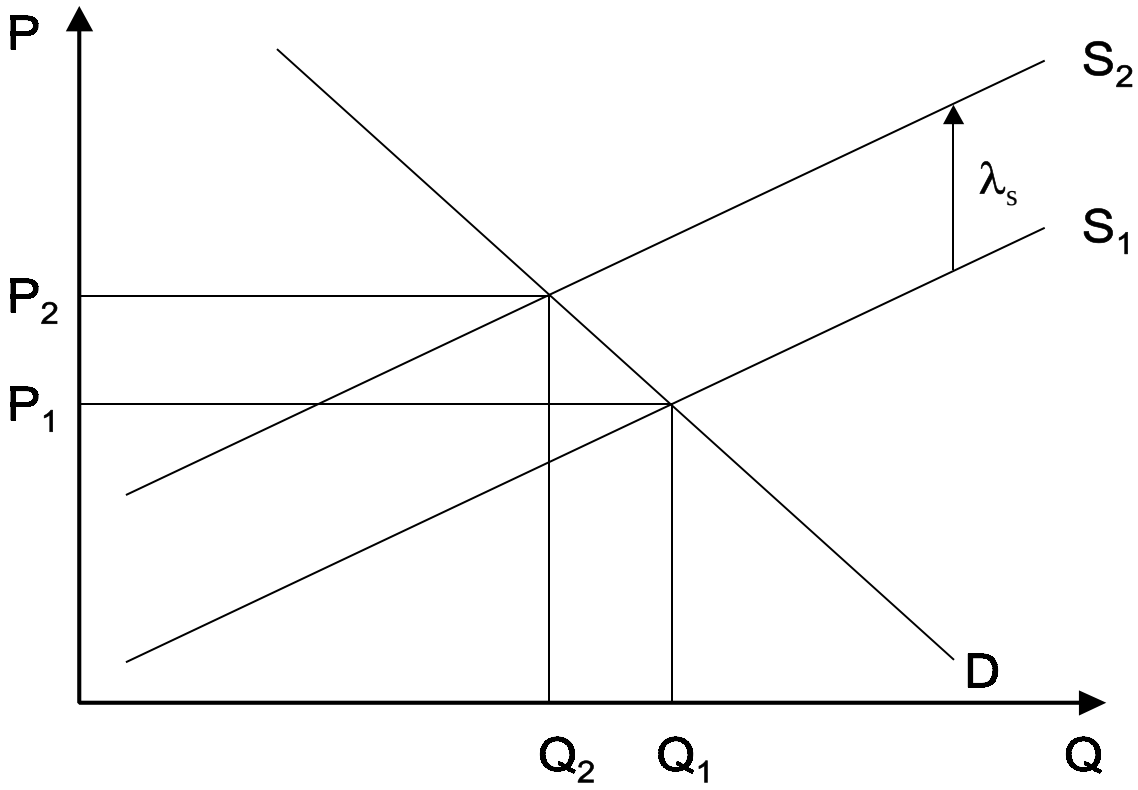
[1] The industry supply curve is the aggregate of all facilities' marginal cost curves. Pollution control costs add to each facilities' marginal cost, so the marginal cost curves of all facilities shifts upward (see Figure A–1). This shift is *very* small. The difference between baseline production (Q_1) and post compliance production (Q_2) under the CP-IL option is only about 18 to 41 million pounds out of a total baseline production of nearly 9 billion pounds or 0.2 to 0.5 percent of current production, depending on cutoff.

[2] Note, however, that this does not mean that the demand curve faced by the industry is horizontal. If all firms in the industry face increased costs price can rise along the downward sloping industry demand curve.

[3] Pollution control costs are the costs incurred by all facilities in the industry to reduce or minimize the amount of pollutants that are contained in the effluent from industrial laundries. This cost causes a very small shift in the supply curve (see footnote above).



D, S_1 = preregulatory market demand and supply
D, S_2 = postregulatory market demand and supply
P_1, Q_1 = preregulatory equilibrium price and quantity
P_2, Q_2 = postregulatory equilibrium price and quantity
λ_s = supply shift = weighted average increase in marginal cost due to regulation

Figure A-1. Pre-and postregulatory supply and demand for the industrial laundries industry.

The market model assumes that the demand curve does not shift as a result of a regulatory option of the IL Standards. This assumption is appropriate because, although changes in pollution control costs affect the production costs of industrial launderers, production costs are supply-side variables and do not shift the market demand curve. However, at the new, higher price, consumers purchase less, which is represented as a movement along the demand curve as a result of the change in market price.

Market impacts depend on the extent to which increases in production costs due to the regulation cause a decrease in the market supply for industrial laundering services and the extent to which higher costs can be passed on to customers through higher prices. The final results of the market model include:

- An estimate of preregulatory market supply and demand curves.
- An estimate of postregulatory market price and quantity.
- Price elasticities of supply and demand that will be used to estimate the postregulatory price, which is used in turn to estimate an industry percentage cost passthrough (CPT). The percentage CPT can be used to revise facility estimates of total posttax annualized costs, which then can be input into the facility and firm financial impact analysis models.

A.2 PREREGULATORY MARKET CONDITIONS

This section provides a detailed discussion of the methodology for modeling the preregulatory market conditions. Section A.2.1 lays the groundwork for the preregulatory market analysis by introducing the preregulatory market supply and demand equations. Section A.2.2 defines the market model variables used in the supply and demand equations, provides a discussion of the sources of data for each of the variables and the methodologies used to construct the variables, and presents the data used in the market model analysis. Section A.2.3 outlines the steps used to solve for (estimate) the preregulatory market equations that pass through the 1993 market equilibrium point and presents the elasticities of supply and demand for the industrial laundries industry.

A.2.1 Market Supply and Demand Equations and Market Equilibrium Conditions

The supply and demand relationships represent a system of interdependent equations in which price and quantity are determined simultaneously to reach a common solution that satisfies both equations. In theory, these equations mimic the market interactions of industrial launderers and their customers and the resulting price and quantity are those that would be faced in the market.

For this model, market supply is assumed to be a function of market price and the Producer Price Index (PPI).[4] Market demand is assumed to be a function of market price and the U.S. population.[5] In addition, the demand and supply relationships are assumed to be log-linear in form. Given these relationships, the market supply and demand equations (which are used to estimate the elasticities of supply and demand [ϵ and η]) can be written as follows:

Preregulatory Supply

$$\ln Q_s = \ln \alpha_s + \epsilon \ln P_t + \theta_1 \ln PPI_t \quad \textbf{(1)}$$

Preregulatory Demand

$$\ln Q_d = \ln \alpha_d + \eta \ln P_t + \theta_2 \ln Pop_t \quad \textbf{(2)}$$

where,

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[4] Although a term for pollution control costs does appear in the preregulatory model, some facilities that were surveyed in the Section 308 Survey reported having some level of pollution control equipment in place. For the purposes of this model, EPA assumes that existing unit pollution control costs (costs per pound of laundry processed) for all facilities have remained constant in the years prior to the regulation, enabling EPA to consider the marginal effect of incremental pollution control costs that result from regulatory options. As a constant value in the preregulatory market, preregulatory pollution control costs appear as part of the constant term for the supply equation, α_s, and not as a separate term. A term for incremental, or marginal, pollution control costs appears in the postregulatory market model.

[5] PPI is a proxy for input costs and Pop is a proxy for shifts in demand.

Q_s = market supply

α_s = supply constant

P_t = market price

ϵ = coefficient for P_t in the supply equation (supply elasticity)

PPI_t = Producer Price Index

θ_1 = coefficient for PPI_t

Q_d = market demand

α_d = demand constant

η = coefficient for P_t in the demand equation (demand elasticity)

Pop_t = United States population

θ_2 = coefficient for Pop_t

To identify the supply and demand relationships econometrically, each equation must contain at least one exogenous variable that does not influence the other equation. This is a prerequisite for obtaining intersecting supply and demand curves and thus a prerequisite for obtaining a solution to the system of simultaneous equations. For the supply equation, PPI is an exogenous variable and is expected to influence market supply but not market demand. For the demand equation, U.S. population is an exogenous variable, expected to affect market demand but not market supply. Because market supply and demand curves show the relationship between industry output, (i.e., quantity supplied or quantity demanded) and market price, these variables (quantity and price) are common to both the supply and demand equations. Each of the variables used in the market model equations are defined and discussed in Section A.2.2.

A.2.2 Supply and Demand Variables

To measure the impacts of the regulation, actual data for the four market model variables (i.e., industry output, market price, PPI, and population) must be input into the model. After an extensive search, EPA found that industry output and market price data for the industrial laundries industry are not available through government sources, trade associations, other organizations, or databases that monitor industry information. For this reason, EPA estimated historical values of output and price from information provided in the industrial laundries detailed questionnaire database and data available through the U.S. Census Bureau and the U.S. Bureau of Labor Statistics, and obtained information for the PPI and population variables from various published sources (see Sections A.2.2.1-A.2.2.4 for exact references). Each of the variables in the market model are discussed below in detail. The variables for both the market supply and demand equations are based on historical data for the years 1978 through 1993, which incorporate a sufficient span to account for industry behavior and trends. Table A-1 presents the data used to estimate the industrial laundries industry market supply and demand curves. Because this analysis is based on annual data, the results derived from this data can be considered "intermediate run results," that is most, but perhaps not all, factors of production can be varied. As is usually the case, EPA assumes that the market is in equilibrium each year.

A.2.2.1 Industry Output (Q)

Industry output is defined as the total pounds laundered by all industrial laundry facilities. EPA constructed estimates of historical industry output data using 1993 industry output data, calculated from survey data contained in the Section 308 Survey database and historical employment data.[6] Industry employment was used to construct pre-1993 industry output because employment is an input into the industrial laundries' production process and directly affects the level of output.

To estimate industry output, EPA assumed that no significant changes in worker productivity occurred over the period analyzed. To explore the effect of this assumption on the model results, EPA used

[6] EPA obtained historical employment data for 1978-1993 from *County Business Patterns*, U.S. Department of Commerce, Bureau of the Census.

Table A-1

Data Used To Estimate The Industrial Laundries Industry Supply And Demand Curves

Year	Production (million pounds)	Price (1993 dollars)	PPI	U.S. Population (millions)
1978	7779.31	$0.39	58.79	222.59
1979	8196.14	$0.42	66.19	225.06
1980	7917.85	$0.47	75.53	227.73
1981	7743.09	$0.52	82.42	229.97
1982	7644.65	$0.56	84.10	232.19
1983	8048.45	$0.54	85.20	234.31
1984	7971.83	$0.60	87.22	236.35
1985	8022.24	$0.62	86.80	238.47
1986	8024.72	$0.68	84.27	240.65
1087	8143.82	$0.72	86.46	242.80
1988	8538.13	$0.75	89.91	245.02
1989	8563.08	$0.76	94.37	247.34
1990	8582.26	$0.77	97.81	249.91
1991	9136.66	$0.74	97.98	252.65
1992	8534.47	$0.83	98.57	255.46
1993	8776.27	$0.81	100.00	258.25

Source: EPA sources and estimates as described in text of Sections A.2.2.1 through A.2.2.4.

a productivity factor constructed by the Bureau of Labor Statistics to conduct a sensitivity analysis for worker productivity. The productivity factor did not improve the regression results and therefore was not included in the final model. One possible explanation for poor results using the productivity factor is that this factor is based partly on industry revenues and not at all on actual production data. Due to the lack of an effective alternative proxy for changes in worker productivity, EPA has assumed a constant 1993 level of worker productivity in the industrial laundries industry between 1978 and 1993. If, as is generally expected, worker productivity improved over those 15 fifteen years, the estimates for historical output could be somewhat high, particularly for the earlier years of the study period. Because productivity measures are calculated as residuals, they capture changes in nonsupply-side factors as well as improvements in worker utilization. Thus, a decrease in product demand one year can cause a measured decrease in productivity if laundries do not lay off a proportionate number of workers. Economically, a decrease in demand is not equivalent to a decrease in supply even though the impact on measured productivity may be equivalent. Thus, productivity measures are more reliable in the long-run, rather than as year-to-year measures of shifts in supply.

Industry output for 1978 to 1992 was constructed by scaling 1993 industry output estimates based on industry employment. EPA derived estimates of historical industry output data using 1) 1993 output estimates from the Section 308 Survey database, 2) 1993 employment estimates from the detailed questionnaire database, and 3) historical employment figures by SIC codes (note new classification scheme presented in Table 2-1 in Section Two of this EA).[7]

Industry output for 1993 was estimated by calculating total output for the population of industrial laundry facilities contained in the detailed questionnaire database. Because the survey was not a census, EPA weighted output data for each facility by a facility-specific sample weight to scale the data to the affected population of industrial laundering facilities. EPA used the following equation to estimate total output for all industrial laundry facilities for 1993:

$$Q_{1993} = \Sigma_i(q_i w_i) \qquad \textbf{(3)}$$

[7] EPA obtained historical employment data for 1978-1993 from *County Business Patterns*, U.S. Department of Commerce, Bureau of the Census.

where,

q_i = output for sampled facility i in 1993

w_i = facility-specific weight factor for facility i

Q_{1993} = output for all facilities in 1993

EPA estimated industry employment ratios using several steps, the first of which involved calculating population estimates for 1993 employment for the three most prevalent SICs in the database: 7211, 7213, and 7218.[8] (The SICs are used in the next step to tailor census employment data to the facilities represented in the detailed questionnaire database.) These three SICs were chosen because their employment represents over 96 percent of total employment for facilities in the database. The mathematical expression for this can be written as follows:

$$E_{weighted_{SIC}} = \Sigma_{SIC} (e_i w_i) \quad \textbf{(4)}$$

where,

$E_{weighted_{SIC}}$ = weighted 1993 employment by SIC

e_i = employment for facility i in 1993

w_i = facility-specific weight factor for facility i

Because only 1993 output and employment data were collected in the detailed questionnaire, EPA used Census Bureau data to construct historical data for these variables. EPA compared total 1993 employment for the three selected SICs to 1993 total Census Bureau employment figures for those same SICs. The ratios resulting from this comparison were multiplied by the Census Bureau employment data for each SIC for each of the years between 1978 and 1993, then summed across SICs, to estimate total employment in the population for each of these years. Mathematically, this can be written as follows:

[8] See Table 2-1 in Section Two of this EA for the new designations for these industries under the NAICS codes.

$$E_t = \Sigma_{SIC} \frac{e_{weighted_{1993_{SIC}}}}{e_{census_{1993_{SIC}}}} (e_{census_{t_{SIC}}}) \quad \textbf{(5)}$$

where,

E_t = total employment in weighted population in year t

$e_{weighted_{1993_{SIC}}}$ = employment in weighted population in 1993 by SIC

$e_{census_{1993_{SIC}}}$ = census employment in 1993 by SIC

$e_{census_{t_{SIC}}}$ = census employment in year t

EPA scaled total employment for each year by total employment for 1993, so that 1993 became the base year, then multiplied by 1993 output to obtain output figures for each year between 1978 and 1993. This can be expressed using the following equation:

$$Q_t = \frac{E_t}{E_{1993}}(Q_{1993}) \quad \textbf{(6)}$$

where,

Q_t = total output for weighted facilities in year t

E_t = total employment for the weighted population in year t

E_{1993} = total employment for the weighted population in 1993

Q_{1993} = total output for all facilities in 1993

A.2.2.2 Market Price (P)

Market price is defined as the average receipts per pound that industrial launderers receive for the services they provide. EPA constructed market prices for 1978 to 1992 by scaling 1993 industry revenue estimates obtained from the Section 308 Survey using industry revenues and CPI data. EPA derived estimates of historical market price from information provided by 1) industrial laundering facilities in the Section 308 Survey database, 2) historical revenue figures by SIC, and 3) CPI data.[9]

EPA calculated market prices by first estimating total 1993 receipts for the population of industrial laundry facilities contained in the detailed questionnaire database. EPA based total population receipts on facility revenue data and facility-specific weights and estimated them using the following equation:

$$Rev_{1993} = \Sigma_i (r_i w_i) \quad \textbf{(7)}$$

where,

r_i = receipts for sampled facility i in 1993 revenues

w_i = facility-specific sample weight factor for facility i

Rev_{1993} = total revenues for weighted industrial laundering facilities in 1993

EPA then calculated revenue ratios and estimated total population receipts for 1993 for the three most significant SICs (7211, 7213, 7218), which represent over 96 percent of revenues for facilities in the database. These SICs are used to tailor Census Bureau revenue data to the facilities represented in the Section 308 Survey database. EPA derived these estimates as follows:

$$r_{weighted_{1993_{SIC}}} = \Sigma_{SIC} (r_i w_i) \quad \textbf{(8)}$$

[9] EPA obtained historical revenue data from *Service Annual Surveys* for 1978-1993 published by the U.S. Department of Commerce, Bureau of the Census. Consumer Price Index data were obtained from the U.S. Department of Labor, Bureau of Labor Statistics.

where,

$r_{weighted_{1993_{SIC}}}$ = weighted 1993 revenues by SIC

r_i = revenues for facility i in 1993

w_i = facility-specific weight factor for facility i

Because only 1993 revenue data were collected in the detailed questionnaire, EPA used Census Bureau data to construct historical revenue figures. EPA compared total 1993 revenues for each of the three SICs to 1993 Census Bureau revenue figures for the same SICs, then multiplied these ratios by the Census Bureau revenues for each SIC for each of the years between 1978 and 1993. Summing across SICs, the Agency estimated total revenues in the population for each of these years. Mathematically, this approach can be written as follows:

$$Rev_t = \Sigma_{SIC} \frac{r_{weighted_{1993_{SIC}}}}{r_{census_{1993_{SIC}}}} (r_{census_{t_{SIC}}}) \quad \textbf{(9)}$$

where,

Rev_t = total revenues in weighted population in year t

$r_{weighted_{1993_{SIC}}}$ = revenues in weighted population in 1993 by SIC

$r_{census_{1993_{SIC}}}$ = census revenues for 1993 by SIC

$r_{census_{t_{SIC}}}$ = census revenues for year t

EPA scaled total revenues for each year by total revenues for 1993, so that 1993 became the base year, then multiplied by 1993 revenues to obtain revenue figures for each year between 1978 and 1993. EPA also multiplied the revenue figures by the ratio of two price indexes: 1) the *Consumer Price Index for Laundry and Drycleaning Services Other Than Coin-Operated* and 2) the overall CPI. This ratio provides

an indication of how market prices for laundering services have changed relative to market prices for all goods and services. The equation used to estimate historical market prices is as follows:

$$R_t = \frac{Rev_t}{Rev_{1993}} (C_t) (Rev_{1993}) \quad \textbf{(10)}$$

where,

R_t = total revenues for all facilities in year t

Rev_t = total revenues for the weighted population in year t

Rev_{1993} = total revenues for the weighted population in 1993

C_t = Consumer Price Index Ratio (CPI for industrial laundries / CPI for all industries) for 1978 to 1993

EPA estimated market price for 1978 to 1993 by dividing the aggregate revenue estimate for each year by the aggregate output estimate for each year (derived previously) to construct a price per pound for industrial items for each year between 1978 and 1993:

$$P_t = \frac{R_t}{Q_t} \quad \textbf{(11)}$$

Changes in product mix can affect price estimated in this manner. Consider a laundry that provides one higher-priced service and one lower-priced service. In year one, it cleans 500,000 pounds of the higher-priced product at a price of $2 per pound and 500,000 pounds of the lower-priced product at $1 per pound. Its average revenue is equal to $1.50 per pound:

(500,000 x $2) + (500,000 x $1)/1,000,000 lbs)

Due to a shift in consumer preferences in year 2, it cleans 100,000 pounds more of the higher-priced product and 100,000 pounds less of the lower-priced product. Then its average revenue will increase:

$$(600{,}000 \times \$2) + (400{,}000 \times \$1)/1{,}000{,}000 = \$1.60 \text{ per pound}$$

even though the product price is unchanged. Changes in product mix ideally should be controlled for calculating price indices. However, EPA had absolutely no reliable data for the 15-year period with which to make such adjustments.

A.2.2.3 PPI

The PPI is a proxy for industrial laundering unit production costs and serves as an indicator of changes or trends in industrial laundering production costs. As stated above, changes in production costs directly influence the level of services that industrial launderers are willing to supply to the market at any

A.3 POSTREGULATORY MARKET CONDITIONS

This section describes the changes in the postregulatory market that result from increases in regulatory compliance costs. Section A.3.1 discusses the methodology for estimating incremental pollution control costs. Section A.2.3 describes the methodologies used to estimate postregulatory price and quantity. Section A.3.3 describes the methodology for estimating the percentage CPT that is applied to the facility and firm closure models.

A.3.1 Estimating Incremental Pollution Control Costs

Industrial launderers that would have incurred compliance costs as a result of pretreatment standards would have faced increased production costs. When production costs increase, industrial launderers would decrease the amount of services they provide at any given price. As noted above, an

EPA assumes that the market supply curve will shift such that the elasticity of supply remains unchanged, and solely because of the change in unit pollution control costs (compliance costs per pound or laundry processed). This assumption implies that unit pollution control costs vary with the level of output in the same way current operating costs do. This is a reasonable assumption that enables the change in the industry's average pollution control costs per unit of output to be used to determine the magnitude of the supply curve shift, as long as shifts in the curve are not large (which they are not).

Unit pollution control costs will be different for each firm and generally are not correlated with firm size. Therefore, EPA uses the weighted average incremental pollution control cost per unit of output to estimate the supply shift.[11] To calculate the weighted average pollution control costs, the incremental control costs for each facility are summed to yield total pollution control costs for the industry and then divided by total weighted output for the industry. This calculation is shown in the following equation:

$$\lambda = \frac{\Sigma_i cc_i w_i}{\Sigma_i q_i w_i} \qquad \textbf{(12)}$$

where,

λ = weighted average incremental pollution control cost per unit of output

cc_i = incremental pollution control costs for facility i

w_i = facility-specific weighting factor

q_i = annual quantity for facility i

The numerator is the total cost of compliance for each option (presented in Table 4-3 in Section Four of this EA) and the denominator is the total pounds of laundry processed by the industry in 1993 (8.8 billion pounds—see Table A-1).

[11] Pollution control costs include capital costs and operating and maintenance expenses for each facility in the detailed questionnaire database. The pollution control costs have been weighted by a facility-specific sample weight to scale the costs associated with the survey sample to the population of industrial laundering facilities. In addition, the costs have been annualized over a 16-year period so that they remain constant over the lifetime of the pollution control equipment.

A.3.2 Estimating Postregulatory Price and Quantity

Postregulatory equilibrium price and quantity depend on the preregulatory supply and demand equations and the change in unit pollution control costs that result from a regulatory option. The unit pollution control cost, λ, is used in the postregulatory supply equation as a function of initial price. Using a constant price elasticity model, the shift in supply caused by compliance costs enters the supply equation as:

$$\text{Postregulatory change in unit cost of production} = \frac{P_1}{(1+\frac{\lambda}{P_1})} \qquad \textbf{(13)}$$

This configuration allows EPA to model the shift in the supply curve assuming a constant elasticity of supply. EPA could also have specified a parallel shift in the curve, but this approach leads to small inconsistencies in computing postregulatory price and quantity. When evaluating small changes in unit costs, however, either assumption (a parallel shift or a constant-elasticity shift) leads to approximately the same change in price.

We can now solve for (estimate) postregulatory price (P_2) using the postregulatory supply and demand equations (in this case the demand equation is the same both pre- and postcompliance, since no shifts in demand are assumed):

$$\text{Postregulatory supply:} \quad \ln Q_s = \ln\alpha_s + \epsilon \ln P_s - \epsilon \ln(1+k) + \theta_1 \ln PPI \qquad \textbf{(14)}$$

$$\text{Demand:} \quad \ln Q_d = \ln\alpha_d + \eta \ln P_d - \theta_2 \ln Pop \qquad \textbf{(15)}$$

Note that the only change in the postregulatory supply and demand equations compared to preregulatory supply and demand is the addition of the term $\epsilon \ln (1+k)$, where $k = \lambda/P_1$, to the supply equation. This term represents the unit cost of compliance under constant elasticity assumptions. Under equilibrium conditions, $Q_s = Q_d$, we can set the two equations equal to each other and rearrange terms:

$$\ln\alpha_d + \eta \ln P_2 + \theta_2 \ln Pop = \ln\alpha_s + \epsilon \ln P_2 - \epsilon \ln(1+k) + \theta_1 \ln PPI \quad \textbf{(16)}$$

$$(\eta - \epsilon)\ln P_2 = \ln\alpha_s - \ln\alpha_d + \theta_1 \ln PPI - \theta_2 \ln Pop - \epsilon \ln(1+k) \quad \textbf{(17)}$$

This equation can be then written algebraically as:

which further can be written as:

$$\ln P_2 = (\eta - \epsilon)^{-1} [\ln\alpha_s - \ln\alpha_d + \theta_1 \ln PPI - \theta_2 \ln Pop - \epsilon \ln(1+k)] \quad \textbf{(18)}$$

where P_2 is the new equilibrium market price. EPA uses this equation to calculate P_2.

To determine postregulatory supply, the same equations are used, but are solved for Q_2. Solving for Q_2 using the above equations leads to:

$$\ln Q_2 = \ln Q_1 - \frac{\epsilon\eta}{\eta - \epsilon} \ln(1+k) \quad \textbf{(19)}$$

A.3.3 Estimating the Percentage CPT and Applying it to the Closure Model

CPT is the percentage of the incremental pollution control cost incurred by an industrial laundries facility that it can pass on to its customers in the form of higher prices. CPT is calculated as the difference between the pre- and postregulatory prices relative to the weighted average pollution control cost per unit of output. The equation is as follows:

$$CPT = \frac{P_2 - P_1}{\lambda} \quad \textbf{(20)}$$

where P_2 is calculated using the elasticities of supply and demand.

The percentage of the incremental pollution control costs incurred by each facility is calculated by multiplying the facility pollution control costs by the complement of CPT, (1 - CPT). This modified estimate of the control costs for each facility is used in the facility and firm closure models to predict the number of facilities and firms that will close as a result of an option. EPA recognizes that cost passthrough may vary by firm. As such this approach defines a lower bound estimate of impact.

A.4 MARKET MODEL RESULTS

This section presents the results of both the pre- and postregulatory market model analyses. Section A.4.1 discusses the preregulatory results, including the estimated preregulatory supply and demand equations and the supply and demand elasticities for the industrial laundries industry. Section A.4.2 presents the postregulatory market model results. These include the estimated shift in the supply curve due to the incremental pollution control costs, the postregulatory price and quantity, and the percentage CPT that is subsequently used in the facility and firm closure models.

A.4.1 Preregulatory Market Results

The preregulatory supply and demand equations were econometrically estimated using the procedures described above. The parameter estimates and regression statistics for both equations are reported in Table A-2.

EPA's contention that the supply and demand equations used are a good approximation of the actual market is supported by a variety of statistics. Of particular note are the probablities, which indicate the estimate for price is just barely outside the 90th percent confidence interval. The low standard errors for both parameter estimates and the overall model indicate that each variable used in this model (i.e., industrial laundering output, market prices, PPI, and U.S. population levels) are significant in estimating the relationship between supply and demand in the industrial laundries market. Durbin-Watson statistics of

Table A-2

Preregulatory Supply And Demand Curve Regression Results

SUPPLY CURVE				
Parameter	**Value**	**Std. Error**	**t-stat**	**Probability**
Intercept	27.81	0.345	80.64	0.000
Price	0.277	0.067	4.12	0.001
PPI	-0.280	0.131	2.14	0.052
Model Statistics				
Sum of Squared Residuals	0.010			
Standard Error	0.027			
Adjusted R-Squared	0.707			
F-Statistic (p = 0.0001)	19.104			
Durbin-Watson Statistic	1.938			
DEMAND CURVE				
Parameter	**Value**	**Std. Error**	**t-stat**	**Probability**
Intercept	-58.38	40.028	1.459	0.168
Price	-0.593	0.346	1.715	0.110
Pop	4.585	2.147	2.136	0.052
Model Statistics				
Sum of Squared Residuals	0.010			
Standard Error	0.027			
Adjusted R-Squared	0.707			
F-Statistic (p = 0.0001)	19.104			
Durbin-Watson Statistic	1.938			

Source: U.S. EPA, 1997. Industrial Laundries Market Model. Model and data are included in the Rulemaking Record for this proposed rule.

1.938 for both the supply and demand equations indicate that no serial correlation exists in the error terms, that is, these equations provide unbiased estimates of supply and demand. An F-statistic of 19.104 indicates that the independent variables as a group contribute significantly to the prediction of quantity supplied and quantity demanded. An adjusted R-squared statistic of 0.707 indicates that 71 percent of the variance in quantity supplied and quantity demanded is explained by the variance in the independent variables used in the equations.

Using the equations for preregulatory supply and demand presented as Equations 1 and 2 in this Appendix, the parameter estimates presented in Table A-2, and the 1993 values for market price, quantity demanded, PPI, and U.S. population presented in Table A-1, the estimated supply and demand equation can be written as:

Preregulatory Supply

$$\ln Q_s = 24.243 + 0.277 \ln P_t - 0.280 \ln PPI_t \quad \textbf{(21)}$$

Preregulatory Demand

$$\ln Q_d = -66.04 - 0.593 \ln P_t + 4.585 \ln Pop_t \quad \textbf{(22)}$$

The constants shown in both equations are not those shown in the regression results; instead, EPA calculated these constants based on the parameter estimates and the 1993 values for the model variables. This modification enables the estimated supply and demand curves to pass through the 1993 market equilibrium point. Figure A-2 plots the preregulatory supply and demand equations and the preregulatory equilibrium price and quantity. The regression equations shown above provide estimates of the elasticities of supply and demand for the industrial laundries market. The price elasticity of supply is the first partial derivative of the log-linear supply equation with respect to price, or 0.277. The interpretation of this estimate is that the quantity supplied of industrial laundering services will increase by 0.277 percent in

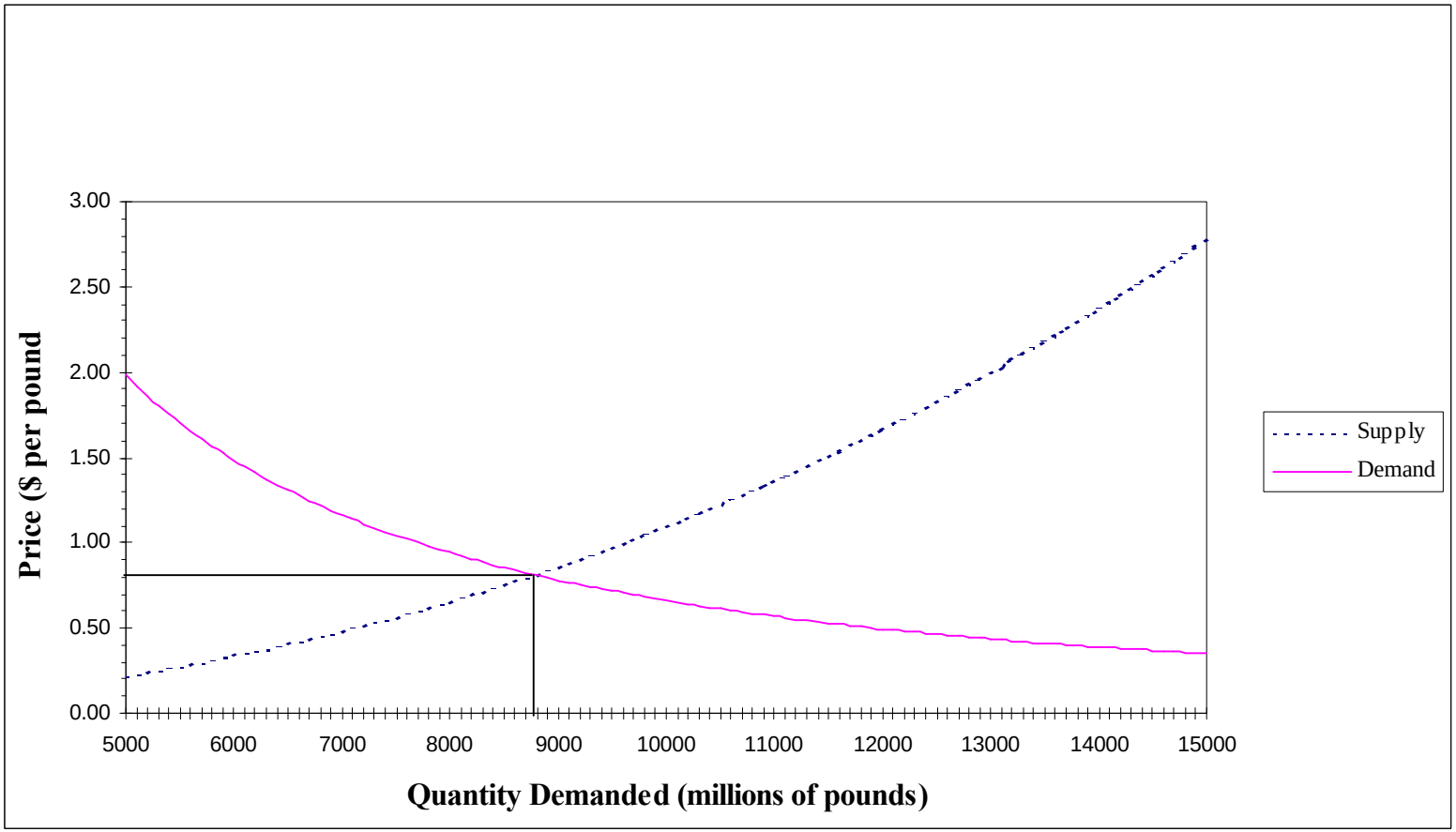

Figure A-2. Industrial laundries industry preregulatory supply and demand curves.

response to a 1 percent increase in price. Similarly, the price elasticity of demand is the first partial derivative of the log-linear demand equation with respect to price, or -0.593. The interpretation of this estimate is that the quantity demanded for industrial laundering services will decrease by -0.593 percent in response to a 1 percent increase in price.

A.4.2 Postregulatory Market Results

Using the equation derived in Section A.3, EPA can estimate the postregulatory price:

$$\ln P_2 = (\eta - \epsilon)^{-1} [\ln\alpha_s - \ln\alpha_d + \theta_1 \ln PPI - \theta_2 \ln Pop - \epsilon \ln(1 + k)] \quad \textbf{(23)}$$

where k is λ/P_1 and λ is the unit cost of pollution control. The unit cost of pollution control (pretax) for the CP-IL option ranges from \$0.009 to \$0.021 per pound. As shown in Table A-1, P_1 = \$0.81 and, from Table A-2, ϵ = 0.277 and η = -0.593. Substituting the cost of the CP-IL option at the 3MM/255K cutoff (\$0.0150) into the equation (it does not matter which cost is used to compute CPT since constant elasticity is assumed) reveals:

$$\begin{aligned} \ln P_2 &= (-0.0593 - 0.277)^{-1} \text{ x } [(24.243 + 66.04) - (0.28 \text{ x } \ln 100) \\ &\quad - (4.585 \text{ x } \ln 258{,}250{,}000) - (0.277 \text{ x } \ln[1 + (0.0150/0.81)])] \\ \ln P_2 &= -0.206438 \\ P_2 &= 0.813 \end{aligned} \quad \textbf{(24)}$$

Then, using the CPT equation:

$$\text{CPT} = \frac{P_2 - P_1}{\lambda} \quad \textbf{(25)}$$

the percentage CPT for all options is found to be approximately 32 percent (see Table A-3). This percentage is applied to all options. Therefore, the factor applied to compliance costs to determine the proportion of these costs that will affect the industrial laundries firms and facilities is 68 percent (1 - CPT).

Table A-3

Calculation of Postcompliance Price and Quantity

Cutoff	Pretax Compliance Cost	Pretax Compliance Cost/lb.	Postcompliance Price	Cost Passthrough	Postcompliance Quantity	Production Loss (lbs.)
CP-IL: no cutoff	$179,687,660	$0.0205	0.815208581	31.57%	8,730,014,495	41,305,874
CP-IL: 1MM/255K	$171,291,344	$0.0195	0.814909003	31.58%	8,731,917,488	39,402,880
CP-IL: 3MM/255K	$131,248,498	$0.0150	0.813477035	31.64%	8,741,029,137	30,291,232
CP-IL: 5MM/255K	$77,401,631	$0.0088	0.811542874	31.72%	8,753,376,894	17,943,475

Source: U.S. EPA, 1999, IL Facility and Firm Financial Model; U.S. EPA, 1999, Industrial Laundries Market Model component. Models and data are included in the Decisionmaking Record for the Notice.

Note that prices will rise $0.003 per pound (from $0.81 to $0.813 per pound; see equation 24) under the 3MM/255K cutoff, which is an increase of only 0.4 percent. With this rise in prices, EPA predicts using the equation solving for quantity that the reductions in laundry services provided ($Q_1 - Q_2$) range from 17.9 million pounds (0.2 percent of Q_1) to 41.3 million pounds (0.5 percent of Q_1),[12] depending on cutoff. This lost production represents a move towards substitutes for individual laundries services (see Section Eight).

Price increases and production decreases of these magnitudes would only slow the growth trend in revenues occurring in the industry, which averaged 4.2 percent per year over the 1991-1993 timeframe according to the Section 308 survey and which, in 1996 reached 12.7 percent (see Section Three), and has been averaging greater than 6 percent in recent years. Given the fact that prices have remained constant or have dropped slightly in recent years, according to comments received by EPA on its proposal (see Comment Response Document), production has been increasing at a similar or greater rate.

A.5 RESULTS OF THE IMPACT ANALYSIS USING THE MARKET MODEL RESULTS

This section discusses the results of analyses undertaken in Sections Five (Facility-Level Analysis) and Six (Firm-Level Analysis) should industrial laundry facilities pass through the costs of compliance. Because EPA uses an average cost passthrough percentage at each facility, this analysis can be considered a lower bound estimate of impact, with the estimates shown in Sections Five and Six being the upper bound estimates. EPA believes that the actual impacts would be bounded by these two sets of estimates.

The baseline analyses do not change when a cost passthrough assumption is used, so the faciltiies and firms that are analyzed in the postcompliance analysis (for the CP-IL option) are the same as those

[12] Note that if no costs can be passed through (i.e., a perfectly elastic demand curve), $-\epsilon\eta/\eta-\epsilon$ in the equation solving for quantity approaches –1 and the equation becomes $\ln Q_2 = \ln Q_1 - \ln(1+K)$. Through additional substitutions, one can prove under these circumstances that the output loss becomes λQ_1, or the total cost of the regulatory option under consideration, since λ is the unit cost, (i.e., total cost/Q_1.) These equations are not reproduced here. This fact is used to develop output losses under a zero-cost passthrough assumption in Section Seven.

analyzed in Sections Five and Six (see Tables 5-1 and 6-1 for the results of baseline closure and failure analyses).

A.5.1 Results of the Facility Closure Analysis Assuming Costs Can Be Passed Through

In this analysis, EPA assumes that each facility can pass through 32 percent of compliance costs to customers (EPA acknowledges that actual cost passthrough will vary by facility, thus this analysis is a lower bound estimate of impacts on industrial laundry facilities). As Table A-4 shows, facility closures under all cutoffs are much fewer when costs are assumed to be passed through. For the 1MM/255K and 3MM/120K cutoffs, results differ by approximately one order of magnitude (with no costs passed through results are 61 and 44 closures, respectively). Results for the 5MM/255K cutoff, however, are not much different regardless of what assumption regarding cost passthrough is used.

A.5.2 Results of the Firm Failure Analysis Assuming Costs Can Be Passed Through

Assuming that all facilities in the analysis can pass through 32 percent of the costs of compliance, the firm failure analysis estimates slightly fewer failures under the no cutoff and 1MM/255K cutoff (both of which were associated with 72 failures assuming no costs can be passed through). No failures would occur under either assumption regarding cost passthrough at the 3MM/120K and 5MM/225K cutoffs. See Table A-5 for more detailed results.

Table A-4

Cost-Passthrough Analysis
Facility Closure Analysis - All Facilities*

Closures	CP_IL no cutoff	CP-IL 1MM/255K	CP_IL 3MM/120K	CP-IL 5MM/255K
All facilities (N=1595)				
Closures	50	7	4	1
Percentage of all facilities	3.2%	0.4%	0.3%	0.1%
Facilities with revenues less than $1 million (N=132)				
Closures	44	1	0	0
Percentage of all facilities	2.7%	0.1%	0.0%	0.0%
Percentage of revenue group	33.3%	1.0%	0.0%	0.0%
Facilities with revenues >= $1 million and < $3.5 million (N=544)				
Closures	5	4	3	0
Percentage of all facilities	0.3%	0.3%	0.2%	0.0%
Percentage of revenue group	1.0%	0.7%	0.5%	0.0%
Facilities with revenues >=$3.5 million and < $7 million (N=619)				
Closures	1	1	1	1
Percentage of all facilities	0.1%	0.1%	0.1%	0.1%
Percentage of revenue group	0.2%	0.2%	0.2%	0.2%
Facilities with revenues >=$7 million and <$10.5 million (N=235)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$10.5 million (N=65)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline closures.

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record for the proposed rule.

Table A-5

Cost-Passthrough Analysis
Firm Failure Analysis - All Firms*

Bankruptcies	CP_IL no cutoff	CP_IL 1MM/255K	CP_IL 3MM/120K	CP_IL 5MM/255K
All firms**				
Incremental bankruptcies	56	54	0	0
Percentage of all firms	7.9%	7.6%	0.0%	0.0%
Firms with revenues < $1 million**				
Incremental bankruptcies	35	35	0	0
Percentage of all firms	5.0%	5.0%	0.0%	0.0%
Percentage of revenue group	56.8%	56.8%	0.0%	0.0%
Firms with revenues >= $1 million and < $3.5 million**				
Incremental bankruptcies	2	0	0	0
Percentage of all firms	0.3%	0.0%	0.0%	0.0%
Percentage of revenue group	0.8%	0.0%	0.0%	0.0%
Firms with revenues >=$3.5 million and < $7 million**				
Incremental bankruptcies	18	18	0	0
Percentage of all firms	2.6%	2.6%	0.0%	0.0%
Percentage of revenue group	8.2%	8.2%	0.0%	0.0%
Firms with revenues >=$7 million and <$10.5 million**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Firms with revenues >=$10.5 million**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline bankruptcies and baseline and postcompliance closures among single-facility firms.

** Number of facilities in each revenue group varies by the difference in postcompliance closures among options.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record for the proposed rule.

APPENDIX B

ADDITIONAL DISCUSSION OF ASSUMPTIONS USED OR CONSIDERED FOR USE IN THE COST ANNUALIZATION MODEL

B.1 FINANCIAL ASSUMPTIONS

The cost annualization model incorporates several financial assumptions:

- Depreciation method
- Timing between initial investment and operation
- Depreciable lifetime for equipment
- Tax shields on interest payments
- Discount rates

Each assumption, and the alternatives examined in making the assumption, is discussed in detail below.

B.1.1 Depreciation Method

The Agency examined four alternatives for depreciating capital investments:

- Modified Accelerated Cost Recovery System (MACRS)
- Straight-line depreciation
- Section 169 of the Internal Revenue Code
- Section 179 of the Internal Revenue Code

Modified Accelerated Cost Recovery System (MACRS) applies to assets put into service after December 31, 1986. MACRS involves the ability to write off greater portions of the investment in the

early years. In contrast, the straight-line depreciation writes off a constant amount of the investment each year. MACRS offers companies an advantage over the straight-line method because a company's income can be reduced under MACRS by a greater amount in the early years when the time value of money is greater. Table B-1 illustrates the effects of the difference in timing in writing off a $100,000 capital investment. The absolute amount depreciated over the 16-year period is the same—$100,000 for both depreciation methods. The sum of the tax shields is also the same for both methods—$100,000 x 38.46 percent or $38,460. The difference in timing, however, means that MACRS provides a $1,664 benefit over straight-line depreciation (i.e., the difference between the present values of the tax shields). The benefit of using MACRS is clear; MACRS is the depreciation used in the cost annualization model.

Section 169 of the Internal Revenue Code provides an option to amortize pollution control facilities over a 5-year period.[1] Under this provision, 75 percent of the investment could be rapidly amortized in a 5-year period using a straight line method. The 75 percent figure is based on the ratio of allowable lifetime (15 years) to the estimated usable lifetime (20 years) as specified in the Internal Revenue Code Section 169, Subsection (f). Although the tax provision enables the facility to expense the investment over a shorter time period, the advantage is substantially reduced because only 75 percent of the capital investment can be recovered. Tables B-2 and B-3 illustrate the differences between using the Section 169 tax provision and MACRS using hypothetical costs. The present value of the tax shield from depreciation (Column 4) increases slightly, from $23,756 (Table B-2) to $24,546 (Table B-3). Because the benefit of the provision is slight, and the facilities might not get the required certification to take advantage of it, the provision was not included in the cost annualization model. Its exclusion results in a more conservative (i.e., higher) estimate of the after-tax annualized compliance cost for the facility.

The Agency also considered the Internal Revenue Code Section 179 provision to elect to expense up to $17,500 the year the investment is placed into service.[2] The Agency assumes that this provision is applied to other investments for the business entity. Its absence in the cost annualization model may result in a slightly more conservative (i.e., higher) estimate of the after-tax annualized cost for the facility.

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[1] Research Institute of America, Inc., 1995. *The Complete Internal Revenue Code*. New York, NY: Research Institute of America, Inc. January.

[2] This assumes that the investment costs do not exceed $200,000 (*The Complete Internal Revenue Code*, Section 179(b)(2); *ibid.*).

Table B-1
Depreciation Methods
Comparison of Straight Line vs. Modified Accelerated Cost Recovery System (MACRS)

Inputs:

Capital Cost ($):		$100,000
Discount Rate :		7.0%
Depreciable Lifetime (yrs):		15
Starting Convention:		mid-year
Marignal Tax Rates:		
	Federal	34.00%
	State	6.75%
	Overall	38.46%

	Straight-Line			MACRS		
Year	Depreciation Rate	Depreciation For Year	Tax-Shield	Depreciation Rate	Depreciation For Year	Tax-Shield
1	3.33%	$3,330	$1,281	5.00%	$5,000	$1,923
2	6.67%	$6,670	$2,565	9.50%	$9,500	$3,653
3	6.67%	$6,670	$2,565	8.55%	$8,550	$3,288
4	6.67%	$6,670	$2,565	7.70%	$7,700	$2,961
5	6.67%	$6,670	$2,565	6.93%	$6,930	$2,665
6	6.67%	$6,670	$2,565	6.23%	$6,230	$2,396
7	6.67%	$6,670	$2,565	5.90%	$5,900	$2,269
8	6.66%	$6,660	$2,561	5.90%	$5,900	$2,269
9	6.67%	$6,670	$2,565	5.91%	$5,910	$2,273
10	6.66%	$6,660	$2,561	5.90%	$5,900	$2,269
11	6.67%	$6,670	$2,565	5.91%	$5,910	$2,273
12	6.66%	$6,660	$2,561	5.90%	$5,900	$2,269
13	6.67%	$6,670	$2,565	5.91%	$5,910	$2,273
14	6.66%	$6,660	$2,561	5.90%	$5,900	$2,269
15	6.67%	$6,670	$2,565	5.91%	$5,910	$2,273
16	3.33%	$3,330	$1,281	2.95%	$2,950	$1,134
Sum	100.00%	$100,000	$38,455	100.00%	$100,000	$38,455
Present Value		$62,849	$24,168		$65,856	$25,325
Net Benefit of Using MACRS over Straight-Line Method (Year 1 dollars)						$1,157

Source: See text.

Table B-2
Spreadsheet for Annualizing Costs

INPUTS

Survey ID #:	1234
Option Number:	
Initial Capital Cost ($):	$100,000
Annual Operation & Maintenance Cost ($):	$10,000
Facility-Specific Nominal Discount/Interest Rate:	13.0%
Expected Inflation Rate:	3.6%
Real Discount Rate:	9.1%
Corporate Tax Structure	1
Taxable Income ($)	$400,000
Marginal Income Tax Rates:	
Federal	34.0%
State	6.60%
Combined	40.60%

Column 1	2	3	4	5	6	7	8
Year	Depreciation Rate	Depreciation For Year	Tax Shield From Depreciation	O&M Cost	O&M Tax Shield	Cash Outflow	Cash Outflow After Tax Shields
1	5.00%	$5,000	$2,030	$5,000	$2,030	$105,000	$100,940
2	9.50%	$9,500	$3,857	$10,000	$4,060	$10,000	$2,083
3	8.55%	$8,550	$3,471	$10,000	$4,060	$10,000	$2,469
4	7.70%	$7,700	$3,126	$10,000	$4,060	$10,000	$2,814
5	6.93%	$6,930	$2,814	$10,000	$4,060	$10,000	$3,126
6	6.23%	$6,230	$2,529	$10,000	$4,060	$10,000	$3,411
7	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545
8	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545
9	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541
10	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545
11	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541
12	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545
13	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541
14	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545
15	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541
16	2.95%	$2,950	$1,198	$5,000	$2,030	$5,000	$1,772
Sum	100.00%	$100,000	$40,600	$150,000	$60,900	$250,000	$148,500
Present Value		$59,423	$24,126	$83,900	$34,063	$183,900	$125,711

	After Tax Shield	Before Tax Shield
Present Value of Incremental Costs:	$125,711	$183,900
Annualized Cost:	$15,192	$22,223

Notes: This spreadsheet assumes that a modified accelerated cost recovery system (MACRS) is used to depreciate capital expenditures.
Depreciation rates are from 1995 U.S. Master Tax Guide for 15-year property and mid-year convention.
Corporate Tax Structure: 1= corporate tax rate 2 = individual tax rate.
If the company-specific discount rate is <3% or >19%, then the industry average figure of 10.0% is used.
First Year is not discounted.

Source: See text.

Table B-3
Spreadsheet for Annualizing Costs Using Section 169 Provision

INPUTS

Survey ID #:	XXXX
Option Number:	
Initial Capital Cost ($):	$100,000
Annual Operation & Maintenance Cost ($):	$10,000
Facility-Specific Nominal Discount/Interest Rate:	13.0%
Expected Inflation Rate:	3.6%
Real Discount Rate:	9.1%
Corporate Tax Structure	1
Taxable Income ($)	$400,000
Marginal Income Tax Rates:	
Federal	34.0%
State	6.60%
Combined	40.60%

Column 1	2	3	4	5	6	7	8
Year	Depreciation Rate	Depreciation For Year	Tax Shield From Depreciation	O&M Cost	O&M Tax Shield	Cash Outflow	Cash Outflow After Tax Shields
1	10.00%	$7,500	$3,045	$5,000	$2,030	$105,000	$99,925
2	20.00%	$15,000	$6,090	$10,000	$4,060	$10,000	($150)
3	20.00%	$15,000	$6,090	$10,000	$4,060	$10,000	($150)
4	20.00%	$15,000	$6,090	$10,000	$4,060	$10,000	($150)
5	20.00%	$15,000	$6,090	$10,000	$4,060	$10,000	($150)
6	10.00%	$7,500	$3,045	$10,000	$4,060	$10,000	$2,895
7	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
8	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
9	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
10	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
11	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
12	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
13	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
14	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
15	0.00%	$0	$0	$10,000	$4,060	$10,000	$5,940
16	0.00%	$0	$0	$5,000	$2,030	$5,000	$2,970
Sum	100.00%	$75,000	$30,450	$150,000	$60,900	$250,000	$158,650
Present Value		$60,876	$24,716	$83,900	$34,063	$183,900	$125,121

	After Tax Shield	Before Tax Shield
Present Value of Incremental Costs:	$125,121	$183,900
Annualized Cost:	$15,120	$22,223

Notes: This spreadsheet assumes that Internal Revenue Code Section 169 is used to depreciate capital expenditures.
Corporate Tax Structure: 1= corporate tax rate 2 = individual tax rate.
If the company-specific discount rate is <3% or >19%, then the industry average figure of 10.0% is used.
First Year is not discounted.

Source: See text.

B.1.2 Timing Between Initial Investment and Operation

A business cannot begin to depreciate a capital investment before it goes into operation. Although the midyear convention is frequently used when calculating depreciation, it is not appropriate for the analysis in Section Four. Several months would be required to build and install most of the equipment considered in the regulatory alternatives. Additional time might be required for design, permitting, and site preparation. The cost annualization model, therefore, assumes a 6-month delay from the capital expenditure to the beginning of operation. As shown in Table B-2, the capital expenditure, depreciation, and one-half of O&M is listed in Year 1, but depreciation and annual O&M costs are not listed until Year 2 (assumed to be the first full year of operation).[3]

B.1.3 Depreciable Lifetime for the Equipment

An asset's depreciable life can differ from its actual service lifetime. The Internal Revenue Code Section 168 classifies an investment as 15-year property if it has a class life of 20 years or more but less than 25 years. Section 168(e)(3)(E) lists a municipal wastewater treatment plant as an example of 15-year property.[4] Fifteen years is also the most commonly listed depreciable lifetime for wastewater treatment equipment in the 1994 Questionnaire. The cost annualization model, therefore, incorporates a 15-year lifetime. EPA investigated the use of a 7-year depreciable life, as well as a 7-year actual life.[5] Only a change in the assumption of actual life has any noticeable effect on annual cost. It is unlikely, however, that the actual life of pollution control equipment is less than 15 years.

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[3]Assuming the equipment goes into service midway through the first year, the annualized cost would decrease slightly because a 5-percent depreciation of the capital investment would more than exceed a half year of O&M expenses.

[4] Research Institute of America, 1995. *Op. cit.*

[5]Jeff Cotter and Anne Jones, ERG, 1997. "Sensitivity analysis of annualized cost estimates to changes in depreciation and project lifetime." Memorandum to Sue Burris, EPA, October 27.

B.1.4 Tax Shields on Interest Payments

The cost annualization model does not consider tax shields on interest paid to finance new pollution control equipment. A facility could finance the investment through a bank loan (debt), money from working capital, issuance of a corporate bond, or selling additional stock (equity shares). In any case, the cost annualization model assumes a cost to the facility to use the money (the discount/interest rate), whether the money is paid as interest or is the opportunity cost of internal funding. According to current tax law, if a facility finances the investment using debt, the associated interest expenses can be deducted, thereby reducing taxable income.[6] The tax shield on the interest payments, therefore, would reduce the after-tax annualized cost. It is not known what mix of debt and capital a facility will use to finance the cost of pollution control equipment. According to Table B-4, which illustrates the effects of 100-percent debt financing, the after-tax annualized cost would drop by approximately 3 percent due to tax shields on the interest payments. If the facility financed the entire investment out of working capital, there would be no associated tax benefit and the after-tax cost should be calculated without interest tax shields. To maintain a conservative estimate of the after-tax annualized cost, tax shields on interest payments are not included in the cost annualization model.

B.1.5 Discount Rates

A company can use internal financing, external financing, or some combination to raise the capital for upgrading its wastewater treatment system. Retained earnings and working capital are examples of internal funding sources. Debt and external equity (stock issuance) are examples of external funding sources. The respondents supplied their discount rate (defined as the weighted average marginal cost of capital given their mix of debt and equity) in the Section 308 Survey.

[6]CCH, 1994, *op. cit.*

Table B-4
Spreadsheet for Annualizing Costs with Interest Payments

INPUTS

Survey ID #:	XXXX
Option Number:	
Initial Capital Cost ($):	$100,000
Annual Operation & Maintenance Cost ($):	$10,000
Facility-Specific Nominal Discount/Interest Rate:	13.0%
Expected Inflation Rate:	3.6%
Real Discount Rate:	9.1%
Corporate Tax Structure	1
Taxable Income ($)	$400,000
Marginal Income Tax Rates:	
Federal	34.0%
State	6.60%
Combined	40.60%

Column 1	2	3	4	5	6	7	8	9	10
Year	Depreciation Rate	Depreciation For Year	Tax Shield From Depreciation	O&M Cost	O&M Tax Shield	Cash Outflow	Cash Outflow After Tax Shields	Interest Payments	Interest Payment Tax Shield
1	5.00%	$5,000	$2,030	$5,000	$2,030	$105,000	$100,940	$1,096	$445
2	9.50%	$9,500	$3,857	$10,000	$4,060	$10,000	$2,083	$1,096	$445
3	8.55%	$8,550	$3,471	$10,000	$4,060	$10,000	$2,469	$1,096	$445
4	7.70%	$7,700	$3,126	$10,000	$4,060	$10,000	$2,814	$1,096	$445
5	6.93%	$6,930	$2,814	$10,000	$4,060	$10,000	$3,126	$1,096	$445
6	6.23%	$6,230	$2,529	$10,000	$4,060	$10,000	$3,411	$1,096	$445
7	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545	$1,096	$445
8	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545	$1,096	$445
9	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541	$1,096	$445
10	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545	$1,096	$445
11	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541	$1,096	$445
12	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545	$1,096	$445
13	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541	$1,096	$445
14	5.90%	$5,900	$2,395	$10,000	$4,060	$10,000	$3,545	$1,096	$445
15	5.91%	$5,910	$2,399	$10,000	$4,060	$10,000	$3,541	$1,096	$445
16	2.95%	$2,950	$1,198	$5,000	$2,030	$5,000	$1,772	$1,096	$445
Sum	100.00%	$100,000	$40,600	$150,000	$60,900	$250,000	$148,500	$17,544	$7,123
Present Value		$59,423	$24,126	$83,900	$34,063	$183,900	$125,711	$9,897	$4,018

	After Tax Shield	Before Tax Shield
Present Value of Incremental Costs:	$125,711	$183,900
Annualized Cost:	$15,192	$22,223
Annualized Interest Tax Shield:	$486	
Annualized Cost After Interest Tax Shield:	$14,706	

Notes: This spreadsheet assumes that a modified accelerated cost recovery system (MACRS) is used to depreciate capital expenditures.
Depreciation rates are from 1995 U.S. Master Tax Guide for 15-year property and mid-year convention.
Corporate Tax Structure: 1= corporate tax rate 2 = individual tax rate.
If the company-specific discount rate is <3% or >19%, then the industry average figure of 10.0% is used.
First Year is not discounted.

Source: See text.

In theory, a company can raise capital up to its *retained earnings breakpoint*—the point at which its capital structure changes. The break occurs when new stock must be issued. Flotation costs associated with the new issue lead to a higher component cost which, in turn, leads to a higher discount rate.[7]

In practice, however, issuing new stock is an option restricted to publicly traded companies. The Section 308 Survey did not ask the respondent to identify whether it is publicly or privately held. However, given the number of S corps and other noncorporate structure arrangements (approximately 42 percent of surveyed firms), given the tendency of these types of firms to be privately held, and given that standard corporations also often are privately held, a substantial proportion of the industry might be privately held. In other words, determining whether the cost of the regulation results in higher discount rates does not seem to be appropriate for a likely majority of the regulated community.

The Agency uses the discount rate provided by the facility, where possible (see Section Four for a discussion of how all facilities were assigned a discount rate), in the cost annualization model. This approach generates the appropriate annualized cost if the capital needed for the pollution control upgrades is raised by:

- internal funding only.
- a mix of internal funding, debt, and equity as long as the mix reflects the capital structure used to calculate the discount rate.
- a mix of debt and equity as long as the mix reflects the capital structure used to calculate the discount rate.

This approach should not underestimate industry compliance costs or impacts.

[7] Brigham, E.F., and L.C. Gapenski, 1997. *Financial Management Theory and Practice.* Chicago: The Dryden Press, 8th edition.

B.2 AVERAGE STATE TAX RATE

Table B-5 lists each state's top corporate and individual tax rates and calculates national average state tax rates.[8] The cost annualization model uses the average state tax rate because of the complexities in the industry; for example, a facility could be located in one state, while its corporate headquarters are located in a second state. Given the uncertainty over which state tax rate applies to a given facility's revenues the average state tax rate is used in the cost annualization model for all facilities.

B.3 COST ANNUALIZATION MODEL AND TOTAL COST ASSESSMENT

The Total Cost Assessment (TCA) approach for evaluating pollution prevention alternatives is comprehensive financial analysis of the life-cycle costs and savings of a pollution prevention project.[9] A TCA approach includes:

- Internal allocation of environmental costs to product lines or processes through full cost accounting.
- Financial analysis of direct and indirect costs, short- and long-term costs, liability costs, and less tangible benefits of an investment.
- Evaluation of project costs and savings over a long-time horizon, e.g., 10 to 15 years.
- Measures of profitability that capture the long-term profitability of the project, e.g., net present value and internal rate of return.

TCA approaches are being developed as alternatives to traditional financial analysis methods to capture and properly evaluate the long-term costs and savings inherent in pollution prevention activities.

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[8] CCH, 1994. *State Tax Handbook*. Chicago, IL: CCH.

[9] U.S. EPA, 1992. *Total Cost Assessment: Accelerating Industrial Pollution Prevention Through Innovative Project Financial Analysis*. Washington, D.C.: U.S. EPA, Office of Pollution Prevention and Toxics.

Table B-5
State Income Tax Rates

State		Corporate Income Tax Rate	Basis for States With Graduated Tax Tables	Personal Income Tax Upper Rate	Basis for States With Graduated Tax Tables
Alabama		5.00%		5.00%	$3,000+
Alaska		9.40%	$90,000+	0.00%	
Arizona		9.00%		6.90%	$150,000+
Arkansas		6.50%	$100,000+	7.00%	$25,000+
California		9.30%		11.00%	$215,000+
Colorado		5.00%		5.00%	
Connecticut		11.50%		4.50%	
Delaware		8.70%		7.70%	$40,000+
Florida		5.50%		0.00%	
Georgia		6.00%		6.00%	$7,000+
Hawaii		6.40%	$100,000+	10.00%	$21,000+
Idaho		8.00%		8.20%	$20,000+
Illinois		4.80%		3.00%	
Indiana		3.40%		3.40%	
Iowa		12.00%	$250,000+	9.98%	$47,000+
Kansas		4.00%	$50,000+	7.75%	$30,000+
Kentucky		8.25%	$250,000+	6.00%	$8,000+
Louisiana		8.00%	$200,000+	6.00%	$50,000+
Maine		8.93%	$250,000+	8.50%	$33,000+
Maryland		7.00%		6.00%	$100,000+
Massachusetts		9.50%		5.95%	
Michigan		2.30%		4.40%	
Minnesota		9.80%		8.50%	$50,000+
Mississippi		5.00%	$10,000+	5.00%	$10,000+
Missouri		6.25%		6.00%	$9,000+
Montana		6.75%		11.00%	$63,000+
Nebraska		7.81%	$50,000+	6.99%	$27,000+
Nevada		0.00%		0.00%	
New Hampshire		7.00%		0.00%	
New Jersey		7.25%		6.65%	$75,000+
New Mexico		7.60%	$1Million+	8.50%	$42,000+
New York		9.00%		7.88%	$13,000+
North Carolina		7.75%		7.75%	$60,000+
North Dakota		10.50%	$50,000+	12.00%	$50,000+
Ohio		8.90%	Based on Stock Value	7.50%	$200,000+
Oklahoma		6.00%		7.00%	$10,000+
Oregon		6.60%		9.00%	$5,000+
Pennsylvania		9.90%	1997 and thereafter	2.80%	
Rhode Island	*	9.00%		10.40%	$250,000+
South Carolina		5.00%		7.00%	$11,000+
South Dakota		0.00%		0.00%	
Tennesee		6.00%		0.00%	
Texas		0.00%		0.00%	
Utah		5.00%		7.20%	$4,000+
Vermont	*	8.25%	$250,000+	9.45%	$250,000+
Virginia		6.00%		5.75%	$17,000+
Washington		0.00%		0.00%	
West Virginia		9.00%		6.50%	$60,000+
Wisconsin		7.90%		6.93%	$20,000+
Wyoming		0.00%		0.00%	
Average:		6.61%		5.84%	

Notes: Basis for rates is reported to nearest $1,000.
Personal income tax rates for Rhode Island and Vermont based on federal tax (not taxable income).
Tax rates given here are equivalents for highest personal federal tax rate.

Source: Personal communication, Maureen Kaplan, ERG, and Commerce Clearinghouse (CCH) Inc., to resolve discrepancies on tax rate for Missouri and Rhode Island, March 30, 1995

CCH, 1994. State Tax Handbook. Chicago, IL: CCH.

The cost annualization model incorporates several features of a total cost assessment analysis, including:

- Long-time horizon (the annualization model uses a 15-year time frame).
- Short- and long-term costs.
- Cost savings due to reduced chemical usage, etc., which are included in the cost estimates prepared by the EPA engineers (see Development Document).
- Depreciation, taxes, inflation, and discount rate.
- The associated closure analysis (Section Five), which uses the net present value of the investment calculated in the cost annualization model to evaluate the long-term impacts on profitability.

The economic analysis differs from the TCA approach in that it does not include a "liability avoided" component or an evaluation of the less tangible benefits of the regulation. There are insufficient data to estimate potential future liability costs for each facility. The exclusion of this parameter results in a more conservative analysis where potential impacts are not offset by avoiding future liability costs. A separate analysis and report compare the costs and benefits of the regulation.

APPENDIX C

RESULTS OF THE FACILITY CLOSURE ANALYSIS AND FIRM FAILURE ANALYSIS UNDER THE DAF-IL OPTION

This appendix presents the results of analyses of the DAF-IL option. These analyses are identical to those performed for the CP-IL option in Sections Five and Six of this report. Table C-1 presents the results of the facility closure analysis under the same four cutoffs investigated in Section Five. As the table shows, the results are identical to those for the CP-IL option under the same cutoffs (see Table 5-4).

Table C-2 presents the results of the firm failure analysis under the cutoffs considered. As the table shows, the results are identical to those for the CP-IL option under the same cutoffs (see Table 6-4).

All other impacts from the DAF-IL option would be expected to be approximately the same as those for the CP-IL option.

Table C-1

Facility Closure Analysis for the DAF-IL Option - All Facilities*

Closures	DAF-IL no cutoff	DAF-IL 1MM/255K	DAF-IL 3MM/120K	DAF-IL 5MM/255K
All facilities (N=1595)				
Closures	106	61	44	2
Percentage of all facilities	6.7%	3.8%	2.7%	0.2%
Facilities with revenues less than $1 million (N=132)				
Closures	58	15	0	0
Percentage of all facilities	3.6%	1.0%	0.0%	0.0%
Percentage of revenue group	44.0%	11.7%	0.0%	0.0%
Facilities with revenues >= $1 million and < $3.5 million (N=544)				
Closures	46	43	41	0
Percentage of all facilities	2.9%	2.7%	2.6%	0.0%
Percentage of revenue group	8.5%	7.9%	7.6%	0.0%
Facilities with revenues >=$3.5 million and < $7 million (N=619)				
Closures	2	2	2	2
Percentage of all facilities	0.2%	0.2%	0.2%	0.2%
Percentage of revenue group	0.4%	0.4%	0.4%	0.4%
Facilities with revenues >=$7 million and <$10.5 million (N=235)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$10.5 million (N=65)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline closures.

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

Table C-2

Firm Failure Analysis for the DAF-IL Option - All Firms*

Bankruptcies	DAF-IL no cutoff	DAF-IL 1MM/255K	DAF-IL 3MM/120K	DAF-IL 5MM/255K
All firms**				
Incremental bankruptcies	72	72	0	0
Percentage of all firms	9.6%	9.6%	0.0%	0.0%
Firms with revenues < $1 million**				
Incremental bankruptcies	53	53	0	0
Percentage of all firms	7.2%	7.2%	0.0%	0.0%
Percentage of revenue group	53.5%	53.5%	0.0%	0.0%
Firms with revenues >= $1 million and < $3.5 million**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Firms with revenues >=$3.5 million and < $7 million**				
Incremental bankruptcies	18	18	0	0
Percentage of all firms	2.5%	2.5%	0.0%	0.0%
Percentage of revenue group	8.2%	8.2%	0.0%	0.0%
Firms with revenues >=$7 million and <$10.5 million**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Firms with revenues >=$10.5 million**				
Incremental bankruptcies	0	0	0	0
Percentage of all firms	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%

* Excluding baseline bankruptcies and baseline and postcompliance closures among single-facility firms.

** Number of facilities in each revenue group varies by the difference in postcompliance closures among options.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

APPENDIX D

RESULTS OF THE BASELINE AND POSTCOMPLIANCE CLOSURE ANALYSIS ASSUMING SALVAGE VALUE PLAYS A ROLE IN CLOSURE DECISIONS

This appendix presents the results of two analyses. The first analysis is a sensitivity analysis that assumes that salvage value would play a role on decisions to close at facilities owned by multifacility firms. As discussed in Section Five, EPA, as supported by industry comments (see Comment Response Document), does not believe salvage value is used by single-facility firms in making decisions about whether to stay open. These firms have many other reasons besides returns on investments to stay in business, and EPA believes, for the most part, these firms would try to stay in business under nearly all adversities unless forced to close under circumstances of persistent negative cash flows. EPA, for a variety of reasons, which are discussed briefly in Section Five and more thoroughly in the Comment Response Document in its response to PECON-2C, Tracking No. 1482, believes that although salvage value might be used by multifacility firms in considering whether to close a facility, the way in which cash flow estimates were made might make a salvage value analysis too conservative. Nevertheless, EPA performed a sensitivity analysis to determine if its decision to model closures without considering salvage value would have had any impact on a decisionmaking process, had EPA decided to promulgate a rule.

The second analysis responds to several public comments submitted to EPA that suggested that a market value for facilities should be used as a salvage value. As is made clear in EPA's response to PECON-2C, Tracking No. 1481, in the Comment Response Document, believes this approach is inappropriate for a closure analysis, primarily because a market value (the value of a business at a market rate) does not reflect a salvage value (the value upon liquidation, that is, well below the market rate of viable facilities), nor does a voluntary sale at a market rate reflect the impact of a forced sale at much below market rate, which is the definition of a regulation-induced closure. The analysis of a market rate baseline "closure" analysis, however, provides an interesting view of the forces that are driving consolidation. This information is summarized in Section Eight in a discussion of impacts of a rule on consolidation in the industry.

D.1 CLOSURE ANALYSIS ASSUMING SALVAGE VALUE PLAYS A ROLE IN THE DECISION

Facility impacts under the salvage value scenario are estimated by comparing each facility's salvage value to the present value of its future earnings. The salvage value represents the expected amount of cash the owner would receive if the facility were closed and liquidated. In the baseline salvage value scenario analysis, the basic model calculates the present value of the earnings stream over a 16-year time frame and subtracts that present value from the calculated salvage value. If salvage value exceeds the present value of cash flow, the model classifies the facility as a "closure" in the baseline.

EPA assumed that if firms go out of business or close a facility under "forced" circumstances (as would happen if the facility must comply with a regulation or close), they will move quickly to liquidate their fixed assets and that, as a result, they will receive only a small fraction of the market value for their fixed assets. In the original model specifications, a 20-percent recovery factor is applied to facilities' actual or estimated value for fixed assets. Like fixed assets, the valuation of current assets when estimating salvage value is based on their probable value during an auction/liquidation process. However, unlike fixed assets, current assets are assumed to be relatively easy to liquidate. Given this, it is assumed that a firm could recover close to the full value of its current assets and, as a result, in the original model, a 100 percent recovery factor is used for current assets. In EPA's sensitivity analysis in the EA for the proposal, inventories were assumed to be liquidated at a 100 percent of cost or fair market value, whichever was lower. EPA subsequently determined that inventories, because they are not nearly as liquid as other current assets also would be liquidated at far less than their actual market value, given the nature of those inventories. The 20 percent fixed asset recovery factor was therefore applied to inventories. This provided a much more realistic baseline closure result than had the previous analysis in the EA for proposal, which used the 100 percent liquidation value for inventories. The 20 percent fixed asset recovery factor and the 100 percent current asset recovery factor (with lower recovery rates for inventories) have been used in previous Office of Water EIAs.[1]

[1] U.S. EPA, 1997. *Economic Analysis for the National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production; Effluent Limitations, Guidelines, Pretreatment Standards, and New Source Performance Standards: Pulp, Paper, and Paperboard Category—Phase I*. p. 3-11.

Table D-1 presents the results of the baseline closure analysis using salvage value as a determinant in the closure of facilities owned by multifacility firms. This table indicates that there are a somewhat larger number of baseline closures under the salvage value analysis than under the cash flow-only scenario shown in Section Five, Table 5-1, particularly among facilities in the $1 million to $3.5 million revenue range, but substantially fewer than those estimated using a 100 percent liquidation value of inventories (36.6 percent of all nonindependent facilities were estimated to close in the baseline under this assumption, as reported in Appendix C in the EA for the proposal as compared to 9.3 percent using the current methodology). A total of 85 nonindependent facilities are estimated to close in the baseline using the current methodology, compared to 51 facilities assuming salvage value does not play a role in the decision to close.

Table D-2 presents the results of a postcompliance closure analysis on those nonindependent facilities that do not close in the baseline. As the table shows, 15 nonindependent facilities would close with no cutoff (3 more than that estimated without using salvage value—see Table 5-3), 9 would close under the 1MM/255K cutoff (3 more than that estimated without using salvage value), 3 would close under the 3MM/120K cutoff (2 fewer than that estimated without using salvage value), and 1 would close under the 5MM/255K cutoff (1 fewer than that estimated without using salvage value).

Thus, had the Agency used a salvage value approach, results would have changed very little, and certainly not enough to have had any impact on any decisionmaking process. EPA considers the estimates derived in this sensitivity analysis to be no more accurate than the ones derived without the use of salvage value.

D.2 RESULTS OF A BASELINE ANALYSIS ASSUMING THAT SALVAGE VALUE EQUALS MARKET VALUE

In this analysis, EPA assumed that the market value of a facility was equal to 1 times annual revenues, which is approximately the midpoint of the range suggested in the Comment Response Document PECON-2C,Tracking No. 1481 and the lower end of the range suggested in PECON-2D, Tracking No. 1486. EPA then set this value to the salvage value of each facility (both single-facility firms and

Table D-1

Baseline Closure Analysis - Nonindependent Facilities

Revenue Groups ($000)	Closures		Nonclosures		Total
	Number	Percentage of Revenue Group	Number	Percentage of Revenue Group	
Nonindependent Facilities					
Total	85	9.3%	827	90.7%	912
< $1 Million	26	63.6%	15	36.4%	41
>= $1 and < $3.5 Million	28	10.8%	228	89.2%	256
>= $3.5 and < $7 Million	23	5.6%	382	94.4%	405
>= $7 and < $10.5 Million	1	0.9%	155	99.1%	156
>= $10.5 Million	0	0.0%	47	100.0%	47

Note: Discrepancies in the number of facilities are due to rounding errors.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

Table D-2

Salvage Value Approach
Facility Closure Analysis - Nonindependent Facilities*

Closures	CP_IL no cutoff	CP_IL 1MM/255K	CP_IL 3MM/120K	CP_IL 5MM/255K
All facilities (N=827)				
Closures	15	9	3	1
Percentage of all facilities	1.8%	1.1%	0.3%	0.1%
Facilities with revenues less than $1 million (N=15)				
Closures	7	1	0	0
Percentage of all facilities	0.9%	0.2%	0.0%	0.0%
Percentage of revenue group	48.0%	9.3%	0.0%	0.0%
Facilities with revenues >= $1 million and < $3.5 million (N=228)				
Closures	3	3	1	0
Percentage of all facilities	0.3%	0.3%	0.2%	0.0%
Percentage of revenue group	1.2%	1.2%	0.6%	0.0%
Facilities with revenues >=$3.5 million and < $7 million (N=382)				
Closures**	2	2	1	1
Percentage of all facilities	0.3%	0.3%	0.1%	0.1%
Percentage of revenue group	0.6%	0.6%	0.3%	0.3%
Facilities with revenues >=$7 million and <$10.5 million (N=155)				
Closures	0	0	0	0
Percentage of all facilities	0.0%	0.0%	0.0%	0.0%
Percentage of revenue group	0.0%	0.0%	0.0%	0.0%
Facilities with revenues >=$10.5 million (N=47)				
Closures	3	3	0	0
Percentage of all facilities	0.3%	0.3%	0.0%	0.0%
Percentage of revenue group	5.3%	5.3%	0.0%	0.0%

* Excluding baseline closures.

Note: Discrepancies in the number of facilities are due to rounding.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.

nonindependent facilities) and used the same methodology outlined above in Section D.1 to compare salvage value with the present value of discounted cash flow.

As Table D-3 indicates, over 70 percent of all facilities (both nonindependent and single-facility firms) would fit into a "sell now" classification based on this approach. Thus this approach is considered more a measure of the consolidation pressures currently in force in the industry rather than a measure of baseline financial health. Furthermore, it is clear from this analysis that a rule would not have had a substantial impact on consolidation. Even if the percentage of the firms that would fit into a "sell now" category grew, demand for industrial laundry facilities might actually have dropped postcompliance (that is, the demand curve for industrial laundry facility acquisitions could have shifted downwards) as multifacility firms would not have had as many funds available to make acquisitions after purchasing and installing pollution control equipment. If demand dropped, the increase in supply of facilities available for acquisition might have had minimal impact on the rate of consolidation, since the decrease in demand would have had the opposite effect on quantity as the increase in supply (note, however, that the average sales price would have inevitably dropped, driven both by an shift downward and outward in the supply curve and by the downward shift in demand).

Table D-3

Salvage Value = Revenues
Baseline Closure Analysis - All Facilities

Revenue Groups ($000)	Closures		Nonclosures		Total
	Number	Percentage of Revenue Group	Number	Percentage of Revenue Group	
Nonindependent Facilities					
Total	646	70.9%	266	29.1%	912
< $1 Million	47	100.0%	0	0.0%	47
>= $1 and < $3.5 Million	140	54.4%	117	45.6%	257
>= $3.5 and < $7 Million	337	83.1%	68	16.9%	405
>= $7 and < $10.5 Million	109	70.0%	47	30.0%	156
>= $10.5 Million	14	29.8%	33	70.2%	47
Single-Facility Firms					
Total	587	70.7%	243	29.3%	830
< $1 Million	124	68.4%	58	31.6%	182
>= $1 and < $3.5 Million	248	84.8%	44	15.2%	292
>= $3.5 and < $7 Million	186	72.3%	71	27.7%	258
>= $7 and < $10.5 Million	20	24.2%	61	75.8%	81
>= $10.5 Million	9	69.3%	9	30.7%	28

Note: Discrepancies in the number of facilities are due to rounding errors.

Source: U.S. EPA, 1999. IL Facility and Firm Financial Model, and Section 308 Survey data. Models and data are included in the Decisionmaking Record.