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ECONOMIC ANALYSIS OF RESOURCE CONSERVATION AND RECOVERY ACT REGULATIONS FOR SMALL QUANTITY GENERATORS

Prepared for:

U.S Environmental Protection Agency

Office of Solid Waste

Prepared by

ICF Incorporated

Development Planning and Research Associates, Inc.

Pope-Reid Associates, Inc.

June 1985

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1850 K Street, Northwest, Washington, D. C. 20006

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EXECUTIVE SUMMARY

The Hazardous and Solid Waste Amendments of 1984 require EPA to regulate by March 31, 1986, those generators of hazardous waste that produce between 100 and 1,000 kilograms per month. This report analyzes the costs and economic impacts of the alternatives being considered by EPA for the regulation of these small quantity generators (SQGs).

The regulatory alternatives being considered by EPA are bracketed by the minimum requirements set forth in the Hazardous and Solid Waste Amendments and by the full Subtitle C requirements that apply to large quantity generators (with such exceptions as are mandated by the amendments). This report focuses primarily on a regulatory alternative that would institute the minimum requirements of the Hazardous and Solid Waste Amendments, including use of the Uniform National Manifest (single copy to accompany shipments) and Subtitle C management; it would also require SQGs to obtain an EPA identification number and follow a limited set of performance standards for on-site storage of 180 or 270 days or less. SQGs managing wastes on-site would be subject to the same requirements as exist for large quantity generators, but with extensions in the effective dates of these requirements.

The methodology used in this analysis of the costs and economic effects of the SQG regulatory alternatives involved comparing current SQG waste management practices and costs (the baseline for the analysis) with their likely practices and costs after the SQG regulations are promulgated. We used a survey of SQGs to characterize waste management practices, and then we estimated the costs of these practices and developed model plants with representative waste generation and financial characteristics.

With the baseline conditions determined, we then analyzed the changes in waste management practices and costs that likely would result after promulgation of the SQG regulations. This analysis focused on the ten largest waste streams produced by SQGs, which account for more than 90 percent of SQG waste generation. We also estimated the government costs associated with administering the SQG regulations. We used these estimates to derive the aggregate cost of the regulations to industry and society.

To analyze the impact of the compliance costs on firms and industries, we compared compliance cost estimates to various financial characteristics of the model plants. Where this approach indicated potential financial difficulty for the model plant, we performed a discounted cash flow analysis to determine the potential for closure.

The results of our analysis can be summarized in terms of the incremental costs to society as a whole; costs to government; and the economic impacts on firms and industries. On a per metric ton basis, the average incremental compliance cost associated with changes in SQG regulations is about $206. Because of differences in baseline practices and, hence, the cost of compliance, the incremental costs vary substantially for different wastes. In

many cases, wastes are currently being managed in a manner consistent with the new requirements under consideration; in others, changes in waste management practices will be necessary. After allocating the incremental compliance costs to the universe of SQGs according to the types of wastes they generate and their baseline waste management practices, our estimate of the total incremental cost of the favored SQG regulatory alternative is about $58 million. Much of this total is attributable to a few wastes (spent solvents, dry cleaning residues, acids and alkalies, and ignitable waste) which constitute a large proportion of those generated by SQGs.

Our analysis of the government costs of the regulations focused on estimating costs for program administration, technical assistance and public education programs, and compliance monitoring and enforcement. Under the favored regulatory alternative, we estimate that program administration costs will be about $1 million, technical assistance and public education program costs will be between $8 and $10 million, and compliance monitoring and enforcement costs will be $2 to $2.5 million. In total, our government costs due to the regulations will amount to about $12 million for the first year that the regulations are in place.

Our method for analyzing the economic impacts of the regulations on SQG firms and on industries with many potentially affected parties was to evaluate the magnitude of the incremental costs imposed by the regulations relative to sales, profits, and other financial flows of the potentially affected firms. By constructing numerous model plants and then assessing the potential economic impacts of the regulations on the viability of these enterprises, our conclusion is that the regulations will not cause significant industry impacts and that few, if any, firms will suffer substantial hardship by complying. In almost all cases, the model plants analysis shows that the ratios of incremental compliance costs to sales and profits do not attain levels indicative of serious financial hardships. Even for the most affected SQGs, the discounted cash flows are still positive after inclusion of the incremental compliance costs associated with the SQG regulations. Because the SQG regulations primarily affect small firms, the concerns of the Regulatory Flexibility Act for the effects of the regulations on small businesses are addressed to a large extent by these results.

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1. INTRODUCTION

On November 8, 1984, the Hazardous and Solid Waste Amendments of 1984 were signed into law. Among the provisions of the amendments are requirements concerning the regulation of those generators of hazardous waste that produce between 100 and 1,000 kilograms per month. This report analyzes the costs and economic impact of the alternatives being considered by the Environmental Protection Agency (EPA) for the regulation of these small quantity generators (SQGs).[1] This chapter presents background information on the SQG problem, discusses the need for and scope of the economic analysis, and describes the regulatory alternatives which will be analyzed.

1.1 NEED FOR SQG REGULATIONS

The Resource Conservation and Recovery Act (RCRA) authorizes EPA to promulgate regulations to ensure that the management of hazardous waste is consistent with protection of human health and the environment. Pursuant to this authority, EPA has established requirements for hazardous waste generators and hazardous waste treatment, storage, and disposal facilities (TSDFs). In regulations issued on May 19, 1980, EPA conditionally exempted generators of less than 1,000 kg/month of hazardous waste or 1 kg/month of acutely hazardous waste from most RCRA Subtitle C regulations.

These exempted generators were required at a minimum to:

- Determine whether their waste is hazardous;
- Store no more than 1,000 kg of waste on-site at any time; and
- Ensure that their wastes are managed in a facility regulated under Subtitle C of RCRA; approved by a state to manage industrial or municipal solid waste; or which beneficially uses, reuses, or recycles or reclaims the waste.

The rationale for this exemption was based on EPA's estimate that this group, representing over ninety percent of all generators, are responsible for only one percent of all hazardous waste. Inclusion of these generators in the Subtitle C program might therefore result in an administrative burden hampering enforcement and implementation of the program with little overall impact on its effectiveness. EPA indicated, however, that it would phase in Subtitle C coverage for generators of greater than 100 kg/month within two to five years.

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[1] The term "small quantity generator" has generally been applied to all generators of 1,000 kg/month or less of hazardous waste. We use this term to refer only to generators in the 100 to 1,000 kg/month range.

The Hazardous and Solid Waste Amendments require EPA to promulgate rules applicable to generators in the 100 to 1,000 kg/month range no later than March 31, 1986. The standards developed under this section may vary from the standards applicable to large quantity generators, but must be sufficient to protect human health and the environment. At a minimum, the standards must require that management of wastes occur at Subtitle C facilities with interim status or a permit. They must allow storage of waste for up to 180 days without a RCRA permit; for generators shipping or hauling waste more than 200 miles, the maximum allowable storage period is 270 days for up to 6,000 kg of waste.

The amendments require that effective 270 days following enactment, all off-site shipments of hazardous waste by SQGs be accompanied by a signed copy of the Uniform Hazardous Waste Manifest, including:[2]

- The name and address of the waste generator;
- The U.S. Department of Transportation description of the waste, including proper shipping name, hazard class, and identification number;
- The number and type of containers;
- The quantity of waste being transported; and
- The name and address of the receiving facility.

EPA must, at a minimum, continue these specific manifest requirements; it may expand the requirements if necessary to protect human health and the environment.

Based on the results of a mail survey conducted in 1983 and 1984, EPA currently estimates that there are 175,000 small quantity generators producing 760,000 tons of hazardous waste per year. Three industry groups, vehicle maintenance, construction, and metal manufacturing, account for approximately 80 percent of SQG establishments. Other SQG establishments include wood preservers, photographic processers, printers, laundries, and textile manufacturers.[3] The principal SQG wastes by volume include used lead acid batteries (62 percent of SQG wastes), spent solvents (18 percent), strong acid and alkalis (6 percent), photographic wastes (3 percent), and dry cleaning filtration residues (2 percent).[4]

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[2]Exempt from this requirement are wastes that are reclaimed under a batch tolling agreement where either the generator or the reclaimer retains ownership of the material and specific recordkeeping requirements are fulfilled.

[3]Abt Associates Inc., National Small Quantity Hazardous Waste Generator Survey, prepared for the Office of Solid Waste, U.S. Environmental Protection Agency, February 1985, pp. 32-34.

[4] Ibid., p. 38.

In spite of the small quantities of waste involved, SQG wastes pose some degree of risk because of their hazardous nature. In determining that wastes produced by generators of between 100 and 1,000 kg/month of hazardous waste should be included in the RCRA program, Congress has struck a balance between the costs expended in controlling smaller quantities of hazardous waste and the need to protect human health and the environment. Because EPA has authority to develop SQG regulations, it is investigating alternatives for the management of SQG wastes to determine which best fulfill the intent of the amendments.

1.2 PURPOSE AND SCOPE OF THE ECONOMIC ANALYSIS

This economic analysis was prepared to support development of a Regulatory Impact Analysis (RIA) in compliance with Executive Order 12291 for changes in regulations for small quantity generators. The elements of an RIA include:

- A statement of the need for and consequences of the proposal;
- An examination of alternative approaches for achieving the objective;
- An analysis of benefits, including a comprehensive statement of the benefits of each alternative and their distribution; quantification of benefits to the extent possible; and consideration of the relative uncertainty of the effects of alternatives, potential intermediate transfers, effects on individuals experiencing maximum as well as average exposure, and likely compliance levels;
- An analysis of costs including estimates of the present value of real incremental costs to society, taking into account both costs incurred by regulated parties and by government for implementation and enforcement; and specification of the distribution of costs, including consideration of second-order effects, such as may result in effects on competition, innovation, prices, profits, and plant closures;
- A comparison of the costs and benefits of each alternative;
- Specification of effects on small entities; and
- A sensitivity analysis of important assumptions.

Our analysis of the alternatives for regulating small quantity generators is designed to provide all economic and cost information necessary to complete the RIA. As part of this effort, we have:

- Characterized the baseline of existing SQG waste management practices potentially affected by the regulatory alternatives;
- Developed model plants for industries likely to experience the greatest impacts, if the regulatory alternatives were adopted;
- Estimated the current costs incurred by different SQGs for waste management;
- Characterized probable future practices;
- Estimated the real resource costs of complying with the SQG regulations;
- Estimated the costs to government of implementing the SQG regulations;
- Determined the impact of incremental costs on affected firms, industries, and society;
- Examined the impacts of the regulatory alternatives on small entities; and
- Conducted a sensitivity analysis of the projected economic effects.

1.3 REGULATORY ALTERNATIVES ANALYZED

The regulatory alternatives being considered by EPA are bracketed by the minimum requirements set forth in the Hazardous and Solid Waste Amendments and by the full Subtitle C requirements that apply to large quantity generators (with such exceptions as are mandated by the amendments). Requirements can be categorized by activity. We describe briefly the alternatives being considered by EPA for small quantity generators, transporters of SQG wastes, and for on-site management of SQG waste.

Alternatives for Generator Requirements

Standards for large quantity generators are detailed in 40 CFR 262 and include the following:

- Determination that wastes are hazardous in accordance with 40 CFR 261 requirements;
- Notification to obtain an EPA identification number;

- Shipment of wastes off-site only to permitted or interim status Subtitle C facilities, and only by a transporter with an EPA identification number.

- For generators shipping wastes off-site, full completion of the Uniform National Manifest; filing of exception reports when manifests are not returned by the destination facility; and retention of copies of manifests and exception reports for at least three years.

- Preparation of waste shipments in accordance with Department of Transportation (DOT) regulations; and

- Filing of biennial reports.

Part 262 also allows for reduced requirements for tank or container storage facilities in which wastes are stored for ninety days or less; other storage facilities must meet full Part 264 or Part 265 requirements.

The Agency is considering the following regulatory alternatives for generators:

- Option G1: Requirements identical to those included in Part 262, but allowing for a 180 or 270-day allowance for on-site storage without compliance with full storage facility requirements.

- Option G2: Minimum requirements as detailed in the Hazardous and Solid Waste Amendments, including use of the partially complete manifest and Subtitle C management; also requiring notification to obtain an EPA identification number and allowing for a limited set of performance standards for on-site storage of 180 or 270 days or less.

- Option G3: The same provisions as Option G2, but including full manifest requirements, i.e., completion of the manifest in triplicate with generator retention of forms signed by destination facilities for three years, and generator investigation and filing of exception reports when signed manifests are not returned within applicable time limits.

Alternatives for Transportation Requirements

Currently, any shipment accompanied by a manifest is subject to full DOT requirements. In addition, Part 263 regulations require transporters to notify EPA; obtain EPA identification numbers; clean up and report releases of waste in transit; and participate in the implementation of the manifest system

(by signing the generator's copy of the manifest, retaining a copy, and delivering the remaining copy to the receiving party). Transporters are allowed to store wastes for up to ten days without a storage permit, but are prohibited from mixing wastes of different types unless they comply with the generator standards for mixed wastes.

EPA is considering only limited modifications in these requirements. Specifically, modifications in manifest requirements for transporters must be made, if only a single-copy manifest is required for SQG shipments. EPA is also considering whether the ten-day period for waiver of storage permit requirements might be extended for SQG shipments. Because EPA has not determined what alternatives, if any, it will consider for storage waivers, we have assumed that the current requirements will apply to SQG wastes.

Alternatives for On-Site Treatment, Storage, and Disposal

Requirements for treatment, storage, and disposal facilities for large quantity generators are set out in 40 CFR Parts 264 and 265. These standards can be divided into four broad categories; the specific requirements of each include:

- Reporting and recordkeeping requirements
  - -- Waste analysis plan
  - -- Inspection schedule and reports
  - -- Personnel training
  - -- Contingency plan
  - -- Manifest
  - -- Operating record
  - -- Biennial report
- Operating standards
  - -- Process-specific design and operating requirements
  - -- Ground water monitoring requirements
  - -- Closure and post-closure standards
- Financial responsibility requirements
  - -- Closure/post-closure financial assurance
  - -- Liability coverage
  - -- Corrective action financial assurance
- Permitting requirements
  - -- Notification requirements
  - -- Part A application
  - -- Part B application

EPA is considering three alternatives for on-site management of SQG wastes:

- Option F1: Full Part 264 and Part 265 requirements, i.e., requirements identical to those applicable to on-site management by large quantity generators.
- Option F2: Full Part 264 and Part 265 requirements, but with extensions in effective dates.
- Option F3: Tailored Part 264 and Part 265 standards that reduce requirements for SQGs managing waste on-site, in conjunction with extended effective dates.

1.4 ORGANIZATION OF THE REPORT

The remainder of this report is organized into six chapters and six appendices:

- Chapter 2 -- Analytical Approach

  This chapter sets out the overall methodology used in the study for estimating incremental compliance costs and the economic impacts of SQG regulations. It provides an overview of the analytical tasks underlying each of the succeeding chapters of the report.

- Chapter 3 -- Development of the Baseline

  This chapter reports the results of a number of tasks designed to develop baseline information on SQGs. The chapter focuses on current wastes generated by SQGs, waste management practices of SQGs, SQG geographical distribution, and the current costs of waste management incurred by SQGs.

- Chapter 4 -- Estimation of Compliance Costs

  This chapter reports in detail the methodology and results of estimating incremental compliance costs for SQGs. Specific components of costs are addressed and these are then applied to the SQG population to calculate total compliance costs.

- Chapter 5 -- Estimation of Government Costs

  This chapter focuses on our estimates of government regulatory costs. The analysis accounts for costs of program administration, technical assistance and public education programs, and compliance monitoring and enforcement.

- Chapter 6 -- Projected Economic Effects

  This chapter reports the results of our analysis of the potential economic impacts of the SQG regulations. The incremental compliance costs of SQGs are analyzed in the context of model plants, developed to assess the potential hardships and plant closures that may occur.

- Chapter 7 -- Summary and Limitations of the Analysis

  This chapter provides a brief summary of the results and reviews the sensitivity of the results to several important assumptions made in the analysis. Discussion of some broad limitations of the analysis concludes the chapter.

The appendices present detailed information on various aspects of the analysis.

2. ANALYTICAL APPROACH

2.1 INTRODUCTION

This chapter describes the methodology used for developing estimates of compliance costs and the economic impacts of the proposed regulations. In section 2.2 we provide an overview of the analyses used to determine the baseline SQG waste management practices and their associated costs. Developing reliable baseline practices information is crucial in determining the incremental costs of compliance with the regulations that may be experienced by SQGs. Section 2.3 reviews the methodology used for estimating the incremental compliance costs likely to be experienced by SQGs, for assessing the economic impacts of the regulations on these firms, and for analyzing government costs associated with administering the regulations.

2.2 METHODOLOGY FOR DEVELOPING THE BASELINE

2.2.1 Introduction

This section describes the methodology used to develop information on the baseline waste management practices of SQGs and the costs of those practices to SQGs. The essence of our method for determining both the costs of compliance and the impacts of the regulations is to model SQG behavior prior to the regulation and after the regulation. Differences in costs between the two scenarios are incremental compliance costs. Thus, the baseline scenario adopted here is current practice. The scenario used to model post-regulation behavior is full compliance with the SQG regulations.

In order to accurately predict changes in costs, a detailed assessment of the baseline waste management practices and costs associated with them is required. Thus, wastes generated by SQGs must be identified and characterized so that the costs of the various waste management methods used by SQGs can be calculated. In order to assess both the social costs of the SQG regulations and their economic impacts, the distribution of SQGs in terms of the wastes they generate and how they manage them is required. In addition, profiles of the productive activities SQGs engage in (model plants) are also necessary for determining economic impacts. The sections below review our methodology for addressing these data requirements.

2.2.2. Characterization of Waste Streams

The Hazardous and Solid Waste Amendments of 1984 require that SQGs generating more than 100 kg of hazardous waste per month be regulated by the Resource Conservation and Recovery Act. This will result in improved waste management practices but at an increased cost for SQGs. In order to analyze the magnitude of these costs and the economic effects of the proposed regulations, it is necessary to characterize the waste streams produced, as the waste management costs are a function of the types and quantities of wastes that need to be managed.

Most of the information used in the characterizations was obtained from three sources: the Abt survey,[1] the RCRA Risk-Cost Analysis Model waste stream data base,[2] and the TRW technical environmental impacts report on small quantity generators.[3] Most of the waste streams characterized in the WET waste stream data base are generated in large quantities; however, in many cases it appears that the operations of the companies generating those waste streams, and therefore the hazardous constituents and their concentrations in the waste streams, are similar to those of SQGs. Consequently, we were able to make use of these characterizations in the SQG analysis in many instances.

For each waste stream, we compared the standard industrial classification (SIC) codes described by the WET model with those industries surveyed by Abt to determine if the model covered the relevant industries for that waste. When the industries corresponded, we used professional judgment to determine whether the operations of the firms documented in the waste stream characterization in the WET data base were representative of SQGs in the SIC, and, if so, we used the data in our waste characterizations. If there was no information in the WET data base for a waste stream from an industry covered by the Abt survey, we considered similar waste streams from other industries. When we judged that the waste from another industry was similar to that included in the survey, we used the relevant information as a basis for the characterization.

For some waste streams, the TRW report provided additional information. In each case we checked the industries included in the TRW report to see if they corresponded to those in the Abt survey. When we found a match between industries, we reviewed the waste characteristics reported, and included any additional data in our waste characterizations. We obtained other information from trade publications and telephone conversations with representatives of the appropriate industries.

The most important characteristics of a waste determining waste management costs are the physical properties and the quantities produced. Therefore, we divided each waste characterization into two sections covering these characteristics. In the first section, we identify the amounts of waste produced by each industry and the percentage of firms that produce a total waste quantity of greater than 100 kg/month. The second section provides information on properties of a typical waste from the category. The information included that is relevant to waste management practices is as follows:

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[1] Small Quantity Hazardous Waste Generator Study; Abt Associates, Inc., 1984.

[2] RCRA Risk-Cost Analysis Model; ICF Inc., 1984. This model is commonly referred to as the Waste-Environment-Technology (WET) Model.

[3] Technical Environmental Impacts of Various Approaches for Regulating Small Volume Hazardous Waste Generators; TRW Environmental Engineering Division, 1979.

- State: Liquid/Solid/Sludge
- Generation: Continuous/Intermittent
- Fraction Nonwater
- Fraction Suspended
- Solids Specific Gravity
- Average Specific Gravity
- Heating Value
- Fraction Chlorine
- Fraction Ash
- pH
- Biological Oxygen Demand

In addition, we identify the major relevant constituents, their concentrations, molecular weights, and vapor pressures.

2.2.3 Current Waste Management Practices

The primary source of information used to characterize current waste management practices was a survey of nearly 50,000 potential SQG establishments conducted by Abt Associates, Inc. for EPA. This survey, conducted between January 1983 and October 1984, asked respondents to describe their waste management activities for the calendar year 1982. Complete information on the survey methodology and the overall results is reported in National Small Quantity Hazardous Waste Generator Survey, February 1985. The determination of SQG current waste management practices was necessary to establish the baseline management costs and to estimate the changes in practice SQGs will make in response to the proposed regulations.

Our analysis considers only those SQGs generating between 100 and 1,000 kg of non-acutely hazardous waste in a calendar month on average during 1982. Generators of less than 100 kg/month will not be affected by the proposed regulations, while small volume generators of acutely hazardous waste are subject to existing requirements. Furthermore, the analysis of SQG current waste management practices is based primarily on the waste management practice profiles for waste streams targeted in the survey. These profiles, which appear in Appendix F, apply only to specific wastes for which respondents were asked to provide quantitative information on current practices. In addition, the profiles exclude used lead-acid batteries, which represented a substantial quantity of the wastes reported by the initial survey, on the assumption that all used batteries can be recycled or returned to the manufacturer. This therefore excludes used lead-acid batteries from the quantity determination used to identify SQGs subject to Subtitle C requirements (40 CFR 261.51c).

Preliminary analysis of the survey data revealed that ten waste streams (defined as in the Abt survey design) constitute the vast majority of both the wastes generated by SQGs and the SQGs themselves. The more detailed analysis of current practices then focused on these ten wastes for purposes of developing a baseline for estimating compliance costs.

Current waste management practices of SQGs were then characterized using the survey data in terms of storage, transportation, and disposal practices (both on-site and off-site). The results of this analysis, summarized in tabular form in section 3.3 of this report, indicate the distribution of generators' storage, transport, and disposal practices, for each of the ten wastes considered, among a wide range of options. For example, twelve current storage practices are indicated in the survey data, so this analysis indicates the percentage of SQGs who utilize each method. Similarly, the survey indicates four transport methods, seven disposal methods, and a large number of treatment methods used by SQGs. The baseline waste management practices of SQGs developed using the survey data account for these management practices as well, as reported in section 3.3 below.

2.2.4 Geographical Distribution of Waste

In order to maintain confidentiality, data relating survey responses to specific geographical locations were excluded by Abt from the SQG data base, with the exception of a code indicating one or four U.S. Census regions (West, North Central, Northeast, and South). Waste management practices generally vary by waste type; because SQG regulations in many states are different from the federal regulations, the practices used for a particular waste may vary by state as well. Consequently, the incremental costs experienced by SQGs under the regulatory alternatives could vary substantially by state. In the event that the economic analysis indicated large incremental costs associated with the management of some waste streams, we anticipated that information on the geographical distribution of wastes could assist us in determining the potential for adverse regional impacts.

We used data on regional waste generation from the Abt SQG survey and County Business Patterns data from 1982 to distribute waste quantities by state. From the Abt survey, we determined, by 4-digit SIC code, the quantity of each waste type produced by generators of less than 1,000 kg per month in each Census region. Using County Business Pattern data giving the number of establishments by SIC code for each state, we determined the distribution by state of establishments of different types over each region. The results of this procedure are discussed in section 3.4 below, and are presented in detail in Appendix C.

2.2.5 Development of Model Plants

The general approach to assessing firm level impacts of SQG regulations was to develop model plants with representative waste generation and financial characteristics. Compliance costs for these representative plants can be compared to sales, costs, profits and cash flow to assess the economic impacts of the regulations as well as to determine the likelihood of potential plant closures.

An analysis of the SQG survey data reveals that plants or establishments in more than 300 industries may meet the criteria of small quantity generators. These industries are listed in Appendix E (Appendix Table E-3: Master List of Industries). The methodology used in this study for assessing economic impacts involved, first, identifying those industries expected to

have a significant number of SQGs. Second, models were developed to represent the affected plants and establishments within these industries. The SQG survey data were used to determine, for each industry, the number of SQGs in three employment size categories: 1-9 employees, 10-49 employees, and 50 or more employees. These numbers were then extrapolated to the entire industry using information on the number of establishments of different SICs contained in the County Business Patterns. For further modeling purposes, the number of SQGs in a size category was considered significant if (1) there were 50 or more plants involved; (2) the number of SQGs constituted 10 percent of the total number of plants in the size category and the number of affected plants was 10 or more, or (3) the total output for the SQGs in a size category exceeded four percent of the total production of all establishments in the size category. Total production was based on shipments data contained in the Census. The estimated numbers of SQGs in each of the affected size categories, by SIC, are listed in Appendix E (Table E-2).

For the categories listed, model plants were developed to reflect typical waste characteristics and financial profiles of the affected establishments. Waste characteristics were determined by identifying the dominant waste for each category of plant from the survey data and then determining the median and total waste volumes reported in the survey by such firms. Financial profiles included sales and profits based on data contained in FINSTAT, a recent and comprehensive data base developed by the U.S. Small Business Administration. For the few plants subjected to more detailed analysis, additional financial data were obtained from Robert Morris Associate's Annual Statement Studies.

2.2.6 Current Costs of Waste Treatment, Storage, and Disposal

The methodology used to develop baseline costs of current waste management practices is straightforward. The results of the survey of small quantity generators provided the distribution of current SQG waste management practices in terms of treatment, storage, and disposal of different wastes. In order to estimate the baseline costs of these practices, costs of the individual components of these activities, such as the cost of off-site landfilling and the cost of on-site storage, were required. Given estimates of these components' costs, the current waste management costs of SQGs were estimated by multiplying the number of similar SQGs, in terms of waste generation and management practices, by the sum of the component management costs that these SQGs face.

The cost estimation methodology divides into (1) off-site waste management costs, (2) transportation costs, and (3) on-site treatment and disposal costs. For off-site waste management costs, surveys of commercial facility prices for a variety of waste disposal and treatment services were used. For transportation costs, the standard EPA methodology for estimating such costs, accounting for hauling, loading, and mileage costs, was modified and applied to SQGs. Finally, on-site treatment and disposal costs were based on engineering estimates of the costs of the on-site treatment and disposal

activities reported in the SQG survey. The components of current waste management practices were then combined with the distribution of SQGs across these management practices to estimate the baseline costs for waste management.

2.3 METHODOLOGY FOR ASSESSING COMPLIANCE COSTS AND ECONOMIC EFFECTS

2.3.1 Identification of Changes in Hazardous Waste Management Practices

The basic methodology for determining how SQGs would alter their waste management practices in response to regulations involved estimating the lowest cost, feasible method for complying with the regulations. In essence, the current practices of groups of SQGs that produce similar wastes and currently handle them in similar ways were examined to determine if these practices would satisfy the regulations. If so, then no change in waste management practices for these groups of SQGs would be necessary. However, the fact that no change in waste management practices would be required does not necessarily imply that no regulatory compliance costs would exist because the SQG regulations may still impose additional costs on these SQGs, e.g., manifest costs.

Other groups of SQGs will find that their current methods of managing wastes will not satisfy the regulations proposed. For these SQGs, alternative management practices would have to be adopted. In these cases, the methodology used was to estimate the lowest cost alternative waste management method that satisfies the regulation.

Because of inherent differences in SQGs, their wastes, and their access to on-site and off-site waste management processes, each group of SQGs currently use a wide range of waste management practices. For example, some SQGs recycle spent solvents, while others dispose of them in landfills. Therefore, in determining changes in SQGs' waste management practices, each group of SQGs is disaggregated somewhat into subgroups that use the different current practices indicated in the survey. Each of these SQG subgroups is then examined, as outlined above, to determine whether any changes in waste management practices would be necessary.

The analysis focused on the top ten wastes generated by SQGs. As discussed in section 3.3, these wastes account for more than 90 percent of all of the wastes generated by SQGs, so focusing on these wastes and modeling SQG behavior and compliance costs for these wastes is reasonable.

2.3.2 Development of Incremental Compliance Cost Estimates

The methodology used to estimate the incremental compliance costs of the regulations involved, at the most basic level, simply calculating the costs of SQGs associated with their management of wastes after the regulations and subtracting from these the waste management costs before the regulation. Because the proposed regulations can affect SQGs in a number of ways, the methodology accounted for all the various types of incremental compliance costs.

As mentioned above, the methodology focuses on the ten top quantity wastes generated by SQGs. Thus, groups of SQGs were formed on the basis of their products (survey definitions were used) and the largest wastes they produce. Next, the additional costs these SQGs would experience under the different regulatory alternatives were estimated. The particular components of costs relevant for subsets of SQGs (based on wastes generated and their baseline waste management practices, as discussed in section 2.3.1 above) were then identified and annualized equivalents for these were computed. The resulting figures, based on median characteristics of the SQGs and their wastes form the basis for both the incremental compliance costs of the proposed regulations, and the economic impacts analysis.

Because of the heterogeneity of the SQGs' characteristics and their waste management practices, a number of important simplifying assumptions were necessary to conduct the analysis even at the level of disaggregation used in this report. These are discussed in depth in Chapter 4.

2.3.3 Estimation of Government Costs

The methodology for estimating government costs focused on estimating the following three costs: program administration costs incurred by the agency (e.g., costs associated with processing EPA identification number requests), technical assistance and public education program costs which the agency is planning to undertake, and costs incurred by EPA and the states in monitoring compliance and enforcing the new SQG regulations.

The first step in estimating these costs was to understand the regulatory strategy to be followed by the Agency and the states authorized to administer their own RCRA programs. Once this strategy was known, the various costs associated with implementing this strategy were estimated by relying on previous EPA cost estimates and expert judgments of EPA and state officials familiar with administering RCRA programs for LQGs. Finally, the costs estimated for each potential government activity under the SQG program were matched with the specific SQG regulatory options. Costs were then summed and a total cost for each regulatory option estimated.

2.3.4 Development of Estimates of Effects of Costs on Firms, Industries, and Society

While the SQG regulations will affect a substantial number of firms and industries, they will not impact most firms in the U.S., nor are they industry-specific or industry-wide. The broad focus and uncertain incidence of these regulations, consequently, suggests a stepwise approach of identifying classes of firms and significant numbers of firms, specific industries, or plants most affected.

The general approach utilized addresses impacts at two levels: firm/plant level and industry level. The two levels are analytically assessed sequentially, although the nature of the regulations suggests that impacts at each level may be independent. For example, if firm level impacts are

significant, then industry impacts may or may not follow depending on the share of industry output represented by the affected SQGs. This can only be assessed by analyzing the frequency of SQGs by economic size and comparing this with the total output from SQGs of these sizes within particular industries.

To implement this approach, several screening steps were undertaken to determine significant impacts at the firm and industry levels. At the firm level, the impacts of concern are effects on sales, costs, and profits and, most importantly, the potential for firm closures. At the industry level the focus is on potential production, price, and employment effects. The approach allows for modification or termination at certain screening steps if no plants or industries qualify for subsequent screening tests and more detailed analysis. For example, the model firm analysis[4] screening steps involved decision rules for determining significant impacts. If the decision rules were not exceeded by any model firms, additional firm level analyses, particularly closure analysis, were not deemed to be necessary.

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[4] As shown, model plants were used to assess firm level impacts. The model plants represent various industrial and size segments, waste quantities and waste types. The specific development of model plants is discussed in Chapter 5.

3. DEVELOPMENT OF THE BASELINE

3.1 INTRODUCTION

This chapter describes the results of several analyses conducted to generate baseline information on SQGs. Information on SQG wastes generated and their characteristics, on current management practices SQGs use to handle these wastes, and on the SQGs themselves is essential to developing accurate estimates of incremental compliance costs. This chapter is organized into six sections as follows:

- 3.2 -- Waste Stream Characterization
- 3.3 -- Waste Stream Management Practices
- 3.4 -- Geographical Distribution of SQGs
- 3.5 -- Baseline Costs of Waste Management
- 3.6 -- Development of Model Plants
- 3.7 -- Development of Industry Profiles

3.2 WASTE STREAM CHARACTERIZATION

Changes in regulatory requirements for management of hazardous wastes, defined by the Hazardous and Solid Waste Amendments of 1984, will result in increased costs for SQGs. As a preliminary step in the analysis of the costs and economic effects of the proposed regulations, the wastes that need to be managed must be characterized. In this section we provide information on the constituents, properties, and quantities of waste streams defined by Abt Associates as being produced by SQGs.

The Abt survey questionnaires defined 27 waste streams (Exhibit 3-1). Some of these waste stream definitions overlap, so it is possible that the total amounts of hazardous waste have been overestimated because of duplicate reporting. For example, wastes that would be categorized under paint waste with heavy metals may also be included under heavy metal solutions and/or heavy metal waste materials. However, the survey provided respondents the opportunity to list wastes generated in addition to those about which they had received specific questionnaires. Respondents indicated many instances where they generated other wastes belonging to categories defined by Abt, and also identified five other very general categories of waste, e.g., miscellaneous organic compounds, miscellaneous laboratory reagents. Unfortunately, no quantity information was requested about these additional wastes, so it is not possible to include them in the estimation of the amounts of each waste produced. Thus, there were many industries that reported generation of waste

EXHIBIT 3-1

WASTE STREAMS INCLUDED IN THE ABT SURVEY

Waste Number	Waste Stream
1	Waste Pesticide
2	Pesticide Washing and Rinsing Solution
3	Empty Pesticide Containers
6	Heavy Metal Dust
8	Cyanide Wastes
9	Photographic Wastes
10	Other Reactive Wastes
12	Strong Acid or Alkaline Wastes
14	Ignitable Wastes
15	Ignitable Paint Wastes
16	Spent Solvents
17	Filtration Residue from Dry Cleaning
18	Solvent Still Bottoms
19	Wastewater Wood Preservatives
21	Heavy Metal Solutions
22	Arsenic Wastes
23	Mercury Wastes
24	Spent Plating Wastes
26	Used Lead-Acid Batteries
27	Paint Waste with Heavy Metals
28	Solution or Sludge with Photo Silver
29	Waste Formaldehyde
30	Wastes Containing Ammonia
31	Waste Ink with Solvent or Heavy Metal
32	Heavy Metal Wastewater Sludges
33	Ink Sludge with Chromium or Lead
39	Heavy Metal Waste Materials

Source: Abt Associates, 1984.

streams but did not provide any additional information regarding quantities produced or waste management practices utilized. Exhibit 3-2 summarizes the availability of quantity information by waste stream. The lack of data on actual amounts of waste produced by some industries counteracts somewhat the effect of the duplicate reporting problem and may mean that the total waste quantities are underestimated.

Exhibit 3-3 summarizes the quantities of waste generated by SQGs. For every waste except paint wastes with heavy metals and mercury wastes (for which all generators produced less than 25 kg/month), over 50 percent of the total quantity of each waste stream was produced by firms that would be regulated under the new SQG rule. For many waste streams, these firms produced over 90 percent of the total waste. The actual properties of each waste are described in detail in Appendix A. Exhibit 3-4 summarizes the constituents of each of the typical waste streams and their probable concentrations.

3.3 WASTE STREAM MANAGEMENT PRACTICES

This section summarizes and discusses the baseline waste management practices of SQGs. In order to focus research efforts cost-effectively, an overall waste generation profile for SQGs was first assembled for the affected wastes (wastes targeted in the Abt survey). This SQG waste generation summary, shown in Exhibit 3-5, presents the numbers of generators, quantities, and average monthly generation rate for each waste reported. Exhibit 3-5 and others appearing in this section exclude used lead-acid batteries (as noted in section 2.2.3) and are based on SQG survey data only for generators of 100+ kilograms per month.

The data in Exhibit 3-5 indicate that spent solvents are the largest single category of targeted wastes, accounting for 46.1 percent of the total quantity reported. With the exception of the acid and alkali waste category (14.9 percent of the total), none of the remaining waste categories accounts for more than 10 percent of the total quantity generated. Furthermore, the first ten waste streams in Exhibit 3-5, ranked by quantity generated annually, account for 92.6 percent of the total quantity reported as well as 89.4 percent of the generators reporting. Consequently, these ten major waste stream categories were used to estimate the baseline and compliance cost estimates for the waste management options considered in the economic impact analysis.

Exhibit 3-6 presents the percentage of generators reporting each significant management activity for all the targeted wastes. In this case, the calculated percentage is based on the number of generators reporting a given management activity for those SQGs generating a specific waste stream. As is evident in this exhibit, multiple responses within a single waste stream are nearly universal. Multiple responses for a single waste stream occur because respondents were asked to indicate as many management practices as they applied to each waste. For instance, an SQG might use one practice for a particular waste on some occasions and another on other occasions. Other facilities may have reported using sequential practices (e.g. treatment prior to disposal) or managing residuals from treatment. For these reasons, the survey results reported in this section must be interpreted carefully.

EXHIBIT 3-2

AVAILABILITY OF WASTE STREAM QUANTITY INFORMATION

Waste Number	Waste Stream	Number of SICs for Which Quantity Information Is Available	Number of SICs for Which Quantity Information Is Not Available
1	Waste Pesticide	25	26
2	Pesticide Rinsing Solution	32	25
3	Empty Pesticide Containers	26	44
6	Heavy Metal Dust	13	36
8	Cyanide Waste	17	18
9	Photographic Waste	34	32
10	Other Reactive Waste	23	10
12	Acid or Alkaline Waste	94	22
14	Ignitable Waste	88	24
15	Ignitable Paint Waste	49	45
16	Spent Solvents	235	20
17	Dry Cleaning Waste	6	6
18	Solvent Still Bottoms	37	19
19	Wastewater Wood Preservative	6	10
21	Heavy Metal Solutions	2	50
22	Arsenic Wastes	1	0
23	Mercury Wastes	1	0
24	Spent Plating Wastes	27	5
26	Lead-Acid Batteries	38	80
27	Paint with Heavy Metals	4	48
28	Sludge with Photo Silver	22	30
29	Waste Formaldehyde	1	55
30	Wastes Containing Ammonia	3	42
31	Waste Ink with Solvent or Heavy Metal	18	30
32	Heavy Metal Wastewater Sludges	11	34
33	Ink Sludge with Chromium or Lead	9	18
39	Heavy Metal Waste Materials	12	60

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates (DPRA) from the Abt Survey information.

EXHIBIT 3-3

WASTE QUANTITIES GENERATED BY SMALL QUANTITY GENERATORS
(Generators of More Than 100 Kg/Month Total Waste)

Waste Number	Waste Stream	Total Quantity Generated (kg/month)	Number of Firms Generating	Percent of All SQGs a/ Generating This Waste %	Percent of Total Waste in This Category Generated by All SQGs a/ %	Quantity of Waste (kg/month)
1	Waste Pesticide	104,769	3,842	25.8	68.1	71,397
2	Pesticide Washing and Rinsing Solution	505,758	4,774	36.6	82.8	418,532
3	Empty Pesticide Containers	304,880	11,772	16.7	64.7	197,185
6	Heavy Metal Dust	14,413	88	45.1	94.3	13,598
8	Cyanide Wastes	178,833	1,972	70.2	99.2	177,386
9	Photographic Wastes	1,535,922	26,236	18.9	76.1	1,168,561
10	Other Reactive Wastes	98,167	1,630	30.5	92.5	90,826
12	Strong Acid or Alkaline Wastes	2,482,578	24,219	43.3	93.4	2,318,451
14	Ignitable Wastes	708,078	11,824	24.3	89.3	631,341
15	Ignitable Paint Wastes	559,411	15,910	19.6	72.6	405,991
16	Spent Solvents	8,780,678	111,104	30.1	81.5	7,160,245
17	Filtration Residue from Dry Cleaning	1,138,298	15,708	16.2	62.3	709,074
18	Solvent Still Bottoms	164,768	2,852	25.9	94.2	155,230
19	Wastewater Wood Preservatives	59,920	196	55.3	96.3	57,712
21	Heavy Metal Solutions	4,869	45	66.3	88.7	4,318
22	Arsenic Wastes	9,269	39	47.7	93.3	8,645
23	Mercury Wastes	17	19	0	0	0
24	Spent Plating Wastes	480,632	5,382	26.4	91.5	439,617
26	Used Lead-Acid Batteries	30,758,087	197,627	39.4	82.4	25,349,533
27	Paint Waste with Heavy Metals	1,580	537	29.1	39.2	619
28	Solution or Sludge with Photo Silver	743,257	7,130	37.1	87.5	665,046
29	Waste Formaldehyde	737,469	13,944	14.4	61.0	449,671
30	Wastes Containing Ammonia	30,547	1,254	8.0	74.0	22,613
31	Waste Ink with Solvent or Heavy Metal	135,203	4,360	16.5	83.8	113,273
32	Heavy Metal Wastewater Sludges	200,312	1,684	46.9	92.2	184,703
33	Ink Sludge with Chromium or Lead	18,056	1,176	7.1	58.6	10,588
39	Heavy Metal Waste Materials	47,308	238	49.1	94.7	44,781

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

a/ "All SQGs" in this context means all firms that generate the waste in quantities less than 1,000 kg/month.

EXHIBIT 3-4

CONSTITUENTS OF WASTE STREAMS

Waste Stream	Constituent	Concentration (ppm)
Waste Pesticide	Pesticide	10,000 - 30,000
Waste Toxaphene	Toxaphene	10,000
Pesticide Washing and Rinsing Solution	Pesticide	2,000
Empty Pesticide Containers	Pesticide	500
Heavy Metal Dust	Cadmium	1,000
	Chromium VI	500
	Lead	15,000
Cyanide Wastes	Cyanide	50,000
	Chromium VI	50,000
	Nickel	50,000
Photographic Wastes	Acetone	200,000
	Methanol	200,000
Blueprinting Ammonia Wastes	Ammonia	389,000
Other Reactive Wastes	Cyanide	0.000075
	Nickel	0.0015
Strong Acid or Alkaline Wastes	Lead	500
	Chlorhydric acid	50,000
	(or sodium hydroxide)	50,000
Ignitable Wastes	Acetaldehyde	100,000
	Xylene	100,000
Ignitable Paint Wastes	Toluene	100,000
	Methyl Ethyl Ketone	100,000
Spent Solvents	Benzene	N/A[1]
	Carbon Tetrachloride	

[1] Because of the large number of generators and the wide variety of solvents used it is difficult to determine a characteristic waste in this category. The solvents listed represent those most commonly used, and their concentrations will vary depending on the particular waste generator.

EXHIBIT 3-4 (continued)

CONSTITUENTS OF WASTE STREAMS

Waste Stream	Constituent	Concentration (ppm)
Spent Solvents (Continued)	Chloroform	
	1,2-Dichlorobenzene	
	Methyl Ethyl Ketone	
	Toluene	
	Toluene Diisocyanate	
	1,1,1-Trichloroethane	
	Trichloroethylene	
	Xylene	
Filtration Residue from Dry Cleaning	Tetrachloroethene	530,000
Solvent Still Bottoms	Toluene, or	200,000
	Tetrachloroethane, or	200,000
	Dichloromethane, or	200,000
	Xylene	200,000
Wastewater Wood Preservative	Pentachlorophenol	780
	Acenaphthene	300
	Chrysene	100
Heavy Metal Solutions	Chromium VI	150
	Lead	760
Arsenic Wastes	Arsenic	250
Spent Plating Wastes	Copper	490
	Nickel	1,200
	Chromium VI	220
	Cadmium	110
	Lead	100
	Cyanide	45
Paint Waste with Heavy Metals	Toluene	10,000
	MEK	10,000
	Chromium VI	56
	Lead	40
	Mercury	12
Solution or Sludge with Photo Silver	Methanol	20,000
	Acetone	20,000
	Phenol	0.09
	Iron	15
	Boron	13
	Silver	0.45
	Cyanide	0.57

EXHIBIT 3-4 (continued)

CONSTITUENTS OF WASTE STREAMS

Waste Stream	Constituent	Concentration (ppm)
Waste Formaldehyde	Formaldehyde	7,500
Wastes Containing Ammonia	Ammonia	100,000
Waste Ink with Solvent or Heavy Metal	Chromium VI	50
	Lead	260
	Toluene	100
Heavy Metal Wastewater Sludges	Chromium VI	1,100
	Lead	600
	Cadmium	350
	Copper	7,000
	Nickel	2,500
Ink Sludge with Chromium or Lead	Chromium VI	150
	Lead	760
	Toluene	100
Heavy Metal Waste Materials	Cadmium	400
	Chromium	450
	Lead	5,000
	Copper	300
	Nickel	100

EXHIBIT 3-5

SUMMARY OF SQG WASTE GENERATION a/

Waste Stream b/	Number of Generators	Total Waste Generated (MT/yr)	Generator Average (kg/month)
Spent Solvents	33,475	85,924	214
Strong Acid or Alkaline Wastes	10,480	27,818	221
Photographic Wastes	4,949	14,022	236
Filtration Residues from Dry Cleaning	2,540	8,510	279
Solutions or Sludges with Photographic Silver	2,648	7,982	251
Ignitable Wastes	2,873	7,574	220
Wastes Containing Formaldehyde	2,014	5,397	223
Spent Plating Wastes	1,422	5,276	309
Pesticide Washing and Rinsing Solutions	1,747	5,021	240
Ignitable Paint Wastes	3,121	4,873	130
Waste Pesticides	990	857	72
Empty Pesticide Containers	1,962	2,336 c/	100
Heavy Metal Dusts	39	161	344
Cyanide Wastes	1,384	2,129	128
Other Reactive Wastes	497	1,090	183
Solvent Still Bottoms	738	1,862	210
Wood Preserving Wastewater Treatment Sludges	108	691	533
Solutions Containing Heavy Metals	30	53	147

Footnotes on next page.

EXHIBIT 3-5 (continued)

SUMMARY OF SQG WASTE GENERATION a/

Waste Stream b/	Number of Generators	Total Waste Generated (MT/yr)	Generator Average (kg/month)
Arsenic Containing Wastes	19	105	461
Paint Wastes Containing Heavy Metals	156	7	4
Ammonia Containing Wastes	100	271	226
Waste Inks with Solvents/Heavy Metals	718	1,360	158
Wastewater Treatment Sludges with Heavy Metals	790	2,216	234
Ink Formulation Sludges with Chromium/Lead	83	127	128
Heavy Metal Waste Materials	117	537	382
TOTAL	73,000	186,230	213

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a/ Based on SQG Survey of targeted wastes for generators of 100+ kilograms per month.

b/ Excludes used lead-acid batteries.

c/ Assumes one kilogram per container.

EXHIBIT 3-6

PERCENT OF GENERATORS REPORTING EACH MANAGEMENT ACTIVITY a/

	Store	Transport	Dispose	Treat	Recycle
Spent Solvents	80.1	61.1	22.0	3.8	62.1
Strong Acid or Alkaline Wastes	84.3	38.0	48.2	19.9	40.6
Photographic Wastes	19.1	17.5	91.0	6.5	13.2
Filtration Residues from Dry Cleaning	58.4	91.0	82.6	9.3	12.8
Solutions or Sludges with Photographic Silver	61.0	45.9	46.6	23.2	63.2
Ignitable Wastes	77.9	81.4	65.9	6.0	36.3
Wastes Containing Formaldehyde	2.9	N/A	105.8	2.9	N/A
Spent Plating Wastes	18.1	53.7	84.8	21.5	10.8
Pesticide Washing and Rinsing Solutions	32.4	12.5	27.7	20.5	67.8
Ignitable Paint Wastes	89.2	78.5	57.0	4.2	29.0
Waste Pesticides	47.8	47.4	93.5	26.6	64.5
Empty Pesticide Containers	83.9	91.4	86.0	19.2	20.6
Heavy Metal Dusts	48.7	59.0	48.7	7.7	33.3
Cyanide Wastes	67.0	60.9	64.6	23.8	7.2
Other Reactive Wastes	73.4	75.7	83.1	33.8	12.7
Solvent Still Bottoms	98.6	76.8	29.3	19.8	16.1
Wood Preserving Wastewater Treatment Sludges	96.3	55.6	60.2	14.8	32.4
Solutions Containing Heavy Metals	50.0	33.3	76.7	20.0	20.0
Arsenic Containing Wastes	42.1	78.9	N/A	N/A	89.5

EXHIBIT 3-6 (continued)

PERCENT OF GENERATORS REPORTING EACH MANAGEMENT ACTIVITY a/

	Store	Transport	Dispose	Treat	Recycle
Paint Wastes Containing Heavy Metals	100.0	100.0	N/A	N/A	N/A
Ammonia Containing Wastes	N/A	N/A	100.0	N/A	N/A
Waste Inks with Solvents/Heavy Metals	85.5	98.7	61.8	7.1	21.0
Wastewater Treatment Sludges with Heavy Metals	62.4	74.9	68.7	19.0	25.4
Ink Formulation Sludges with Chromium/Lead	100.0	95.2	45.8	3.6	65.1
Heavy Metal Waste Materials	82.1	98.3	69.2	16.2	59.8

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a/ Based on SQG Survey data base for generators of 100+ kilograms per month.

Exhibit 3-7 provides an overview of storage practices used by SQGs. This exhibit, and Exhibits 3-8 through 3-11, were compiled from the management profiles developed from the survey data (presented in Appendix F) for all the targeted wastes, except used lead-acid batteries. Exhibit 3-7 shows that approximately 70 percent of the generator population reported some form of storage for their wastes. The predominant storage method reported is the use of closed metal drums (25.3 percent of all generators). In addition, of the generators who reported storing their wastes, 84 percent store for less than 180 days and 36 percent store in closed metal drums.

Exhibit 3-8 presents a summary of the transportation methods used by SQGs. Approximately 55 percent of the generators reported transporting their wastes. The most prevalent transport method reported is a contracted (commercial) waste collection truck (45.1 percent of all generators). Considering only the number of generators who report that they transport their wastes, 81.5 percent use a commercial hauler.

Exhibit 3-9 summarizes the disposal methods reported by generators for both on-site and off-site practices. As this exhibit indicates, off-site disposal is much more common among generators (39.5 percent) than on-site disposal (5.9 percent). We considered discharge to a POTW as an off-site practice because the wastes will ultimately be managed off-site even though the discharge occurs to an on-site sewer. Discharge to sewers accounts for 18.8 percent of the generators reporting, or 47.6 percent of those generators who dispose off-site. The second most common off-site disposal practice is sanitary landfilling, which accounts for 10.3 percent of the generators reporting (26.1 percent of the generators who dispose off-site).

Exhibit 3-10 provides a summary of the on- and off-site treatment methods employed by SQGs. Although treatment represents a relatively small part of SQGs current waste management practices (e.g., less than 10 percent on-site and 1 percent off-site), the treatment methods reported are numerous. On a percentage basis, on-site treatment is more common than off-site treatment. Neutralization and evaporation account for the most frequently reported on-site treatment processes, attributable to their use as pretreatment processes prior to POTW disposal.

Exhibit 3-11 presents summary information on recycling methods used by SQGs. The specific types of recycling conducted by SQGs both on- and off-site are not available from the survey. Instead, recycling categories (defined in the survey) are reported and are summarized in Exhibit 3-11. The number of generators recycling off-site exceeds those who report on-site recycling by more than two-to-one. Use or reuse is practiced most frequently on-site, while reclamation or reprocessing is the most common off-site recycling method. Within many industrial processes, using process materials and chemicals (e.g. plating baths, acids/alkalies, photographic solutions, etc.) is quite common, as shown by the survey data. Furthermore, off-site reprocessing to recover chemicals is widely practiced and particularly important to those SQGs who generate spent solvents, solvent still bottoms, or ignitable wastes. A review of the off-site recycling for these three waste streams indicates a high percentage of reclaiming/reprocessing is used. This is most likely the commercial solvent recovery services.

EXHIBIT 3-7

SUMMARY OF STORAGE METHODS USED BY GENERATORS a/

Number of generators storing: 51,325
% of generators that store : 70.3%

Storage Method	Percent
Above ground tanks	7.7
Below ground tanks	7.7
Open metal drums	2.5
Closed metal drums	25.3
Open fiberboard drums	0.2
Closed fiberboard drums	0.9
Pails or garbage cans	4.4
Surface impoundments/lagoons	0.2
Piles	2.4
Bulk waste containers	3.9
Lab packs	0.9
Other	28.8

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a/ Based on SQG Survey data base for generators of 100+ kilograms per month.

EXHIBIT 3-8

SUMMARY OF TRANSPORTATION METHODS USED BY GENERATORS a/

Number of generators transporting: 40,406
% of generators that transport : 55.4%

Transportation Method	Percent
Public waste collection truck	11.2
Contracted waste collection truck	45.1
Truck owned by organization	6.8
Other	8.5
Don't know	1.5

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a/ Based on SQG Survey data base for generators of 100+ kilograms per month.

EXHIBIT 3-9

SUMMARY OF DISPOSAL METHODS USED BY GENERATORS a/

	On-Site	Off-Site
Numbers of generators disposing:	4,338	28,850
% of generators that dispose :	5.9%	39.5%

Disposal Method	% On-Site	% Off-Site
Hazardous waste landfill	0.3	5.2
Sanitary landfill	0.3	10.3
Hazardous waste incinerator	0.4	3.1
Solid waste incinerator	2.1	0.8
POTW	-	18.8
Septic tank or leaching field	2.0	1.3
Other	0.9	0.1

a/ Based on SQG Survey data base generators of 100+ kilograms per month.

EXHIBIT 3-10

SUMMARY OF TREATMENT METHODS USED BY GENERATORS a/

	On-Site	Off-Site
Number of generators treating:	6,352	741
% of generators that treat :	8.7%	1.0%

Treatment Method	% On-Site	% Off-Site
Thermal treatment	0.1	0.1
Chemical treatment	≤ 0.1	0.1
Ion exchange	≤ 0.1	-
Chemical sedimentation	0.1	-
Neutralization	2.4	0.2
Filtration or sludge dewatering	1.4	≤ 0.1
Activated carbon	≤ 0.1	-
Distillation or fractionation	0.1	≤ 0.1
Electrolysis	0.8	0.4
Evaporation	2.3	0.1
Triple rinse or other cleaning	0.5	≤ 0.1
Deep well injection	≤ 0.1	≤ 0.1
Dilution	0.4	≤ 0.1
Biological treatment	0.1	-
Spray irrigation	0.1	-
Solidification or other stabilization	≤ 0.1	≤ 0.1
Miscellaneous high-tech	0.5	-
Don't know	≤ 0.1	≤ 0.1

a/ Based on SQG Survey data base for generators of 100+ kilograms per month.

EXHIBIT 3-11

SUMMARY OF RECYCLING METHODS USED BY GENERATORS a/

	On-Site	Off-Site
Number of generators recycling:	10,011	23,195
% of generators that recycle :	13.7%	31.8%

Recycling Method	% On-Site	% Off-Site
Used/reused unprocessed	7.5	6.1
Reclaimed reprocessed	4.3	20.7
Blended for fuel	≤ 0.1	1.0
Burned for fuel	3.0	1.2
Applied to land	0.3	0.3
Other	≤ 0.1	-

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a/ Based on SQG Survey data base for generators of 100+ kilograms per month.

We have no data on the extent to which batch tolling arrangements are currently used for SQG wastes that are reclaimed/recycled, but based on some discussions with industry experts, we believe that such arrangements are common for spent solvents. In our analysis, we assumed that batch tolling arrangements are used for 50 percent of the SQG spent solvent wastes that are reclaimed/recycled. Two other waste streams within the top ten, ignitable wastes and ignitable paint wastes, are assumed to include some solvents. We therefore assumed that 10 percent of these wastes that are reclaimed/recycled involve batch tolling arrangements.

As discussed previously, the top ten waste streams, based on annual quantities generated, represent over ninety percent of the waste quantity reported by SQGs and nearly ninety percent of the generators. A comparison of the generator population for all targeted wastes with generators of the top ten wastes only is presented in Exhibit 3-12. The data show less than a ten percent difference between the two waste groups for each of the management methods selected. Small percentage changes are also evident in specific management practices for storage, transport, etc. For instance, of the generators of the top ten wastes generated and stored, 31.1 percent store in closed metal containers. This becomes 36 percent when all wastes are included. Further, the top ten wastes discharged to POTWs account for 44.2 percent of the wastes disposed off-site compared to 47.6 percent when all wastes are included.

The picture of current SQG waste management practices provided by the top ten waste streams for the affected SQG population forms the basis for our characterization of baseline practices and, consequently, for our estimation of baseline and incremental compliance costs of waste management. Exhibit 3-13 presents the percent distribution of selected baseline management practices for each of the top ten waste streams compiled from the Survey data. The percentages tabulated are based on the number of generators of each waste stream who reported any one of these baseline storage, treatment, recycling, or disposal practices. Storage in closed metal containers for less than 180 days prior to shipment off-site (except for those disposing to POTWs) for treatment, recycling, or disposal was assumed as the baseline storage condition. In addition, any on-site treatment or recycling would also be conducted within this time period to reduce the incremental compliance costs of waste or residual storage. Treatment and recycling methods are not distinguished in Exhibit 3-13 except to note whether they occur on- or off-site.

3.4 GEOGRAPHICAL DISTRIBUTION OF SQGs

As described in Section 2.2.4, we determined the geographical distribution of wastes produced by generators of less than 1,000 kg/month of hazardous waste using the SQG survey data and County Business Patterns (CBP) data. Exhibit 3-14 gives the distribution of wastes by U.S. Census Region from the survey. Exhibit 3-15 shows the states that comprise each region. The District of Columbia is included in the southern region.

Because the regional distribution shown in Exhibit 3-14 was the starting point for the methodology used to distribute the wastes by state, our

EXHIBIT 3-12

COMPARISON BETWEEN TARGETED WASTES AND TOP TEN GENERATED WASTES

Management Method	All Targeted Wastes	Top Ten Wastes
Storage:		
• Number of generators storing	51,325	45,598
• % of generators storing	70.3%	62.5%
Transport:		
• Number of generators transporting	40,406	34,598
• % of generators transporting	55.4%	47.4%
Disposal On-Site:		
• Number of generators disposing on-site	4,338	3,835
• % of generators disposing on-site	5.9%	5.3%
Disposal Off-Site:		
• Number of generators disposing off-site	28,850	23,046
• % of generators disposing off-site	39.5%	31.6%
Recycle On-Site:		
• Number of generators recycling on-site	10,011	8,800
• % of generators recycling on-site	13.7%	12.1%
Recycle Off-Site:		
• Number of generators recycling off-site	23,195	22,159
• % of generators recycling off-site	31.8%	30.4%
Treatment On-Site:		
• Number of generators treating on-site	6,352	5,229
• % of generators treating on-site	8.7%	7.2%
Treatment Off-Site:		
• Number of generators treating off-site	741	350
• % of generators treating off-site	1.0%	0.5%

NOTE: The number of SQGs reporting waste generation of 100+ kg/month is 73,000.

EXHIBIT 3-13

PERCENT DISTRIBUTION OF BASELINE MANAGEMENT PRACTICES a/

	SPENT SOLVENTS	ACID/ ALKALINE WASTES	PHOTO-GRAPHIC WASTES	DRY CLEANING RESIDUES	PHOTO-GRAPHIC WASTES W/ SILVER	IGNITABLE WASTES (liquids) b/	IGNITABLE WASTES (solids) b/	FORMALDEHYDE WASTES	SPENT PLATING WASTES	PESTICIDE WASHES/ RINSES	IGNITABLE PAINT WASTES
CLOSED METAL DRUMS	34.8	12.0	5.8	16.4	6.3	23.0	23.0	NO	13.5	7.3	37.8
POTW	4.0	23.6	81.1	12.6	43.4	15.6	NO	94.2	12.3	58.1	1.9
SANITARY LANDFILL	2.9	9.6	2.8	54.9	0.7	NO	24.6	NO	NO	2.9	41.7
SECURE LANDFILL	3.0	3.8	1.4	10.5	NO	10.9	10.9	NO	19.6	4.0	9.4
OFF-SITE TREATMENT	0.2	0.9	NO	1.1	4.9	0.3	NO	NO	0.1	0.8	NO
OFF-SITE INCINERATION	4.7	0.3	NO	NO	NO	10.6	10.6	NO	3.2	NO	4.0
ON-SITE TREATMENT	3.6	19.1	6.5	8.2	18.4	5.7	5.7	2.9	21.4	19.7	4.2
ON-SITE RECYCLING	10.6	19.5	10.2	9.3	32.0	3.3	NO	NO	3.7	51.5	18.1
OFF-SITE RECYCLING	51.4	21.1	3.1	3.5	31.2	33.0	NO	NO	7.1	16.3	10.9

a/ Based on SQG Survey data base for generators of 100+ kilograms per month.

b/ 50% of the generators (and 50% of the volume) were assumed to be generating liquid ignitable wastes while the other 50% were assumed to be generating a sludge/solid ignitable waste.

NO = Management practice not reported in survey results.

EXHIBIT 3-14

DISTRIBUTION OF WASTE BY CENSUS REGION
(METRIC TONS PER YEAR)

WASTE TYPE	CENSUS REGION				TOTAL
	WEST	NORTH CENTRAL	NORTH-EAST	SOUTH	
Spent Solvents	15,740 14.94%	29,799 28.28%	29,445 27.95%	30,383 28.84%	105,368 100.00%
Strong Acid or Alkaline Wastes	4,040 13.56%	6,244 20.96%	11,864 39.82%	7,643 25.66%	29,791 100.00%
Photographic Wastes	5,682 30.83%	4,890 26.53%	4,224 22.92%	3,634 19.72%	18,431 100.00%
Filtration Residue f/ Dry Cleaning	2,106 15.42%	2,524 18.48%	3,909 28.62%	5,121 37.49%	13,660 100.00%
Solution or Sludge w/ Photo Silver	2,424 27.18%	1,633 18.31%	2,495 27.97%	2,367 26.54%	8,919 100.00%
Waste Formaldehyde	856 9.67%	4,122 46.58%	1,087 12.29%	2,785 31.47%	8,850 100.00%
Ignitable Wastes	1,341 15.81%	3,010 35.47%	2,230 26.29%	1,904 22.44%	8,485 100.00%
Ignitable Paint Wastes	1,602 23.87%	1,985 29.57%	1,450 21.60%	1,676 24.97%	6,713 100.00%
Pesticide Washing and Rinsing	817 13.47%	2,605 42.91%	687 11.32%	1,960 32.30%	6,069 100.00%
Spent Plating Wastes	1,417 24.58%	1,024 17.76%	2,926 50.73%	400 6.93%	5,768 100.00%
Empty Pesticide Containers	526 14.39%	1,520 41.56%	498 13.62%	1,113 30.43%	3,659 100.00%
Heavy Metal Wastewater Sludges	833 34.66%	15 0.63%	592 24.64%	963 40.07%	2,404 100.00%
Cyanide Wastes	537 25.01%	602 28.07%	788 36.72%	219 10.19%	2,146 100.00%
Solvent Still Bottoms	275 13.93%	112 5.68%	203 10.27%	1,386 70.12%	1,977 100.00%
Waste Ink w/ Solvent or Heavy Metals	254 15.68%	868 53.52%	259 15.97%	241 14.83%	1,622 100.00%
Waste Pesticide	194 15.46%	439 34.93%	51 4.02%	573 45.59%	1,257 100.00%

EXHIBIT 3-14
(Continued)

DISTRIBUTION OF WASTE BY CENSUS REGION
(METRIC TONS PER YEAR)

WASTE TYPE	CENSUS REGION				TOTAL
	WEST	NORTH CENTRAL	NORTH-EAST	SOUTH	
Other Reactive Wastes	254 21.53%	324 27.54%	271 23.01%	329 27.91%	1,178 100.00%
Wastewater Wood Preservative	189 26.22%	84 11.65%	32 4.42%	415 57.72%	719 100.00%
Heavy Metal Waste Materials	18 3.25%	334 58.83%	175 30.76%	41 7.15%	568 100.00%
Wastes with Ammonia	10 2.83%	31 8.41%	299 81.68%	26 7.09%	367 100.00%
Ink Sludge w/ Chromium or Lead	1 0.68%	95 43.67%	44 20.23%	77 35.42%	217 100.00%
Heavy Metal Dust	0.45 0.26%	2 1.35%	138 79.84%	32 18.55%	173 100.00%
Arsenic Wastes	21 18.48%	0.00 0.00%	0.00 0.00%	91 81.52%	111 100.00%
Heavy Metal Solutions	10 17.50%	35 59.91%	4 7.00%	9 15.60%	58 100.00%
Paint Wastes w/ Heavy Metals	0.37 1.98%	0.00 0.00%	7 39.21%	11 58.81%	19 100.00%
Mercury Wastes	0.00 0.00%	0.21 100.00%	0.00 0.00%	0.00 0.00%	0.21 100.00%
Total All Wastes	39,151 17.13%	62,299 27.26%	63,680 27.87%	63,398 27.74%	228,528 100.00%

Source: SQG Survey

EXHIBIT 3-15

STATES BY U.S. CENSUS REGION

West	North Central	Northeast	South
Washington (WA)	Minnesota (MN)	Maine (ME)	Arkansas (AR)
Oregon (OR)	Iowa (IA)	New Hampshire (NH)	Louisiana (LA)
California (CA)	Missouri (MO)	Vermont (VT)	Oklahoma (OK)
Alaska (AK)	North Dakota (ND)	Massachusetts (MA)	Texas (TX)
Hawaii (HI)	South Dakota (SD)	Rhode Island (RI)	Kentucky (KY)
Montana (MT)	Nebraska (NE)	Connecticut (CT)	Tennessee (TN)
Idaho (ID)	Kansas (KS)	New York (NY)	Alabama (AL)
Wyoming (WY)	Michigan (MI)	New Jersey (NJ)	Mississippi (MS)
Nevada (NV)	Ohio (OH)	Pennsylvania (PA)	Delaware (DE)
Utah (UT)	Indiana (IN)		Maryland (MD)
Colorado (CO)	Illinois (IL)		Virginia (VA)
Arizona (AZ)	Wisconsin (WI)		West Virginia (WV)
New Mexico (NM)			North Carolina (NC)
			South Carolina (NC)
			Georgia (GA)
			Florida (FL)
			District of Columbia (DC)

estimates on a regional basis match those from the survey. To test the methodology, we also developed a geographical distribution using the national estimates for each waste stream from the SQG survey. From this distribution, we constructed regional estimates by summing across the appropriate states; these estimates were compared with those from the survey.

The regional distributions for total waste are quite similar, although for some individual wastes there are significant differences. The relatively large volume waste streams are generally distributed with few major discrepancies between actual survey results and the results using the CBP methodology. The distributions for the ten largest waste streams are shown in Exhibit 3-16, along with the aggregate results for all wastes. Results for some of the smaller waste streams (not shown in the exhibit) were poor where the SQG survey indicates that waste production is highly concentrated in one region, as in the case of mercury, ammonia, arsenic, and several heavy metal wastes. For example, the results of the SQG survey show all generators of mercury waste located in the North Central Census Region. The methodology predicted a far more even distribution of mercury waste across the four regions: 28 percent West, 22 percent North Central, 20 percent Northeast, and 30 percent South. By using the regional distribution from the SQG survey, these discrepancies are avoided. It is clear, however, that the upper bound on the accuracy of this methodology is the reliability of the survey for making regional estimates. This may vary from waste to waste, and therefore the results must be used with caution.

Exhibit 3-17 shows the total quantity of wastes generated by generators of less than 1,000 kg/month of waste by state. The results for individual waste streams are shown in Appendix C. The exhibit shows that waste generation from small and very small quantity generators is concentrated in the larger industrial states (as is that from large quantity generators). Generators in the top ten states are responsible for approximately 60 percent of these wastes. California and New York alone account for 20 percent of waste generation. In all states, Spent Solvents is the largest single waste stream, accounting for 32 to 55 percent of the state total.

When individual waste streams are examined, states in the top ten for total generation are dominant. Exhibit 3-18 shows the top five generating states for each of the ten largest waste streams. Only in the case of Waste Formaldehyde is a state from outside of the top ten for total generation included (Indiana, thirteenth in overall generation).

Exhibit 3-19 shows finally that almost half of wastes from generators of less than 1,000 kg/month is generated in states with no exclusion level or lower exclusion levels than are contained in the existing federal regulations. Of the top ten generating states, four have exclusion levels of 100 kg/month (New York, Illinois, New Jersey, and Michigan), one has an exclusion level of 20 kg/month (Massachusetts), and one has no exclusion level (California). The remaining four states (Texas, Pennsylvania, Ohio, and Florida) use the 1,000 kg/month exclusion level, but have somewhat more restrictive disposal requirements than those contained in the federal regulations; in the case of Pennsylvania, there are also additional recordkeeping requirements.

EXHIBIT 3-16

COMPARISON OF WASTE QUANTITY DISTRIBUTION BY CENSUS REGION
(METRIC TONS PER YEAR)

WASTE TYPE	CENSUS REGION: WEST CBP*	WEST SURVEY	NORTH CENTRAL CBP	NORTH CENTRAL SURVEY	NORTHEAST CBP	NORTHEAST SURVEY	SOUTH CBP	SOUTH SURVEY	TOTAL CBP	TOTAL SURVEY
Spent Solvents	21,618 20.52%	15,740 14.94%	29,147 27.66%	29,799 28.28%	23,768 22.56%	29,445 27.95%	30,836 29.26%	30,383 28.84%	105,368 100.00%	105,368 100.00%
Strong Acid or Alkaline Wastes	6,502 21.82%	4,040 13.56%	8,231 27.63%	6,244 20.96%	6,919 23.22%	11,864 39.82%	8,139 27.32%	7,643 25.66%	29,791 100.00%	29,791 100.00%
Photographic Wastes	4,248 23.05%	5,682 30.83%	4,688 25.43%	4,890 26.53%	4,611 25.02%	4,224 22.92%	4,884 26.50%	3,634 19.72%	18,431 100.00%	18,431 100.00%
Filtration Residue f/ Dry Cleaning	2,487 18.20%	2,106 15.42%	3,229 23.64%	2,524 18.48%	3,183 23.30%	3,909 28.62%	4,761 34.85%	5,121 37.49%	13,660 100.00%	13,660 100.00%
Solution or Sludge w/ Photo Silver	2,354 26.39%	2,424 27.18%	2,023 22.68%	1,633 18.31%	2,259 25.33%	2,495 27.97%	2,283 25.60%	2,367 26.54%	8,919 100.00%	8,919 100.00%
Waste Formaldehyde	888 10.03%	856 9.67%	2,884 32.59%	4,122 46.58%	2,207 24.94%	1,087 12.29%	2,871 32.44%	2,785 31.47%	8,850 100.00%	8,850 100.00%
Ignitable Wastes	1,688 19.89%	1,341 15.81%	2,150 25.34%	3,010 35.47%	2,143 25.26%	2,230 26.29%	2,504 29.51%	1,904 22.44%	8,485 100.00%	8,485 100.00%
Ignitable Paint Wastes	1,509 22.48%	1,602 23.87%	1,522 22.67%	1,985 29.57%	1,531 22.81%	1,450 21.60%	2,151 32.04%	1,676 24.97%	6,713 100.00%	6,713 100.00%
Pesticide Washing and Rinsing	1,368 22.54%	817 13.47%	1,351 22.27%	2,605 42.91%	1,117 18.40%	687 11.32%	2,233 36.80%	1,960 32.30%	6,069 100.00%	6,069 100.00%
Spent Plating Wastes	1,224 21.23%	1,417 24.58%	1,828 31.69%	1,024 17.76%	1,536 26.63%	2,926 50.73%	1,180 20.45%	400 6.93%	5,768 100.00%	5,768 100.00%
Total Ten Waste Streams	43,885 20.70%	36,026 16.99%	57,053 26.90%	57,836 27.27%	49,273 23.24%	60,319 28.45%	61,841 29.16%	57,872 27.29%	212,053 100.00%	212,053 100.00%
Total All Waste Streams	47,517 20.79%	39,151 17.13%	61,634 26.85%	62,299 27.26%	52,922 23.16%	63,398 27.87%	66,724 29.20%	63,398 27.24%	228,528 100.00%	228,528 100.00%

* CBP = County Business Patterns.

Source: SQG Survey and ICF estimates using County Business Patterns data.

EXHIBIT 3-17

QUANTITY OF WASTE GENERATED BY STATE

STATE	TOTAL QUANTITY GENERATED (MT/Year)	PERCENT OF TOTAL WASTE	LARGEST WASTE STREAM	PERCENT OF STATE TOTAL
CALIFORNIA	24,588	10.76	Spent Solvents	40.77
NEW YORK	20,326	8.89	Spent Solvents	39.59
TEXAS	14,031	6.14	Spent Solvents	47.24
PENNSYLVANIA	13,722	6.00	Spent Solvents	53.19
ILLINOIS	12,393	5.42	Spent Solvents	47.08
NEW JERSEY	11,455	5.01	Spent Solvents	48.97
OHIO	11,312	4.95	Spent Solvents	49.94
FLORIDA	9,512	4.16	Spent Solvents	47.58
MICHIGAN	8,688	3.80	Spent Solvents	52.84
MASSACHUSETTS	8,142	3.56	Spent Solvents	45.73
WISCONSIN	5,795	2.54	Spent Solvents	50.94
CONNECTICUT	5,173	2.26	Spent Solvents	47.52
INDIANA	5,172	2.26	Spent Solvents	48.39
NORTH CAROLINA	5,140	2.25	Spent Solvents	49.82
MISSOURI	5,095	2.23	Spent Solvents	43.99
MINNESOTA	4,708	2.06	Spent Solvents	45.80
GEORGIA	4,557	1.99	Spent Solvents	47.54
VIRGINIA	3,752	1.64	Spent Solvents	47.99
TENNESSEE	3,750	1.64	Spent Solvents	49.74
MARYLAND	3,216	1.41	Spent Solvents	44.05
IOWA	3,166	1.39	Spent Solvents	43.06
WASHINGTON	3,109	1.36	Spent Solvents	38.86
LOUISIANA	3,015	1.32	Spent Solvents	49.41
ALABAMA	3,005	1.31	Spent Solvents	47.80
OKLAHOMA	2,802	1.23	Spent Solvents	49.23
KANSAS	2,791	1.22	Spent Solvents	45.26
KENTUCKY	2,683	1.17	Spent Solvents	50.56
COLORADO	2,633	1.15	Spent Solvents	37.57
SOUTH CAROLINA	2,338	1.02	Spent Solvents	47.79
OREGON	2,117	0.93	Spent Solvents	41.44
ARIZONA	1,897	0.83	Spent Solvents	39.23
RHODE ISLAND	1,882	0.82	Spent Solvents	39.21

EXHIBIT 3-17
(Continued)

QUANTITY OF WASTE GENERATED BY STATE

STATE	TOTAL QUANTITY GENERATED (MT/Year)	PERCENT OF TOTAL WASTE	LARGEST WASTE STREAM	PERCENT OF STATE TOTAL
ARKANSAS	1,838	0.80	Spent Solvents	47.88
MISSISSIPPI	1,776	0.78	Spent Solvents	49.85
NEBRASKA	1,769	0.77	Spent Solvents	40.89
NEW HAMPSHIRE	1,215	0.53	Spent Solvents	50.35
MAINE	1,182	0.52	Spent Solvents	55.16
WEST VIRGINIA	1,111	0.49	Spent Solvents	45.96
UTAH	1,035	0.45	Spent Solvents	40.84
NEW MEXICO	791	0.35	Spent Solvents	40.52
NORTH DAKOTA	722	0.32	Spent Solvents	37.12
SOUTH DAKOTA	687	0.30	Spent Solvents	36.92
IDAHO	671	0.29	Spent Solvents	41.78
MONTANA	603	0.26	Spent Solvents	42.16
VERMONT	583	0.26	Spent Solvents	52.80
HAWAII	576	0.25	Spent Solvents	32.12
NEVADA	573	0.25	Spent Solvents	37.87
DELAWARE	452	0.20	Spent Solvents	48.40
DISTRICT OF COLUMBIA	419	0.18	Spent Solvents	34.61
WYOMING	349	0.15	Spent Solvents	42.12
ALASKA	210	0.09	Spent Solvents	33.18
TOTAL	228,528	100.00%		

Source: ICF estimates

EXHIBIT 3-18

MAJOR GENERATING STATES FOR THE TEN LARGEST WASTES

WASTE TYPE	QUANTITY GENERATED NATIONAL (MT/Year)	MAJOR GENERATING STATES	% OF TOTAL
Spent Solvents	105,368	California	9.51
		New York	7.64
		Pennsylvania	6.93
		Texas	6.29
		Illinois	5.54
		Total	35.91%
Strong Acid or Alkaline Wastes	29,791	New York	12.53
		California	8.72
		Pennsylvania	8.65
		New Jersey	6.99
		Texas	6.91
		Total	43.80%
Photographic Wastes	18,431	California	19.19
		New York	10.89
		Illinois	6.23
		Texas	4.61
		Ohio	3.99
		Total	44.92%
Filtration Residue f/ Dry Cleaning	13,660	New York	11.99
		California	8.89
		Texas	7.69
		Pennsylvania	5.34
		New Jersey	4.83
		Total	38.73%
Solution or Sludge w/ Photo Silver	8,919	California	17.25
		New York	14.02
		Texas	6.50
		Illinois	4.84
		Florida	4.58
		Total	47.19%

EXHIBIT 3-18
(Continued)

MAJOR GENERATING STATES FOR THE TEN LARGEST WASTES

WASTE TYPE	QUANTITY GENERATED NATIONAL (MT/Year)	MAJOR GENERATING STATES	% OF TOTAL
Waste Formaldehyde	8,850	Ohio	8.70
		Illinois	7.95
		Michigan	5.54
		Texas	5.01
		Indiana	4.67
		Total	31.87%
Ignitable Wastes	8,485	California	9.97
		New York	7.28
		Illinois	6.78
		Ohio	6.16
		New Jersey	5.12
		Total	35.32%
Ignitable Paint Wastes	6,713	California	14.80
		New York	8.16
		Illinois	5.67
		Ohio	5.58
		Texas	4.65
		Total	38.87%
Pesticide Washing and Rinsing	6,069	California	8.55
		Ohio	8.11
		Illinois	7.88
		Texas	6.33
		Florida	6.15
		Total	37.02%
Spent Plating Wastes	5,768	California	17.29
		New York	14.80
		Pennsylvania	8.89
		New Jersey	8.54
		Massachusetts	7.16
		Total	56.67%

Source: ICF estimates

EXHIBIT 3-19

WASTE GENERATION BASED ON STATE REGULATORY SCHEME

	TOTAL QUANTITY GENERATED (MT/Year)	PERCENT OF TOTAL WASTES
STATES WITH EXCLUSION LEVEL AT 1000 KG/MONTH	119,608	52.34
STATES WITH NO EXCLUSION LEVEL OR ONE LOWER THAN THE FEDERAL LEVEL	108,920	47.66
TOTAL ALL STATES	228,528	100.00%

Source: ICF estimates

3.5 BASELINE COSTS OF WASTE MANAGEMENT

3.5.1 Off-Site Management Costs

Information on prices charged by commercial hazardous waste management facilities is generally limited. Prices per metric ton on waste vary significantly depending on the composition and physical form of the waste as well as on quantity and packaging of the wastes. SQGs using commercial services are likely to incur higher costs for these services than generators of large waste quantities because of small shipments and increased handling and waste analyses required of containerized wastes. Even though SQG shipments may be consolidated to reduce transportation costs, the additional burden to the commercial facility to classify multi-generator wastes for proper treatment or disposal will likely increase the costs to the SQG.

Prices for commercial treatment, incineration, and disposal services were estimated using price information reported by Booz-Allen[1] for different types of treatment and disposal in 1983. In estimating likely prices for the ten major waste streams evaluated in this analysis, consideration was given to the composition, physical form, quantities, and shipping method (i.e., bulk or containerized) of the SQG wastes. Exhibit 3-20 presents the results of these price estimates, which have been adjusted to 1984 levels. Included in this exhibit are the price estimates for commercial recycling which are based, in all but one case on price information for solvent recovery services. Costs for recycling certain waste streams in which a waste is sold (or given) to another manufacturer for resource recovery or use in their process cannot be accurately estimated. For instance, certain acids used to clean electronic parts can be reused for metal cleaning/treating in another industry (e.g., steel finishing) once the acid becomes too contaminated for use by the former manufacturer. In all likelihood, their baseline costs are zero, and they may even sell their wastes and receive a modest profit. In these cases, we have noted the practice but are unable to estimate a cost.

3.5.2 Transportation Costs

Hazardous waste transportation services are often provided by commercial facilities, as well as being offered by a large number of independent transporters. A basic methodology developed for EPA to estimate commercial hazardous waste transportation costs was modified and the unit costs updated to estimate likely prices for commercial transportation of SQG shipments under different conditions. The resulting cost model was used to estimate prices paid by SQGs to ship containerized wastes either 100 or 300 miles to the destination facility. Presented in Exhibit 3-21 are the results of the analysis of transportation costs. With one exception, the costs are based on quantities stored for 180 days and transported 100 miles, or stored 270 days

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[1] Review of Activities of Firms in the Commercial Hazardous Waste Management Industry: 1983 Update, Final Report, Booz-Allen & Hamilton, USEPA, Office of Policy Analysis, November 30, 1984.

EXHIBIT 3-20

COSTS FOR OFF-SITE TREATMENT AND DISPOSAL METHODS a/

Waste Stream	Secure Landfill	Commercial Recycling	Commercial Treatment	Commercial Incineration
Spent Solvents	250	300 b/	400	250
Strong Acid or Alkaline Wastes	250	Unknown	200	500
Photographic Wastes	250	Unknown	350	N/A
Filtration Residues From Dry Cleaning	150	Unknown	400	500
Solutions or Sludges with Photographic Silver	250	400 c/	350	N/A
Ignitable Wastes (liquids)	250	350 b/	450	250
Ignitable Wastes (solids)	150	N/A	N/A	500
Wastes Containing Formaldehyde	250	N/A	200	N/A
Spent Plating Wastes	250	Unknown	350	500
Pesticide Washing and Rinsing Solutions	250	Unknown	350	N/A
Ignitable Paint Wastes	250	350 b/	450	500

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a/ Costs for complying with Subparts A-H or container storage (prior to shipment) are not included, nor are costs for transportation to commercial facilities.

b/ Pick-up service is assumed; no off-site transportation costs are required.

c/ Cost estimate for 3,000 kg/yr on-site recovery system when recovered residual (silver) is sold off-site.

EXHIBIT 3-21

CONTAINERIZED WASTE TRANSPORTATION COST ESTIMATES

100-mile distance

Shipment Size (Kg)*	Cost Per Shipment ($)	Number of Shipments/Year	Annual Cost ($/Yr)	Unit Cost ($/MT)
600	129	2	258	215
1,000	129	2	258	129
3,000	286	2	572	95
6,000	431	2	862	72
18,000	937	Unknown	-	52

300-mile distance

Shipment Size (Kg)*	Cost Per Shipment ($)	Number of Shipments/Year a/	Annual Cost ($/Yr)	Unit Cost ($/MT)
900	272	1.35	367	302
1,500	370	1.35	500	247
4,500	655	1.35	884	146
6,000	937	1.35-2	1,265-1,874	156
18,000	1,942	Unknown	-	108

a/ Overall average; 1.35 shipments per year is equivalent to shipment of wastes every 270 days.

and then shipped 300 miles. The exception in this table of costs is the 18,000 kg container shipment which represents a long term storage facility transporting a full truckload. To determine the cost to the generator per shipment of waste, it was necessary to assume various quantities to be consolidated on one truck. Assuming certain loading time estimates at each SQG facility (i.e., based on number of drums to be loaded) and transport times between generators along the service route, it is possible to determine the number of generators that could reasonably be serviced by a transporter in approximately an eight hour day.[2] Travel time between generators was assumed to average 20 minutes. A minimum of 45 minutes was spent by the transporter at each generator facility to allow for loading and administrative requirements.

Container loading times are longer than bulk liquid transfer because of the need to handle individual drums. For example, approximately three hours would be required to load and catalog 30 drums (6,000 kg) from one generator because forklifts and palletized drum storage likely would not be present. Costs for the generator to assist in the loading process were estimated and factored into the total transportation cost each generator incurred. Labor costs for transport (and return) time, unloading time, and required layover periods (for shipments of 300 miles) were estimated and added to the fixed and variable costs necessary to operate the truck and trailer unit.

The number of generators using a container truck and its percent utilization were determined from the assumed shipment sizes from each SQG facility and the travel time between facilities along the route. The results are presented below and assume that the standard container trailer unit can transport 80 drums.

Shipment Size (Kg)	Generators Per Truck	% Truck Utilization
600	7	35
900	7	53
1,000	7	53
1,500	5	50
3,000	3	60
4,500	3	83
6,000	2	75
18,000 (full truck)	1	100

3.5.3 On-Site Treatment Costs

Cost estimates for on-site treatment of the top ten SQG wastes are presented in Exhibit 3-22. Treatment cost estimates were developed for a

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[2] Total pick-up times on a route ranged from 7 to 8½ hours.

EXHIBIT 3-22

COSTS FOR ON-SITE TREATMENT METHODS

Waste Stream	Treatment Method	Incremental Annualized Cost ($/MT) a/ 1,200 kg/yr	6,000 kg/yr	12,000 kg/yr
Spent Solvents	Batch Distillation	2,448	1,059	738
Strong Acids or Alkaline Wastes	Neutralization and Settling	1,537	332	172
Photographic Wastes	Sewering	0	0	0
Filtration Residues from Dry Cleaning	Solidification	1,558	1,161	1,023
Solutions or Sludges with Photographic Silver	pH Adjustment and Settling	857	221	123
Ignitable Wastes (liquid portion)	Batch Distillation	2,312	927	625
Ignitable Wastes (solid portion)	Solidification	1,594	1,116	957
Wastes Containing Formaldehyde	Chemical Hydrolysis	905	235	132
Spent Plating Wastes	Oxidation/Reduction	1,472	523	335
Pesticide Washing and Rinsing Solutions	Chemical Hydrolysis	1,414	383	218
Ignitable Paint Wastes	Batch Distillation	2,828	1,046	682

a/ Includes capital recovery charges (3% real discount rate and 10 year operating life). Incremental costs assume that no treatment system existed prior to SQG regulation. Disposal and transport costs for residuals are included as well as any credits for recovered materials. Costs for complying with Subparts A-H and J or container storage (prior to treatment) are not included in these incremental treatment costs.

range of SQG generating rates (1,200, 6,000 and 12,000 kg/year). The incremental treatments costs have been annualized, in dollars per metric ton, for each treatment method. The reported incremental costs assume that no treatment system existed prior to SQG regulation. Transport and disposal costs of treatment system residuals have been included, as well as any credits for recovered materials (e.g., solvents). In addition, the cost of disposing the waste in a sanitary landfill or POTW under baseline conditions has been deducted in the preparation of these estimates. Costs for complying with Subparts A-H and J (tanks), as well as container storage (Subpart I) needed for waste or residual management, were not included in these reported costs. Compliance cost estimates for these Subparts were estimated and applied to appropriate treatment technologies and are described and tabulated in another section.

Photographic wastes that do not contain silver are currently being sewered and will likely continue to be sewered under the proposed regulations. Because they are so dilute there is essentially no reasonable on-site treatment alternative for these wastes. Consequently, they will not incur an incremental cost in continuing this practice.

Exhibit 3-23 provides a summary of the baseline management costs (excluding storage and transport) for the top ten SQG wastes. Costs also appear for discharge to a POTW (with or without pretreatment depending on the waste stream and industry considered) and sanitary landfill disposal. These baseline costs were used in the development of incremental compliance costs and correspond to the baseline management practices evaluated for the impact analysis.

3.6 DEVELOPMENT OF MODEL PLANTS

Developing model plants for the affected industries required profiling and merging operational characteristics (products or services, employment, type and amount of waste) and financial characteristics (sales, costs, profits, and cash flow). The method for developing model plants based on these characteristics is discussed below.

3.6.1 Operational Characteristics

Economic models of plants were developed for each of the applicable size categories in the affected SICs (at the 4-digit level). The size categories were: establishments with 1-9 employees, 10-49 employees, and 50 employees and over. The operational characteristics considered for the models were the total annual waste load (all types of waste) and the "dominant" waste (the waste produced in the largest quantity). The annual waste loads were determined from an analysis of the median load of each size category of plant as reported in the SQG survey. When the data were available, the medians of the size categories in the survey were selected as the waste loads of the corresponding models. When the data were not available for an SIC, the data of the relevant size categories in the other industries in the same 3-digit groups for which data were available were used in developing the model waste loads.

EXHIBIT 3-23

BASELINE MANAGEMENT COSTS ($/MT) FOR TOP TEN SQG WASTES

	POTW	Sanitary Landfill a/	On-Site Recycling b/	Off-Site Recycling	Secure Landfill
Spent Solvents	0.40	75	2,164	300 c/	250
Strong Acid or Alkaline Wastes	500 d/	75	0	0	250
Photographic Wastes	0.40	75	0	0	250
Filtration Residues from Dry Cleaning	0.40	75	0	0	150
Solutions or Sludges with Photographic Silver	0.40	75	857 221 123	857 221 123	N/A
Ignitable Wastes (liquid portion)	0.40	N/A	2,134 946 667	350 c/	250
Ignitable Wastes (solid portion)	N/A	75	N/A	N/A	150
Wastes Containing Formaldehyde	0.40	N/A	N/A	N/A	N/A
Spent Plating Wastes	500 d/	N/A	0	0	250
Pesticide Washing and Rinsing Solutions	0.40	75	100	0	250
Ignitable Paint Wastes	0.40	75	2,774 1,021 664	350 c/	250

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a/ Includes costs for collection, transport, and disposal.

b/ Costs are provided for 1,200 kg/yr, 6,000 kg/yr, and 12,000 kg/yr being treated or recycled.

c/ Pick-up service is assumed; no off-site transportation costs are required.

d/ Costs estimated to meet pre-treatment requirements in certain industries generating this waste stream.

Although SQGs may generate more than one type of waste, only the dominant waste was modeled as the operational waste characteristic for each model plant. The dominant waste for each model was determined from the SQG survey and is defined as the waste constituting the largest portion of the total waste reported for the relevant SICs. The dominant waste for each plant was used, instead of attempting to model multiple wastes, in order to render the task of computing compliance costs under various regulatory alternatives a manageable one. For industries not covered in the SQG survey, the dominant waste was determined by analyzing data for other industries in the same 3-digit level industry group.

3.6.2 Financial Characteristics

As discussed in section 2.3.4, two screenings were conducted for the economic impact analysis on those model plants that might potentially experience significant impacts under the SQG regulations. The first screening involved calculating the compliance cost as a percent of sales and as a percent of profits for each model plant. The sales and profits for the models were based on the median sales and profits for applicable size categories contained in the FINSTAT data base. After-tax profits reported in FINSTAT were converted to before-tax profits using the tax rates contained in the 1984 Tax Reform Law. The resulting model plant profiles for the first screening are included, with their associated compliance costs under regulatory alternative G2-F2, in Appendix D.

For model plants that indicated potentially significant effects due to the compliance costs, a second level screening was conducted using discounted cash flows (DCF). For this screening, additional financial parameters were developed, including:

- earnings before taxes (EBT)
- interest payments (I)
- sales growth (G)
- working capital requirements (WC)
- cost of debt capital (Kd)
- cost of equity capital (Ke)
- overall cost of capital (Kc)
- debt position (D/A)

Using this information, discounted cash flows after compliance (DCF_{AC}) were determined based on the following formula:

$$DCF_{AC} = \sum_{t=1}^{10} \frac{EBT_o(1+G)^t - T_t + I_o(1+G)^t - G(WC_{t-1}) - (CE)_o(1+G)^t + D - CC_o(1+G)^t}{(1+Kc)^t}$$

or

$$DCF_{AC} = \sum_{t=1}^{10} \frac{(1+G)^t (EBT_o + I_o - CE_o - CC_o) - T_t - G(WC_{t-1}) + D}{(1 + Kc)^t}$$

where:

$K_c = (D/A)\ k_d + (1-D/A)\ (Ke)$

$T_t = (\text{tax rate})\ (EBT_t) = (\text{tax rate})\ (1+G)^t\ (EBT_o)$

$WC_{t-1} = (1+G)^{t-1}\ (WC_o)$

CE = annualized capital expenditures

WC = working capital

CC = annualized compliance costs

In this screening it was assumed that models would experience financial distress if DCF ≤0.

Some of the additional data required for this screening were not available in the FINSTAT data base. Consequently, other published sources were used in developing the models for this analysis. The tax rates were based on the 1984 Tax Reform Law. Interest expenses, working capital, and depreciation were based on the financial data provided in Robert Morris Associates Annual Statement Studies. Capital expenditures were calculated from an analysis of capital expenditures reported in Value Line. Finally, the cost of capital and growth rate were assumed to be 10 percent and 4 percent, respectively.

The second level screening based on financial characteristics was conducted only for a limited number of model plants because few model plants showed significant impacts (and closure potential) based on the first screening, which compared compliance costs with sales and profits.

3.7 DEVELOPMENT OF INDUSTRY PROFILES

Economic impacts at the industry level concentrated on potential effects on output, industry structure, and employment. Impacts on prices could also be potentially important, but these would only follow if aggregate output effects or compliance costs were significant. Thus, the analysis of price impacts was triggered on an industry-specific basis only if costs or output were substantially affected.

Developing industry profiles involved two major tasks. The first task required collecting and compiling secondary data on industry baseline conditions. The second involved estimating the share of the output potentially affected by SQG regulations in each industry.

3.7.1 Industry Baseline Conditions

The objective of this task was to compile essential data from secondary sources on general industry conditions. As with model plants, the data were needed for approximately 300 industries potentially affected by SQG regulations (See Appendix Table E-3--Master List of SQG Industries).

Bureau of Census data were collected on value of shipments (sales, revenues, or other output proxies), number of establishments, employment, payroll and, for some industries, concentration ratios. Census data were used primarily because of their uniformity, comprehensiveness and ready availability. The data were collected for the two most recent available Census years, 1972 and 1977. Also, because the potential effects were not necessarily industry-wide, the data were collected by employment size classes of enterprises or establishments within each industry. Common size classes are:

1-4 employees,
5-9 employees,
10-19 employees,
20-49 employees,
50-99 employees,
100-249 employees, and
250+ employees.

These classes vary somewhat by general Census industry sectors (manufacturing, construction, wholesale, retail), reflecting the form in which the data are reported.

These data were entered into an SQG economic data base stored in SAS (Statistical Analysis System -- a data management system), to facilitate automated retrieval and statistical analysis.

3.7.2 Share of Industry Affected by SQG Regulations

The SQG regulations generally affect only a portion of an industry. Many firms in a given industry will not be affected because these firms (1) do not generate hazardous waste, (2) are very small generators (≤100 kg/mo), or (3) are large quantity generators (≥1000 kg/mo). Therefore, to estimate industry impacts, the economic importance of regulated SQGs in each industry must be known. This information was obtained by analyzing the SQG survey data and extrapolating the SQG survey data to the general industry data as discussed in Chapter 6.

The most difficult part of this effort is in determining the number and size of firms in a given industry that will be regulated. This study made extensive use of the SQG survey data to complete this analysis. However, in some cases, the survey data were extended beyond the original statistical design of the survey, so that the results provided cannot be tested for statistical validity. They are judged, however, to be the best estimates available.

Estimating the share of industry output from SQGs was based on the estimated percentage of regulated SQGs within employment size categories of an industry--enterprises with 1-9 employees (small), 10-49 employees (medium), and 50+ employees (large). These percentages were estimated in three general ways depending on the size of the sample available for the industry-size category from the national SQG survey. If the 4-digit industry sample was judged adequate ($n \geq 50$), then the percentage from the sample was used as the population percentage estimate. However, there were several industries and size categories for which the data at the 4-digit SIC basis were judged inadequate and the above rule was not acceptable. In these cases, two alternate approaches were used which essentially used results for "analogous" industries to estimate undersampled or unsampled industries.

The "analogous industry" approach involved using results for 2- or 3-digit SIC groupings for undersampled 4-digit industries in that 2- or 3-digit group. In other words, results from the 3-digit industry group 329 (Abrasives, Asbestos and Miscellaneous Nonmetallic Mineral Products) were used for SICs 3291 (Abrasive Products) and 3293 (Gaskets, Packing and Sealing Devices).

For other industries, the analogous industry was selected by the study team and included a single similar 4-digit industry or a group of similar 2, 3 or 4-digit industries. For example, membership sport clubs (SIC 7997, mainly private golf clubs) were assumed to be analogous with SIC 7992 (Public Golf Courses). Similarly, mobile home manufacturers (SIC 2451) were judged to be analogous with wood partitions and fixture manufacturers (SIC 2541), wood household furniture manufacturers (SIC 2511), and wood office furniture manufacturers (SIC 2521).

Using the SQG survey directly and supplemented by the analogous industry approach, the percentage of enterprises covered by SQG regulations by size was estimated for each of the potentially affected industries. These estimates were combined with the general industry data to give a profile of the industries and the estimated share of the industries affected by SQG regulations. This information was developed for the entire master list of industries, but summarized in this report only for those industries in which SQGs were estimated to contribute 5 percent or more of industry output. The summary profiles are tabulated in Appendix E and include the following information:

- Total revenues for industry (1977 Census);
- Total employment for industry (1977 Census);
- Share of industry revenues, by employment size class (1977 Census);
- Share of industry employment, by employment size class (1977 Census);

- Estimated percentage of facilities that are SQGs, by employment size class (SQG survey, analogous industries, and professional judgment); and

- Estimated share of industry revenues and employment from SQGs (based on share of industry and portion of SQGs by employment size).

The SQG analysis is conducted at the firm level conceptually, but the Census data are for establishments (plants). This creates some error in the estimates. However, given the small size of many SQGs, the "firm" and "plant" are synonymous, so inaccuracies due to this should be relatively minor.

4. ESTIMATION OF COMPLIANCE COSTS

4.1 INTRODUCTION

This chapter presents the assumptions and the results of estimating the incremental compliance costs incurred by SQGs based on the proposed regulatory scenarios. The following costs are discussed in this chapter:

- Generator incremental compliance costs
- Part 265 (Subparts A-H) incremental compliance costs
- Part 265 (Subpart I) incremental compliance costs
- Changes from current practice to compliance management options
- Total incremental compliance costs.

Compliance cost estimates for the regulatory options discussed in this chapter, as well as other regulatory Parts, Subparts, and alternatives were developed by estimating the labor and material resources necessary to be in compliance. The majority of the estimated incremental costs for generators who store their wastes on-site involves labor charges for SQG personnel to bring their establishment and its waste management practices into compliance with the proposed regulations. Included in these labor cost estimates is the time necessary for generators to become aware of and understand their responsibilities under the proposed regulations through education programs and information provided by EPA and trade associations. Only a small portion of the aggregate compliance cost to the generator is attributable to equipment purchase or facility upgrading to meet regulations. Facilities electing to treat their wastes on-site likely will incur similar incremental compliance costs to those of generators who store prior to off-site treatment or disposal (i.e., generator requirements plus limited Part 265 standards). In addition, construction and equipment costs for on-site treatment systems should be considered an incremental cost if no treatment system existed prior to the proposed regulations.

Presented in Exhibit 4-1 are the facility personnel and their assumed labor rates which were used to estimate labor resource costs to comply with the requirements of the proposed regulations. To derive a fully burdened dollar per hour cost, a base salary was first developed and to this annual amount fringe benefits and facility overhead were then added. The operating year consists of 260 days (2,080 hours).

EXHIBIT 4-1

LABOR RATES ASSUMED FOR COMPLIANCE COST ESTIMATES

Personnel	Base Salary	$/Hour*
1. Facility Manager/Owner	$42,000	$35.50
2. Engineer/Foreman	$36,000	$30.50
3. Maintenance	$30,000	$25.00
4. Process Operator	$26,000	$22.00
5. Clerical (Secretary)	$15,000	$12.50

* Includes fringe benefits (25% of base salary) and facility overhead (50% of base salary). Rounded to nearest $0.50.

4.2 COMPONENTS OF COMPLIANCE COSTS

4.2.1 Generator Compliance Costs

As stated in Chapter 1, the Agency has identified the following options for SQG generator requirements:

- Option G1: Full Part 262 Regulations

  Require SQGs to meet the same requirements as LQGs with the exception that up to 6,000 kg of waste could be stored for 180 days (270 days if the waste will be transported more than 200 miles) without obtaining a storage facility permit.

- Option G2: Minimum Generator Requirements

  Same as Option G1, except for reduced manifest and storage requirements and the elimination of the requirement for a biennial report. The generator would be required to complete all items on the manifest (including an EPA identification number), but only one copy of the manifest would be produced and there would be no recordkeeping or exception reporting requirements. SQGs taking advantage of the storage exemption described in Option G1 would be subject to the same good-housekeeping requirements (e.g., maintenance of containers and tanks) as under Option G1, but would not be required to develop formal written contingency plans and also would not be required to provide formal employee training as long as appropriate emergency procedures are established and employees are made aware of these procedures as well as proper handling methods for hazardous wastes.

- Option G3: Minimum Generator Requirements Plus Additional Manifest and Recordkeeping and Reporting Requirements

  Same as Option G2, except multiple copies of the manifest would be produced and there would be recordkeeping and exception reporting requirements as in Option G1. The biennial report would not be required, however.

Presented in Exhibit 4-2 are the incremental compliance costs for each of the generator Part 262 options. Option G1 assumes that the SQG complies with the full Part 262 requirements. Compliance costs under Options G2 and G3 are for partial manifest requirements and reduced recordkeeping and reporting. Generators who elect to store wastes for greater than 180 (270) days and

EXHIBIT 4-2

PART 262 INCREMENTAL COMPLIANCE COSTS BY REGULATORY OPTION a/

Short Storer (less than 180/270 days)

Part 262	G-1		G-2		G-3		RCRA Storage Facility b/	
	Initial ($)	Annual ($/Yr)	Initial ($)	Annual ($/Yr)	Initial ($)	Annual ($/Yr)	Initial ($)	Annual ($/Yr)
Subpart A - General	1,694	0	1,694	0	1,694	0	1,098	0
Subpart B - The Manifest	486	125	486	104	486	125	486	63
Subpart C - Pre-Transport Requirements	0	84	0	84	0	84	0	42
Subpart D - Recordkeeping and Reporting	87	194	0	0	87	90	87	149
TOTAL	2,267	403	2,180	188	2,267	299	1,671	254

a/ These costs do not reflect incremental compliance costs incurred by generators with batch tolling arrangements for reclaiming/recycling their wastes.

b/ Annual costs based on one shipment per year.

submit Part A of the permit application have smaller Part 262 compliance costs because the costs for waste sampling and analysis are reported under §265.13 (General Waste Analysis) rather than §262.11 (Hazardous Waste Determination) and waste transportation is assumed to occur less frequently than for short-term storers.

4.2.2 Part 265 (Subpart A-H) Compliance Costs

Generators who store or treat their wastes on-site within the 180 day (or 270 day) period specified under the provisions of the storage exemption are not required to submit a Part A (and subsequently a Part B) permit application. In addition, the proposed regulations allow a reduced level of compliance for Subparts C (Preparedness and Prevention) and D (Contingency Plan and Emergency Procedures) and limited requirements for personnel training (section 265.16 of Subpart B). The incremental compliance costs for facilities choosing this management option are presented under Option G2 of Exhibit 4-3. Option G3 compliance costs are identical to those for Option G2 for Part 265 of the proposed SQG regulations.

Under Option G1 on Exhibit 4-3, the incremental compliance costs for generators using the storage exemption include full compliance with Subparts C and D and the personnel training requirements which had been modified under Option G2. For SQG facilities who elect to be long-term storers, compliance with the full requirements of Subparts A through H was assumed, and the incremental compliance costs under this scenario are also presented in Exhibit 4-3.

Although not presented in Exhibit 4-3, the subsequent incremental compliance costs for a facility to submit Part B of the permit application and to comply with the Part 264 general facility requirements (i.e., Subparts A-H) is approximately $7,500 per facility. Of this amount, $7,100 is for Part B preparation. These cost estimates do not include costs for specific container storage facility requirements described under Part 264 (Subpart I) and Part 122.25(b). The costs for public hearings and any modification to the permit application necessitated by the permit review process were not estimated because of their extreme variability.

4.2.3 Part 265 (Subpart I) Compliance Costs

The estimated compliance costs for storage containers (Subpart I) are presented as ranges in Exhibit 4-4. Facilities operating under the storage exemption are shown with cost ranges based on the limits of the monthly generating capacities for SQGs (i.e., 100 and 1,000 kg/month). SQGs who elect to accumulate a full truckload of waste for off-site management will exceed the 6,000 kg limit and must comply with the full Subpart I requirements as well as submit Part A of their permit application. Compliance costs for a container storage facility under this assumption have been prepared and are presented in Exhibit 4-4. The container storage facility costs are based on 80 drums (18 MT) managed on-site.

EXHIBIT 4-3

PART 265 (SUBPARTS A-H) INCREMENTAL COMPLIANCE COSTS BY REGULATORY OPTION

Short Storer (less than 180/270 days)

Part 262	G-1		G-2		G-3		RCRA Storage Facility*	
	Initial ($)	Annual ($/Yr)	Initial ($)	Annual ($/Yr)	Initial ($)	Annual ($/Yr)	Initial ($)	Annual ($/Yr)
Subpart A - General	0	0	0	0	0	0	0	0
Subpart B - General Facility Standards	2,086	523	441	53	441	53	3,134*	931
Subpart C - Preparedness and Prevention	2,249	200	1,006	0	1,006	0	2,249	200
Subpart D - Contingency Plan and Emergency Procedures	355	99	0	0	0	0	355	99
Subpart E - Manifest System Recordkeeping, and Reporting	0	0	0	0	0	0	74	348
Subpart F - Groundwater Monitoring	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Subpart G - Closure and Post-Closure	0	0	0	0	0	0	292	0
Subpart H - Financial Requirements	0	0	0	0	0	0	1,176	1,735**
Part A of Permit (Part 122)	N/A	N/A	N/A	N/A	N/A	N/A	903	0
TOTAL	4,690	822	1,447	53	1,447	53	8,183	3,313

* $6 more for ignitable or reactive wastes.

** Does not include contributions to closure fund; these costs are based on the facility closure cost estimate and therefore vary with facility size and design.

EXHIBIT 4-4

INCREMENTAL PART 265 (SUBPART I) COMPLIANCE COSTS

Subpart I	Initial ($)*	Annual ($/Yr)*
≤ 180 days:		
• 100 Kg/month	4-537	404-924
• 1,000 Kg/month	25-1,854	447-4,251
≤ 270 days:		
• 100 Kg/month	7-757	406-1,021
• 1,000 Kg/month	29-2,323	454-4,454
Full Subpart I Requirements	2,165-7,500	477-5,517

* Cost ranges are a function of baseline practice and waste stream; costs for transport and disposal are not included in annual costs.

As noted in Exhibit 4-4, the cost ranges are a function of the assumed baseline practice, the facility generating and storage capacity, and the composition of the waste being stored. For example, container storage facilities that once stored their wastes in open fiberboard drums would be required to upgrade to closed metal drums for proper storage and transport under RCRA. Consequently, the purchase of new metal drums and labels would constitute their compliance cost.

The cost analysis does not assume that the provisions and requirements of a class permit for storage in tanks and containers, or the forthcoming requirements for secondary containment, leak testing, and groundwater monitoring for tanks are in place when the proposed SQG regulations take effect. The proposed tank regulations could impose significant costs on any SQGs storing wastes in tanks, even for less than 180 or 270 days.

4.2.4 Incremental Compliance Costs by Waste and Current Practices

Exhibits 4-5 through 4-15 present the baseline and incremental compliance costs for each of the top ten waste streams under a variety of current practice/compliance management options. Annual costs ($/year) and annual revenue requirements (ARR) were calculated for three SQG facility sizes (1,200, 6,000, and 12,000 kg/year) and summed for each compliance option evaluated. In this way, the total annual incremental compliance cost of one option at the facility level can be compared to any other for a specified waste stream. For example, Exhibit 4-5 shows a number of incremental cost estimates for generators of spent solvents. Down the left-hand side of the exhibit are listed a number of combinations of current waste management practices and waste management options under compliance with the regulations. The entries to the right of the current practices/compliance options are current practice costs and the components of incremental costs that would be experienced by generators of spent solvents if they originally managed these wastes in the indicated manner and were they to select the option listed for compliance.

We assumed that generators who are currently recycling off-site (but are not batch tolling) probably cannot switch to this form of recycling. Consequently, we have provided cost estimates for only those generators who are batch tolling under baseline and that continue to do so in the presence of new regulations. The batch tolling cost estimate consists of the time for the facility manager and engineer to discuss such details as waste quantity and quality, pick-up and delivery schedules, specifications of recovered materials, and prices with the reclaimer. In addition, time to review and sign an agreement, provided by the reclaimer, was also considered.

We believe the actual agreements are fairly straightforward and are standard in the solvent recycling industry. Therefore, the generator would not be required to prepare the actual agreement. Further, it is our opinion that these agreements, however simple they may be, currently exist and entering into such an agreement should be considered an initial baseline cost to the generator. The annual costs for pre-transport requirements (Part 262, Subpart C, Option G-2 of Exhibit 4-2) were also considered a baseline cost incurred by the generator in preparing his wastes for pick-up by the reclaimer.

EXHIBIT 4-5

Baseline and Incremental Compliance Costs
Spent Solvents

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
San. LF-drums	Sec. LF, <200 mi -	1200	125	443	222	254	210	405	1534
		6000	485	443	222	585	1050	425	2725
		12000	935	443	222	838	2100	450	4053
San. LF-drums	Sub. C Trtmt., <200 mi	1200	125	443	222	254	390	405	1714
		6000	485	443	222	585	1950	425	3625
		12000	935	443	222	838	3900	450	5853
Sec. LF-drums	Sec. LF, same site	1200	589	443	222	0	0	405	1070
		6000	2120	443	222	0	0	425	1090
		12000	3873	443	222	0	0	450	1115
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	589	443	222	0	180	405	1250
		6000	2120	443	222	0	900	425	1990
		12000	3873	443	222	0	1800	450	2915
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	589	443	222	0	180	405	1250
		6000	2120	443	222	0	900	425	1990
		12000	3873	443	222	0	1800	450	2915
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	125	0	0	0	-90	0	0
		6000	485	0	0	0	-448	0	0
		12000	935	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000				Option Not Applicable			
		12000							
Recycle - on-site	Recycle - on-site	1200	2631	443	222	0	340	397	1402
		6000	5951	443	222	0	444	399	1508
		12000	8471	443	222	0	432	400	1497
Recycle - off-site	Recycle - off-site	1200	395	443	222	0	0	405	1070
		6000	1835	443	222	0	0	425	1090
		12000	3635	443	222	0	0	450	1115
Recycle - batch toll	Recycle - batch toll	1200	492	198	222	0	0	405	825
		6000	1932	198	222	0	0	425	845
		12000	3732	198	222	0	0	450	870
San. LF-drums	Recycle - off-site	1200	125	443	222	0	270	405	1340
		6000	485	443	222	0	1350	425	2440
		12000	935	443	222	0	2700	450	3815
San. LF-drums	Treatment, on-site	1200	125	443	222	0	2846	397	3909
		6000	485	443	222	0	5910	399	6974
		12000	935	443	222	0	7968	400	9033

EXHIBIT 4-6

Baseline and Incremental Compliance Costs
Strong Acid or Alkaline Wastes

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental					
				Part 262 (ARR)	Part 265 A-H (ARR)	Transp. ($/yr)	Compl. Mgmt. ($/yr)	Part 265 I (ARR)	Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	125	443	222	254	210	405	1534
		6000	485	443	222	585	1050	425	2725
		12000	935	443	222	838	2100	450	4053
San. LF-drums	Sub. C Trtmt., <200 mi	1200	125	443	222	254	150	405	1474
		6000	485	443	222	585	750	425	2425
		12000	935	443	222	838	1500	450	3453
Sec. LF-drums	Sec. LF, same site	1200	589	443	222	0	0	405	1070
		6000	2120	443	222	0	0	425	1090
		12000	3873	443	222	0	0	450	1115
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	589	443	222	0	-60	405	1010
		6000	2120	443	222	0	-300	425	790
		12000	3873	443	222	0	-600	450	515
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	589	443	222	0	-60	405	1010
		6000	2120	443	222	0	-300	425	790
		12000	3873	443	222	0	-600	450	515
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
POTW, with pretrtmt.	POTW, same pretrtmt.	1200	600	0	0	0	0	0	0
		6000	3000	0	0	0	0	0	0
		12000	6000	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	125	0	0	0	-90	0	0
		6000	485	0	0	0	-448	0	0
		12000	935	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200	125	0	0	0	510	0	510
		6000	485	0	0	0	2550	0	2550
		12000	935	0	0	0	5100	0	5100
Recycle - on-site	Recycle - on-site	1200	35	443	222	0	0	397	1062
		6000	35	443	222	0	0	399	1064
		12000	35	443	222	0	0	400	1065
Recycle - off-site	Recycle - off-site	1200	35	443	222	0	0	405	1070
		6000	35	443	222	0	0	425	1090
		12000	35	443	222	0	0	450	1115
San. LF-drums	Recycle - off-site	1200	125	443	222	0	-90	405	980
		6000	485	443	222	0	-450	425	640
		12000	935	443	222	0	-900	450	215
San. LF-drums	Treatment, on-site	1200	125	443	222	0	1756	397	2818
		6000	485	443	222	0	1548	399	2612
		12000	935	443	222	0	1164	400	2229

EXHIBIT 4-7

Baseline and Incremental Compliance Costs
Photographic Wastes

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	582	443	222	254	210	837	1966
		6000	2009	443	222	585	1050	1866	4166
		12000	3793	443	222	838	2100	3151	6754
San. LF-drums	Sub. C Trtmt., <200 mi	1200	582	443	222	254	330	837	2086
		6000	2009	443	222	585	1650	1866	4766
		12000	3793	443	222	838	3300	3151	7954
Sec. LF-drums	Sec. LF, same site	1200	1046	443	222	0	0	837	1502
		6000	3644	443	222	0	0	1866	2531
		12000	6731	443	222	0	0	3151	3816
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	1046	443	222	0	120	837	1622
		6000	3644	443	222	0	600	1866	3131
		12000	6731	443	222	0	1200	3151	5016
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	1046	443	222	0	120	837	1622
		6000	3644	443	222	0	600	1866	3131
		12000	6731	443	222	0	1200	3151	5016
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	582	0	0	0	-90	0	0
		6000	2009	0	0	0	-448	0	0
		12000	3793	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000				Option Not Applicable			
		12000							
Recycle - on-site	Recycle - on-site	1200	60	443	222	0	0	397	1062
		6000	119	443	222	0	0	399	1064
		12000	193	443	222	0	0	400	1065
Recycle - off-site	Recycle - off-site	1200	492	443	222	0	0	837	1502
		6000	1559	443	222	0	0	1866	2531
		12000	2893	443	222	0	0	3151	3816
San. LF-drums	Recycle - off-site	1200	582	443	222	0	-90	837	1412
		6000	2009	443	222	0	-450	1866	2081
		12000	3793	443	222	0	-900	3151	2916
San. LF-drums	Treatment, on-site	1200							
		6000				Option Not Applicable			
		12000							

EXHIBIT 4-8

Baseline and Incremental Compliance Costs
Filtration Residues from Dry Cleaning

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	582	443	222	254	90	837	1846
		6000	2009	443	222	585	450	1866	3566
		12000	3793	443	222	838	900	3151	5554
San. LF-drums	Sub. C Trtmt., <200 mi	1200							
		6000	----------	----------	----------	Option Not Applicable	----------	----------	----------
		12000							
Sec. LF-drums	Sec. LF, same site	1200	926	443	222	0	0	837	1502
		6000	3044	443	222	0	0	1866	2531
		12000	5531	443	222	0	0	3151	3816
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200							
		6000	----------	----------	----------	Option Not Applicable	----------	----------	----------
		12000							
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200							
		6000	----------	----------	----------	Option Not Applicable	----------	----------	----------
		12000							
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	582	0	0	0	-90	0	0
		6000	2009	0	0	0	-448	0	0
		12000	3793	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000	----------	----------	----------	Option Not Applicable	----------	----------	----------
		12000							
Recycle - on-site	Recycle - on-site	1200	60	443	222	0	0	397	1062
		6000	119	443	222	0	0	399	1064
		12000	193	443	222	0	0	400	1065
Recycle - off-site	Recycle - off-site	1200	492	443	222	0	0	837	1502
		6000	1559	443	222	0	0	1866	2531
		12000	2893	443	222	0	0	3151	3816
San. LF-drums	Recycle - off-site	1200	582	443	222	0	-90	837	1412
		6000	2009	443	222	0	-450	1866	2081
		12000	3793	443	222	0	-900	3151	2916
San. LF-drums	Treatment, on-site	1200	582	443	222	0	1867	397	2930
		6000	2009	443	222	0	6966	399	8030
		12000	3793	443	222	0	12264	400	13329

EXHIBIT 4-9

Baseline and Incremental Compliance Costs
Solutions or Sludges with Photographic Silver

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Part 265 A-H (ARR)	Transp. ($/yr)	Compl. Mgmt. ($/yr)	Part 265 I (ARR)	Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	582	443	222	254	210	837	1966
		6000	2009	443	222	585	1050	1866	4166
		12000	3793	443	222	838	2100	3151	6754
San. LF-drums	Sub. C Trtmt., <200 mi	1200	582	443	222	254	330	837	2086
		6000	2009	443	222	585	1650	1866	4766
		12000	3793	443	222	838	3300	3151	7954
Sec. LF-drums	Sec. LF, same site	1200							
		6000			Option Not Applicable				
		12000							
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200							
		6000			Option Not Applicable				
		12000							
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200							
		6000			Option Not Applicable				
		12000							
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	582	0	0	0	-90	0	0
		6000	2009	0	0	0	-448	0	0
		12000	3793	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000			Option Not Applicable				
		12000							
Recycle - on-site	Recycle - on-site	1200	1088	443	222	0	0	397	1062
		6000	1451	443	222	0	0	399	1064
		12000	1681	443	222	0	0	400	1065
Recycle - off-site	Recycle - off-site	1200	1521	443	222	0	0	837	1502
		6000	2891	443	222	0	0	1866	2531
		12000	4381	443	222	0	0	3151	3816
San. LF-drums	Recycle - off-site	1200	582	443	222	0	938	837	2441
		6000	2009	443	222	0	882	1866	3413
		12000	3793	443	222	0	588	3151	4404
San. LF-drums	Treatment, on-site	1200	582	443	222	0	938	397	2001
		6000	2009	443	222	0	882	399	1946
		12000	3793	443	222	0	588	400	1653

EXHIBIT 4-10

Baseline and Incremental Compliance Costs
Ignitable Wastes (Liquid Portion)

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
POTW, w/o pretrtmt.	Sec. LF, <200 mi	1200	0	443	222	254	300	897	2116
		6000	2	443	222	585	1498	1984	4732
		12000	5	443	222	838	2995	3343	7842
POTW, w/o pretrtmt.	Sub. C Trtmt., <200 mi	1200	0	443	222	254	540	897	2356
		6000	2	443	222	585	2698	1984	5932
		12000	5	443	222	838	5395	3343	10242
Sec. LF-drums	Sec. LF, same site	1200	1046	443	222	0	0	837	1502
		6000	3644	443	222	0	0	1866	2531
		12000	6731	443	222	0	0	3151	3816
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	1046	443	222	0	240	837	1742
		6000	3644	443	222	0	1200	1866	3731
		12000	6731	443	222	0	2400	3151	6216
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	1046	443	222	0	240	837	1742
		6000	3644	443	222	0	1200	1866	3731
		12000	6731	443	222	0	2400	3151	6216
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
Sec. LF-drums	POTW, w/o pretrtmt.	1200	1046	0	0	0	-300	0	0
		6000	3644	0	0	0	-1498	0	0
		12000	6731	0	0	0	-2995	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000							
		12000							
			Option Not Applicable						
Recycle - on-site	Recycle - on-site	1200	60	443	222	0	317	397	1379
		6000	12923	443	222	0	288	399	1352
		12000	11545	443	222	0	156	400	1221
Recycle - off-site	Recycle - off-site	1200	912	443	222	0	0	837	1502
		6000	3659	443	222	0	0	1866	2531
		12000	7093	443	222	0	0	3151	3816
Recycle - batch toll	Recycle - batch toll	1200	1009	198	222	0	0	837	1257
		6000	3756	198	222	0	0	1866	2286
		12000	7190	198	222	0	0	3151	3571
POTW, w/o pretrtmt.	Recycle - off-site	1200	0	443	222	0	420	897	1982
		6000	2	443	222	0	2098	1984	4747
		12000	5	443	222	0	4195	3343	8204
POTW, w/o pretrtmt.	Treatment, on-site	1200	0	443	222	0	2877	457	3999
		6000	2	443	222	0	5962	517	7144
		12000	5	443	222	0	8155	592	9413

EXHIBIT 4-11

Baseline and Incremental Compliance Costs
Ignitable Wastes (Solid Portion)

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	582	443	222	254	90	837	1846
		6000	2009	443	222	585	450	1866	3566
		12000	3793	443	222	838	900	3151	5554
San. LF-drums	Sub. C Trtmt., <200 mi	1200							
		6000	Option Not Applicable						
		12000							
Sec. LF-drums	Sec. LF, same site	1200	926	443	222	0	0	837	1502
		6000	3044	443	222	0	0	1866	2531
		12000	5531	443	222	0	0	3151	3816
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200							
		6000	Option Not Applicable						
		12000							
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200							
		6000	Option Not Applicable						
		12000							
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200							
		6000	Option Not Applicable						
		12000							
San. LF-drums	POTW, w/o pretrtmt.	1200							
		6000	Option Not Applicable						
		12000							
San. LF-drums	POTW, with pretrtmt.	1200							
		6000	Option Not Applicable						
		12000							
Recycle - on-site	Recycle - on-site	1200							
		6000	Option Not Applicable						
		12000							
Recycle - off-site	Recycle - off-site	1200							
		6000	Option Not Applicable						
		12000							
San. LF-drums	Recycle - off-site	1200							
		6000	Option Not Applicable						
		12000							
San. LF-drums	Treatment, on-site	1200	582	443	222	0	1915	397	2978
		6000	2009	443	222	0	6684	399	7748
		12000	3793	443	222	0	11424	400	12489

EXHIBIT 4-12

Baseline and Incremental Compliance Costs
Wastes Containing Formaldehyde

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mont. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
POTW, w/o pretrtmt.	Sec. LF, <200 mi	1200	0	443	222	254	240	897	2056
		6000	2	443	222	585	1198	1984	4432
		12000	5	443	222	838	2395	3343	7242
POTW, w/o pretrtmt.	Sub. C Trtmt., <200 mi	1200	0	443	222	254	240	897	2056
		6000	2	443	222	585	1198	1984	4432
		12000	5	443	222	838	2395	3343	7242
Sec. LF-drums	Sec. LF, same site	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
Sec. LF-drums	POTW, w/o pretrtmt.	1200	494	0	0	0	-240	0	0
		6000	1785	0	0	0	-1198	0	0
		12000	3238	0	0	0	-2395	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
Recycle - on-site	Recycle - on-site	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
Recycle - off-site	Recycle - off-site	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
POTW, w/o pretrtmt.	Recycle - off-site	1200							
		6000	---------- Option Not Applicable ----------						
		12000							
POTW, w/o pretrtmt.	Treatment, on-site	1200	0	443	222	0	1088	457	2210
		6000	2	443	222	0	1408	517	2590
		12000	5	443	222	0	1567	592	2825

EXHIBIT 4-13

Baseline and Incremental Compliance Costs
Spent Plating Wastes

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
POTW, w/o pretrtmt.	Sec. LF, <200 mi	1200	0	443	222	254	300	990	2209
		6000	2	443	222	585	1498	2555	5303
		12000	5	443	222	838	2995	4511	9009
POTW, with pretrtmt.	Sec. LF, <200 mi	1200	600	443	222	254	-300	990	1609
		6000	3000	443	222	585	-1500	2555	2305
		12000	6000	443	222	838	-3000	4511	3014
POTW, w/o pretrtmt.	Sub. C Trtmt., <200 mi	1200	0	443	222	254	420	990	2329
		6000	2	443	222	585	2098	2555	5903
		12000	5	443	222	838	4195	4511	10209
POTW, with pretrtmt.	Sub. C Trtmt., <200 mi	1200	600	443	222	254	-180	990	1729
		6000	3000	443	222	585	-900	2555	2905
		12000	6000	443	222	838	-1800	4511	4214
Sec. LF-drums	Sec. LF, same site	1200	1140	443	222	0	0	925	1590
		6000	4215	443	222	0	0	2405	3070
		12000	7899	443	222	0	0	4254	4919
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	1140	443	222	0	120	925	1710
		6000	4215	443	222	0	600	2405	3670
		12000	7899	443	222	0	1200	4254	6119
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	1140	443	222	0	120	925	1710
		6000	4215	443	222	0	600	2405	3670
		12000	7899	443	222	0	1200	4254	6119
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
POTW, with pretrtmt.	POTW, same pretrtmt.	1200	600	0	0	0	0	0	0
		6000	3000	0	0	0	0	0	0
		12000	6000	0	0	0	0	0	0
Sec. LF-drums	POTW, w/o pretrtmt.	1200	1140	0	0	0	-300	0	0
		6000	4215	0	0	0	-1498	0	0
		12000	7899	0	0	0	-2995	0	0
Sec. LF-drums	POTW, with pretrtmt.	1200	1140	0	0	0	300	0	300
		6000	4215	0	0	0	1500	0	1500
		12000	7899	0	0	0	3000	0	3000
Recycle - on-site	Recycle - on-site	1200	65	443	222	0	0	397	1062
		6000	150	443	222	0	0	399	1064
		12000	257	443	222	0	0	400	1065
Recycle - off-site	Recycle - off-site	1200	586	443	222	0	0	925	1590
		6000	2130	443	222	0	0	2405	3070
		12000	4061	443	222	0	0	4254	4919

EXHIBIT 4-13

Baseline and Incremental Compliance Costs
Spent Plating Wastes (Continued)

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental					
				Part 262 (ARR)	Part 265 A-H (ARR)	Transp. ($/yr)	Compl. Mgmt. ($/yr)	Part 265 I (ARR)	Total (ARR)
POTW, w/o pretrtmt.	Recycle - off-site	1200	0	443	222	0	0	990	1655
		6000	2	443	222	0	-2	2555	3218
		12000	5	443	222	0	-5	4511	5171
POTW, with pretrtmt.	Recycle - off-site	1200	600	443	222	0	-600	990	1055
		6000	3000	443	222	0	-3000	2555	220
		12000	6000	443	222	0	-6000	4511	0
Sec. LF-drums	Recycle - off-site	1200	1140	443	222	0	-90	925	1500
		6000	4215	443	222	0	-450	2405	2620
		12000	7899	443	222	0	-900	4254	4019
POTW, w/o pretrtmt.	Treatment, on-site	1200	0	443	222	0	1766	462	2893
		6000	2	443	222	0	3136	549	4349
		12000	5	443	222	0	4015	657	5337
POTW, with pretrtmt.	Treatment, on-site	1200	600	443	222	0	1166	462	2294
		6000	3000	443	222	0	138	549	1352
		12000	6000	443	222	0	-1980	657	0

EXHIBIT 4-14

Baseline and Incremental Compliance Costs
Pesticide Washing and Rinsing Solutions

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	582	443	222	254	210	837	1966
		6000	2009	443	222	585	1050	1866	4166
		12000	3793	443	222	838	2100	3151	6754
San. LF-drums	Sub. C Trtmt., <200 mi	1200	582	443	222	254	330	837	2086
		6000	2009	443	222	585	1650	1866	4766
		12000	3793	443	222	838	3300	3151	7954
Sec. LF-drums	Sec. LF, same site	1200	1046	443	222	0	0	837	1502
		6000	3644	443	222	0	0	1866	2531
		12000	6731	443	222	0	0	3151	3816
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	1046	443	222	0	120	837	1622
		6000	3644	443	222	0	600	1866	3131
		12000	6731	443	222	0	1200	3151	5016
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	1046	443	222	0	120	837	1622
		6000	3644	443	222	0	600	1866	3131
		12000	6731	443	222	0	1200	3151	5016
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	582	0	0	0	-90	0	0
		6000	2009	0	0	0	-448	0	0
		12000	3793	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000				Option Not Applicable			
		12000							
Recycle - on-site	Recycle - on-site	1200	180	443	222	0	0	397	1062
		6000	719	443	222	0	0	399	1064
		12000	1393	443	222	0	0	400	1065
Recycle - off-site	Recycle - off-site	1200	492	443	222	0	0	837	1502
		6000	1559	443	222	0	0	1866	2531
		12000	2893	443	222	0	0	3151	3816
San. LF-drums	Recycle - off-site	1200	582	443	222	0	-90	837	1412
		6000	2009	443	222	0	-450	1866	2081
		12000	3793	443	222	0	-900	3151	2916
San. LF-drums	Treatment, on-site	1200	582	443	222	0	1607	397	2669
		6000	2009	443	222	0	1848	399	2912
		12000	3793	443	222	0	1716	400	2781

EXHIBIT 4-15

Baseline and Incremental Compliance Costs
Ignitable Paint Wastes

Current Management	Compliance Option	Waste (kg/yr)	Baseline (ARR)	Incremental Part 262 (ARR)	Incremental Part 265 A-H (ARR)	Incremental Transp. ($/yr)	Incremental Compl. Mgmt. ($/yr)	Incremental Part 265 I (ARR)	Incremental Total (ARR)
San. LF-drums	Sec. LF, <200 mi	1200	540	443	222	254	210	797	1926
		6000	1865	443	222	585	1050	1729	4029
		12000	3522	443	222	838	2100	2895	6498
San. LF-drums	Sub. C Trtmt., <200 mi	1200	540	443	222	254	450	797	2166
		6000	1865	443	222	585	2250	1729	5229
		12000	3522	443	222	838	4500	2895	8898
Sec. LF-drums	Sec. LF, same site	1200	1004	443	222	0	0	797	1462
		6000	3500	443	222	0	0	1729	2394
		12000	6460	443	222	0	0	2895	3560
Sec. LF-drums	Sub. C Trtmt., eq. dist.	1200	1004	443	222	0	240	797	1702
		6000	3500	443	222	0	1200	1729	3594
		12000	6460	443	222	0	2400	2895	5960
Sec. LF-drums	Sub. C Trtmt., <200 mi	1200	1004	443	222	0	240	797	1702
		6000	3500	443	222	0	1200	1729	3594
		12000	6460	443	222	0	2400	2895	5960
POTW, w/o pretrtmt.	POTW, same pretrtmt.	1200	0	0	0	0	0	0	0
		6000	2	0	0	0	0	0	0
		12000	5	0	0	0	0	0	0
San. LF-drums	POTW, w/o pretrtmt.	1200	540	0	0	0	-90	0	0
		6000	1865	0	0	0	-448	0	0
		12000	3522	0	0	0	-895	0	0
San. LF-drums	POTW, with pretrtmt.	1200							
		6000				Option Not Applicable			
		12000							
Recycle - on-site	Recycle - on-site	1200	57	443	222	0	190	397	1252
		6000	16755	443	222	0	504	399	1568
		12000	12430	443	222	0	732	400	1797
Recycle - off-site	Recycle - off-site	1200	870	443	222	0	0	797	1462
		6000	3515	443	222	0	0	1729	2394
		12000	6822	443	222	0	0	2895	3560
Recycle - batch toll	Recycle - batch toll	1200	967	198	222	0	0	797	1217
		6000	3612	198	222	0	0	1729	2149
		12000	6919	198	222	0	0	2895	3315
San. LF-drums	Recycle - off-site	1200	540	443	222	0	330	797	1792
		6000	1865	443	222	0	1650	1729	4044
		12000	3522	443	222	0	3300	2895	6860
San. LF-drums	Treatment, on-site	1200	540	443	222	0	3428	397	4491
		6000	1865	443	222	0	6180	399	7244
		12000	3522	443	222	0	7800	400	8865

The baseline costs reported include storage in closed metal drums (where appropriate) and any applicable waste management, transportation, and container storage costs required for on- or off-site management.

4.3 DETERMINING THE LEAST COST COMPLIANCE MANAGEMENT OPTION

Incremental compliance cost estimates require a number of assumptions and three critical steps: (1) specifying the distribution of waste by current management practices, (2) assigning least cost incremental compliance costs for current management practices and, closely related, (3) selecting the compliance strategy for a given current management practice.

The current management distributions reflect data reported in the report, National Small Quantity Hazardous Waste Generator Survey plus data from special tabulations on management practices completed by Pope-Reid Associates (PRA). These data are not used directly, however, but are adjusted to overcome some limitations in the available data. These adjustments are as follows:

1. Estimate the percent of waste currently managed under specified management practices from the national survey report. When data were not available from the national survey report, then PRA's special tabulations based on number of generators were used.

2. Determine the percent of waste subject to "Other" and "Unknown" waste management practices. This is the balance of waste not accounted for from the previous data. Assume, for example, that the known distribution from Step 1 equalled 60 percent of total volume; then "Other" and "Unknown" would equal 40 percent.

3. Use PRA's special tabulations and analysis to determine the portion of waste subject to "Other" management practices and deduct from the remainder in Step 2. Thus if the PRA data showed 10 percent "Other" which was also assumed unchanged in response to regulations, then "Other" management practices for a given waste would be assigned 10 percent.

4. Redistribute "Unknown" balance, in this example 30 percent (40-10 percent), over known management practices in proportion to known management practices.

5. In cases of combinations of management practices (which can result in double counting costs), assign waste to final management practice.

The least cost compliance response, i.e., the specific activities undertaken to comply with the regulations, was based on the cost analysis for combinations of current and compliance management practices reported in Exhibits 4-5 through 4-15. As these exhibits show, in many cases there will likely be no change (N/C) in management practices. Nevertheless, even in these cases, costs will still be incurred because the proposed regulations affect SQGs in their capacities as generators as well as the disposal cost that they face. For example, in Exhibit 4-5, spent solvents recycled off-site (without a batch tolling arrangement) both before and after the regulation still incur costs of $1,090 per year (for generation rates of 6,000 kg/yr) even though the waste management practice does not change. This is because generators of these wastes will face incremental Part 262 and Part 265 (Subparts A-I) costs, as the entries in Exhibit 4-5 show.

In certain cases, the least cost option from Exhibits 4-5 through 4-16 was not selected. In these cases, a next best option was selected reflecting concern that the least cost option will not be available in the future (liquids to landfills) or the general belief that an option is being used already to the extent it is available.

The estimates developed here also assume that all of the waste of a given waste stream currently managed in a given practice would be managed after the regulation identically. In reality, it is conceivable that different SQGs might choose to comply in different ways. However, our estimates of the costs of alternative management methods suggest one that is least expensive for each waste and current management practice. Hence, for theoretical consistency, given the degree of aggregation of the analysis, it seems most appropriate to assume that all amounts of a waste stream that are managed identically prior to the regulation would be managed identically after the regulation as well.

Some generators are exempt for certain Part 262 requirements because of batch tolling practices with off-site recyclers. This will reduce off-site recyclers' compliance costs by $245 per facility. The savings will accrue only to those currently practicing batch tolling which is estimated to be 50 percent of the spent solvents and 10 percent of the ignitable waste and ignitable paint waste recycled off-site. This adjustment is incorporated in subsequent aggregate estimates.

POTW-managed waste is assumed to be fully exempt from SQG regulations and is assigned no costs. It is included in the analysis, however, to account for all hazardous waste generated by SQGs.

We also note that waste managed under "Other" management practices did require a different costing approach. Because of its unspecified nature, costs assigned were based on common practices. In effect, the "Other" waste was assigned the same cost as the most common non-POTW current waste management practice when no change (N/C) in compliance practice was anticipated.

The unit least costs used for this analysis consist of the costs of SQGs who generate 6,000 kg/yr (or 500 kg/mo). Thus, in deriving the least cost compliance management option for a particular waste given a current management

practice, a "midpoint" amount of waste generation is assumed. This is an approximation because the distribution of the quantities of wastes generated is skewed -- most generators are below 6,000 kg/yr, but most of the SQG waste comes from those generating over 6,000 kg/yr. Alternative assumptions regarding the average quantity of waste generated by SQGs are considered in the sensitivity analysis in Chapter 7.

Based on Exhibits 4-5 through 4-15, least cost compliance practices were assigned by waste stream and by current management practices as follows. Consider spent solvents (Exhibit 4-5). For such waste currently managed in secure landfills, there are three options identified as possible post-regulation waste management options. Of all of these, the secure (Subtitle C) landfill option is cheapest, $1,090 per year for 6,000 kg/yr of waste. Other options, such as off-site treatment, are more expensive, as the entries in Exhibit 4-5 indicate.

4.4 AGGREGATE COMPLIANCE COSTS

The aggregate compliance costs for the SQG regulations were developed by combining waste stream and current (baseline) management practices data with least cost options for various combinations of current and compliance management practices. The costs are annualized incremental and reflect compliance with Regulatory Alternative 1 (the combination of Options G2 and F2), the alternative currently being emphasized by EPA. The results are shown in Exhibit 4-16, which indicates aggregate incremental compliance costs of about $58 million in annual revenue equivalents.

Exhibit 4-16 was developed based on the results reported in Exhibits 4-5 through 4-15. Consider the first entry in Exhibit 4-16, spent solvents. SQG survey results indicate that about 4 percent of these wastes currently are managed off-site in sanitary landfills. To comply with the SQG regulations, this practice/must be discontinued. The incremental cost of doing so (and complying with other aspects of the SQG regulations) is estimated to be $407 per metric ton. This incremental cost is based on Exhibit 4-5 in which the least-cost alternative management method for spent solvents currently managed in sanitary landfills that was judged sufficient to comply with the regulations is off-site recycling.[1] This change in method of managing wastes has an incremental compliance cost of $2,440 for a 6,000 kg/yr generation rate. On a per metric ton basis, this is about $407 ($2,440 ÷ 6), which is shown in Exhibit 4-16.

All of the other current waste management practices for spent solvents shown in Exhibit 4-16 were judged to be sufficient to satisfy the SQG regulations, so these quantities of wastes remain in these original waste management practices. Note also that the incremental compliance costs for wastes currently managed in POTWs is zero. This is because generators wastes managed in this way are totally exempted from the regulations.

The result of shifting the spent solvents originally managed in sanitary landfills and leaving the rest of spent solvents in their current practices is shown in the "New Management Dist." line under spent solvents. The 4 percent from sanitary landfills is moved to off-site recycling, increasing the

EXHIBIT 4-16
GENERAL RESPONSE TO SQG REGULATIONS AND
ESTIMATE OF AGGREGATE INCREMENTAL COMPLIANCE COSTS
BY WASTE AND MANAGEMENT PRACTICE

WASTE STREAM	WASTE MANAGEMENT PRACTICES							
	OFFSITE							
	SANITARY LF	SUBTITLE C LF	SUBTITLE C TRTMT	RECYCLE	RECYCLE 8/ ONSITE	POTW	OTHER	TOTAL
SPENT SOLVENTS (46.1% 1/ OF 281,000 MT/YR)								129,541
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	4	5	6	56	16	3	10	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	407	182	332	162	251	0	182	194
NEW MANAGEMENT PRACTICE 4/	OFF-RECY	N/C	N/C	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	5	6	60	16	3	10	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	2,109	1,179	2,580	11,752	5,202	0	2,358	25,180
ACIDS AND ALKALIES (14.9% 1/ OF 281,000 MT/YR)								41,869
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	3	10	-	8	20	39	20	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	404	182	-	182	177	0	177	116
NEW MANAGEMENT PRACTICE 4/	OFF-TREAT	N/C	-	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	13	-	8	20	39	20	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	507	762	-	610	1,482	0	1,482	4,843
PHOTOGRAPHIC WASTES (7.5% 1/ OF 281,000 MT/YR)								21,075
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	2	2	-	4	11	79	2	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	694	422	-	422	177	0	177	62
NEW MANAGEMENT PRACTICE 4/	SECURED LF	N/C	-	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	4	-	4	11	79	2	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	293	178	-	356	410	0	75	1,311
DRY CLEANING RESIDUES (8.6% OF 281,000 MT/YR)								24,166
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	54	12	-	7	7	13	7	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	594	422	-	422	177	0	422	445
NEW MANAGEMENT PRACTICE 4/	SECURED LF	N/C	-	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	66	-	7	7	13	7	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	7,751	1,224	-	714	299	0	714	10,702
PHOTOGRAPHIC WASTE W/SILVER (4.3% OF 281,000 MT/YR)								12,083
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	1	-	-	-	32	43	24	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	694	N/A	-	N/A	177	0	177	106
NEW MANAGEMENT PRACTICE 4/	SECURED LF	-	-	-	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	1	-	-	32	43	24	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	84	0	-	0	684	0	513	1,282

EXHIBIT 4-16
GENERAL RESPONSE TO SQG REGULATIONS AND
ESTIMATE OF AGGREGATE INCREMENTAL COMPLIANCE COSTS
BY WASTE AND MANAGEMENT PRACTICE

WASTE STREAM	WASTE MANAGEMENT PRACTICES							
	OFFSITE							
	SANITARY LF	SUBTITLE C LF	SUBTITLE C TRTMT	RECYCLE	RECYCLE 8/ ONSITE	POTW	OTHER	TOTAL
IGNITABLE WASTES (4.1% OF 281,000 MT/YR)								11,521
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	27	9	10	29	5	16	4	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	594	422	622	418	225	0	422	410
NEW MANAGEMENT PRACTICE 4/	SECURED LF	N/C	N/C	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	36	10	29	5	16	4	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	1,848	438	717	1,397	130	0	194	4,723
FORMALDEHYDE WASTES (2.9% OF 281,000 MT/YR)								8,149
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	14	-	-	-	2	80	4	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	739	N/A	N/A	N/A	N/A	0	205	112
NEW MANAGEMENT PRACTICE 4/	SECURED LF	-	-		N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/		14		-	2	80	4	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	843	0	0	0	0	0	67	910
SPENT PLATING WASTES (2.8% OF 281,000 MT/YR)								7,868
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	-	1	22	7	8	62	-	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/		512	612	512	177	0	N/A	190
NEW MANAGEMENT PRACTICE 4/	-	N/C	N/C	N/C	N/C	N/C	-	
NEW MANAGEMENT DISTRIBUTION (%) 5/	-	1	22	7	0	62	-	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	0	40	1,059	282	111	0	0	1,493
PESTICIDE WASHES/RINSES (2.7% OF 281,000 MT/YR)								7,587
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	3	4	-	16	52	12	13	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	-	422	-	422	177	0	177	199
NEW MANAGEMENT PRACTICE 4/	POTW	N/C	-	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/		4	-	16	52	15	13	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	0	128	-	512	698	0	175	1,513
IGNITABLE PAINT WASTES (2.6% OF 281,000 MT/YR)								7,306
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	37	8	-	25	15	2	13	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	872	399	-	385	261	0	399	542
NEW MANAGEMENT PRACTICE 4/	OFF-TREAT	N/C	N/C	N/C	N/C	N/C	N/C	
NEW MANAGEMENT DISTRIBUTION (%) 5/		8	37	25	15	2	13	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	2,357	233	0	703	286	0	379	3,959

EXHIBIT 4-16
GENERAL RESPONSE TO SQG REGULATIONS AND
ESTIMATE OF AGGREGATE INCREMENTAL COMPLIANCE COSTS
BY WASTE AND MANAGEMENT PRACTICE

WASTE STREAM	WASTE MANAGEMENT PRACTICES							
	OFFSITE							
	SANITARY LF	SUBTITLE C LF	TRTMT	RECYCLE	RECYCLE 8/ ONSITE	POTW	OTHER	TOTAL
TOTAL ALL WASTE (281,000 MT/YR) 7/								281,000
CURRENT MANAGEMENT DISTRIBUTION (%) 2/	10	6	4	31	16	22	11	100
LEAST COST UNIT COMPLIANCE COSTS (AVE $/MT) 3/	580	262	407	191	214	0	205	206
NEW MANAGEMENT PRACTICE 4/								
NEW MANAGEMENT DISTRIBUTION (%) 5/	0	13	5	33	16	22	11	100
INCREMENTAL COMPLIANCE COSTS ($1000) 6/	16,365	4,333	4,514	16,917	9,641	0	6,172	57,944

1/ TOTAL WASTE (281,000 MT/YR) FROM TARGETED INDUSTRIES (186,000 MT/YR) AND SECONDARY INDUSTRIES (95,000 MT/YR) AS REPORTED BY ABT SQG SURVEY REPORT.
2/ ABT SQG SURVEY REPORT AND SPECIAL TABULATIONS FROM PRA.
3/ INCREMENTAL COSTS FROM PRA FACILITY COST ESTIMATES, 6000 KG/YR FACILITY COSTS. IN SOME CASES, LEAST OPTION JUDGED NOT AVAILABLE IN FUTURE.
4/ DESIGNATES MANAGEMENT PRACTICE AFTER PROMULGATION OF THE SQG REGULATIONS.
N/C = NO CHANGE
5/ THE SUM OF: COMPLIANCE DISTRIBUTION X CURRENT MANAGEMENT.
6/ THE SUM OF: LEAST COST X CURRENT MANAGEMENT PRACTICE.
7/ INCLUDES WASTE NOT DETAILED ABOVE (3.5% OF TOTAL). HENCE, TOTAL COMPLIANCE COSTS EXCEED THE SUM OF THE COMPLIANCE COSTS FOR THE 10 WASTES LISTED IN THE EXHIBIT.
8/ BATCH TOLLING PRACTICES SAVE $245/YR FOR A FACILITY. FOR 6000 KG/YR GENERATION RATE, THIS IS EQUIVALENT TO $40/MT. APPLIES TO 50% OF SOLVENTS AND 10% OF IGNITABLE WASTES AND PAINT WASTES.

proportion of spent solvents managed in this way from 56 percent to 60 percent. Finally, the total cost of compliance is derived simply by multiplying the quantities of wastes in each original waste management practice by the associated incremental compliance cost per metric ton. Thus, the $2,109,000 figure for spent solvents currently managed in sanitary landfills is derived as: 4 percent times 46.1 percent of the 281,000 metric ton/year of wastes, times $407 per metric ton. Summing the individual entries for spent solvents yields the $25,180,000 figure to the far right of the exhibit.[2]

Exhibit 4-16 indicates that managing spent solvents is responsible for $25.18 million of the total incremental costs, or 43 percent. This is not because managing spent solvents has higher unit incremental costs, rather, it is because spent solvents amount to almost half of the total regulated wastes generated by SQGs. The second highest costs by type of waste are for dry cleaning residues, $10.7 million, which equals 18 percent of the aggregate costs. In this case, high volume is one reason for the high portion of aggregate costs accounted for by these wastes. In addition, however, this also reflects the high volume of dry cleaning residues currently going to sanitary landfills which must be (expensively) shifted to another disposal practice.

Exhibit 4-16 also indicates that compliance costs will be greatest for the group of SQGs currently practicing off-site recycling, $16.92 million. Incremental costs associated with this current management practice are 29 percent of the total costs primarily because these constitute 31 percent of total SQG wastes. Wastes currently managed in sanitary landfills, 10 percent of waste volume, are responsible for 28 percent of the costs, or $16.36 million. One reason for this is that wastes managed by this practice currently will experience the highest unit costs of compliance, averaging about $580 per metric ton of waste. By way of comparison, for all wastes, the incremental compliance cost (annualized) averages about $206 per metric ton.

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[1] It was assumed that this waste could not be sent to a POTW without pretreatment, because if it could, it would currently be sent to a POTW.

[2]The grand total in Exhibit 4-16 is slightly larger than the sum of the compliance costs for the ten wastes considered because about 3.5 percent of the total 281,000 metric tons of wastes generated by SQGs are in waste types other than the ten wastes listed in the exhibit.

5. ESTIMATION OF GOVERNMENT COSTS

5.1 INTRODUCTION

Costs to the government attributable to regulating small quantity generators are an important part of the overall cost analysis, and can influence the regulatory alternative selected. Because certain state and local governments are also involved in the administration of the new regulatory program, the costs incurred by them must also be analyzed.

Various strategies can be adopted for achieving compliance with new regulations; some are more resource intensive than others. In the case of SQGs, hundreds of thousands of firms will constitute the new regulated community. Traditional techniques to foster compliance, similar to those used for large quantity generators, would be highly resource intensive. It appears unlikely that the Agency would have sufficient resources to use these traditional techniques on the SQG community; therefore a strategy has been developed to foster compliance which would use available resources in the most cost-effective manner.

The Agency's three-pronged strategy for achieving compliance with new SQG regulations can be summarized as follows:

- Clarity in regulations: an attempt will be made by EPA to ensure that the new regulations are clear, reasonable, and intelligible to the regulated community of SQGs;

- An outreach program: the agency will actively provide information and technical assistance to the SQGs so as to enable them to take the measures necessary to comply with the new regulations. The information will be provided through trade associations, public education programs for SQGs, the media, existing channels such as POTWs, and a special hot-line which will enable SQGs to obtain immediate answers to their queries. Technical assistance will be provided by extending the SQG consultation program nationwide, by working with states, municipalities and private industry, and by helping generators develop joint waste collection programs. Because of the large number of SQGs, the outreach program will have to be continued for a few years to ensure that all SQGs are covered.

- Focus inspections on SQGs with the highest degree of risk: the agency will focus inspections on those SQGs that might pose the most risk because of the degree of hazard of their wastes or because they are located in

areas where they pose a high risk to the surrounding population. Wherever possible, these inspections will be conducted together with other inspections under existing programs such as the Pretreatment Program and the Unleaded Gasoline Program. The agency will also publicize some of the violations of the regulations in local newspapers to serve as a deterrent so that other SQGs will have the incentive to comply.

Within the overall framework of the compliance and enforcement strategy, the Agency will bear three kinds of costs in regulating SQGs:[1]

- program administration costs;
- technical assistance and public education program costs; and
- compliance monitoring and enforcement costs.[2]

These costs will differ for each regulatory option. For example, in a regulatory option for SQGs where biennial reporting is required, program administration costs will be higher than in an option where it is not, because each biennial report will have to be handled by the government. The remainder of this chapter discusses these costs in detail. Section 5.2 defines and discusses the cost elements in each of the cost categories listed above and Section 5.3 estimates the costs likely to be incurred by the Agency for each regulatory alternative.

5.2 DESCRIPTION OF COST CATEGORIES

5.2.1 Program Administration Costs

Costs are likely to be incurred in processing the various notifications and reports which will be sent in by the SQGs. Depending on the regulatory

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[1] If the SQG regulatory program is administered by an authorized state, the costs attributed to the Agency will be borne by the state. It is assumed here that these costs will remain the same regardless of the administering authority.

[2] Costs incurred in developing the regulations are not included here. These pre-regulatory costs are incurred regardless of which regulatory alternative is selected.

alternative being considered, one or more of the following program administration activities will be necessary:

- issuance of an EPA identification number for the SQG;
- review of exception reports;
- review of biennial reports;
- issuance of permits; and
- oversight of state programs.

The resources required for each of the program administration activities are described below. The costs for each activity are then summed to arrive at an overall cost of program administration for each regulatory alternative.

5.2.1.1 Issuance of an EPA Identification Number

The RCRA regulations require that EPA identification numbers be issued to generators (40 CFR 262.12), transporters (40 CFR 263.11) and TSDFs (40 CFR 264.11). Without these identification numbers, a generator, transporter, or TSDF cannot "treat, store, dispose of, transport, or offer for transportation," any hazardous waste. The cost of issuing each EPA identification number has been estimated by EPA, based on past experience, to be approximately $10. The SQG survey commissioned by EPA found that approximately 90,000 SQGs are likely to be regulated (excluding SQGs that generate only used lead-acid batteries that are to be recycled). The total cost of issuing identification numbers to all these SQGs will, therefore, be 90,000 x $10 = $900,000. This is the upper limit on the cost because some SQGs already will have obtained a number prior to the new SQG regulations to facilitate waste disposal. An estimate of the fraction of the SQGs that currently have identification numbers is not available.

This $900,000 cost to be incurred by EPA is a one-time cost. The recurring annual cost for this activity is likely to be significantly less because the number of new SQGs each year will only be a fraction of the total SQG population. An estimate of this fraction can be obtained by examining small business incorportions annually.[3] A simple average of the 1978-83 annual percent change in small business incorporations[4] leads to an estimate

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[3]According to the SQG survey, nearly 66.9 percent of SQGs have less than 50 employees, 78.4 percent have less than 100 employees and 99.3 percent have less than 500 employees. The majority of the SQGs, therefore, are small businesses.

[4]"The State of Small Business," A Report to the President (March 1984), U.S. Small Business Administration, Washington, D.C. P. 34.

of an approximately 5 percent annual increase in the number of small business incorporations. Using this estimate as representative of the number of new SQGs which will request EPA identification numbers annually yields an annual recurring cost of (90,000 x 0.05 x $10) = $45,000.

5.2.1.2 Review of Exception Reports

RCRA regulations require that exception reports be submitted to the agency in cases where the generator has not had confirmation from the TSDF of delivery of a waste shipment (40 CFR 262.42). These reports consist of a copy of the manifest for which the generator has not had confirmation of delivery and a cover letter describing efforts taken by the generator to locate the shipment. These reports, therefore, serve as warning indicators for detection of possible cases of improper disposal. Past EPA experience indicates that few large quantity generators have filed exception reports with EPA. It is not expected that this situation will change significantly for SQGs, if exception reports are required. The costs for reviewing the few exception reports that are filed are expected to be negligible.[5]

5.2.1.3 Review of Biennial Reports

RCRA regulations require that biennial reports be filed with the Regional Administrator by generators for wastes shipped off-site, and these reports must include the generator's identification number, lists of facilities and transporters receiving wastes, and descriptions and quantities of wastes shipped off-site (40 CFR 161.41). Furthermore, RCRA regulations also require that authorized states submit a summary of these biennial reports to the Agency. This is likely to be a highly time intensive task in view of the large number of biennial reports likely to be received (nearly 90,000) over a period of two years.

In order to estimate these costs the following assumptions have been made:

- The biennial reports of all 90,000 generators will have to be compiled at the state level. This assumption is reasonable in that 43 states have received authorization for RCRA programs at the state level;
- It will take 0.4 hours to compile and summarize each biennial report in the format required by the Agency; and
- The cost of a clerical hour in each state is $12 per hour.

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[5] If, out of 100,000 to 130,000 waste shipments annually, exception reports are filed on 5 percent, the cost will be $150,000 to $200,000 (assuming that it takes 1.5 person hours to process each report at $20 per person hour). This is small compared to the total costs to the government.

Using these three assumptions, the cost to the States of compiling the biennial report summaries will be (90,000 x 0.4 x $12) = $432,000 over a two-year period. On an average, therefore, the annual cost will be $216,000 if SQGs are required to submit biennial reports.

5.2.1.4 Issuance of Permits

Under 40 CFR 270.1, a permit is required for the treatment, storage, and disposal of any hazardous waste unless there is a specific exclusion for any of these purposes listed in the statute. In the case of SQGs, all the regulatory alternatives extend the exclusion from the on-site storage permit requirements from 90 days for large quantity generators to 180 days (or 270 days if the disposal facility is more than 200 miles away). For on-site disposal, however, there is no difference in the permitting requirements between LQGs and SQGs in any of the regulatory alternatives. To estimate the costs of permitting to the Agency, the following assumptions are necessary:

- A negligible number of SQGs will store waste on-site for more than 180/270 days because of the high storage cost beyond this period; and
- A negligible number of SQGs will dispose of wastes on-site because the costs of doing so generally will be higher than off-site disposal.

On the basis of these two assumptions, EPA is unlikely to receive a significant number of permit applications for storage or on-site disposal. The costs of permitting to the Agency, therefore, will be negligible.

5.2.1.5 Oversight of State Programs

It seems reasonable to assume that the review of State authorized RCRA programs including the new SQG regulations will take place in the Agency's periodic review of State programs. There is, however, likely to be one person full time in each EPA region to oversee and guide the States in the implementation of the new regulations. If a workyear is taken to be 260 days (i.e., 2,080 hours), then at a fully burdened per hour cost of $20/hour, the incremental cost for this person per region will be (2,080 x $20) = $41,600. The total cost for the ten EPA regions will, therefore, be $416,000.

5.2.2 Technical Assistance and Public Education Program Costs

These costs are likely to be significant because the Agency is planning an intensive public outreach program to facilitate voluntary compliance by the regulated community. The RCRA Small Quantity Generator Consultation Program currently in operation in Georgia is likely to be extended to other states, especially to those states with a large number of SQGs. The current level of funding in Georgia is $200,000 annually. A similar level of funding is

possible in other states to which the program is extended. Other public education programs in collaboration with trade associations, municipalities, POTW, OSHA, USDA's extension service and other government programs are also envisioned.

The resources to be devoted to the programs outlined above are likely to be in the $8 to $10 million range. This is a rough estimate, likely to be firmed up by the Agency.

5.2.3 Compliance Monitoring and Enforcement Costs

5.2.3.1 Compliance Monitoring (Inspection) Costs

The States plan to inspect from 7 to 10 percent of the SQGs annually, i.e., there are likely to be between 6,300 to 9,000 inspections nationwide annually, according to Agency estimates. Each inspection is likely to take 8 person-hours. At a cost of $20 per person-hour, an inspection will cost $160. The total cost of inspections, therefore, will range from $1.01 million to $1.44 million annually.

5.2.3.2 Enforcement Costs

The Agency does not at present plan to use any enforcement action other than a warning letter to those SQGs found to be in violation of the regulations. It is expected by the Agency that 20 percent of the inspections will need followup action in the form of a warning letter. Each warning letter is expected to take about 40 hours to prepare. These hours include the time for a review of the violations, drafting of the letter, legal review and filing. Assuming 25 percent of the 40 hours are clerical and the rest supervisory, the cost of a warning letter will be [(30 hours x $20) + (10 hours x $12)] = $720. The total number of such letters is likely to be between 1,260 (20 percent of 6,300) and 1,800 (20 percent of 9,000). The total enforcement cost, therefore, will be between $0.91 million and $1.30 million.

Each of the cost elements stated above will not be incurred for every regulatory alternative under consideration. The next section relates the costs discussed above to the various regulatory alternatives.

5.3. COSTS FOR EACH REGULATORY ALTERNATIVE

As discussed in Chapter 1, EPA has identified several options for regulating SQGs. Agency costs for each of these regulatory alternatives are outlined in Exhibit 5-1.

EPA costs for Alternatives 1, 2, 5 and 6 are identical. EPA costs for Alternatives 3 and 4 differ from the others because of the costs of the biennial reporting requirement. The major component of the costs for each alternative are the technical assistance and public education program costs of $8 million to $10 million, followed by the compliance monitoring and enforcement costs of $1.92 million to $2.74 million. Exhibit 5-1 indicates that EPA's costs for the regulation do not differ very significantly between alternatives.

EXHIBIT 5-1

GOVERNMENT COSTS IN THE FIRST YEAR OF THE SQG REGULATIONS (1986)[a/]
(Millions of Dollars)

Costs	Regulatory Alternative 1 Option G2-F2	2 Option G2-F1	3 Option G1-F1	4 Option G1-F2	5 Option G3-F1	6 Option G3-F2
1. PROGRAM ADMINISTRATION						
a. EPA Identification Number	0.9	0.9	0.9	0.9	0.9	0.9
b. Review of Exception Reports	Negligible[b/]	Negligible	Negligible	Negligible	Negligible	Negligible
c. Review of Biennial Reports	0	0	0.22[c/]	0.22	0	0
d. Storage and On-Site Treatment Permits	0	0	0	0	0	0
e. Oversight of State Programs	0.42	0.42	0.42	0.42	0.42	0.42
2. TECHNICAL ASSISTANCE AND PUBLIC EDUCATION PROGRAM	8.00-10.00[d/]	8.00-10.00	8.00-10.00	8.00-10.00	8.00-10.00	8.00-10.00
3. COMPLIANCE MONITORING AND ENFORCEMENT						
a. Inspection	1.01-1.44	1.01-1.44	1.01-1.44	1.01-1.44	1.01-1.44	1.01-1.44
b. Enforcement	0.91-1.30	0.91-1.30	0.91-1.30	0.91-1.30	0.91-1.30	0.91-1.30
TOTAL (RANGE)	11.24-14.06	11.24-14.06	11.46-14.28	11.46-14.28	11.24-14.06	11.24-14.06
TOTAL (MIDPOINT OF RANGE)	12.65	12.65	12.87	12.87	12.65	12.65

NOTE: The facility options (F1 and F2) do not change the government costs.

a/ EPA identification number costs will decrease to $45,000 in the second and subsequent years of the regulations.

b/ This estimation assumes that few, if any, exception reports will be filed. However, even if out of 100,000 to 130,000 shipments annually, exception reports are filed on 5%, the cost will be around $150,000 to $200,000 (assuming that it takes 1.5 person-hours to process each report at $20/person-hour). This is small compared to the total cost.

c/ The biennial cost is $432,000. The annual cost will therefore be half this amount.

d/ These costs would continue at this level for several years and then be reduced somewhat in subsequent years.

The costs shown in Exhibit 5-1 may be somewhat overstated. These estimates include costs to the 16 states and one territory which are currently regulating SQGs at or below the 100 kg/month exclusion level,[6] and are, therefore, incurring the costs of some of the activities described above.

To estimate the degree to which costs may be overstated, activities undertaken by five of the 16 states (California, Illinois, Massachusetts, New Jersey, and Washington) were examined, based on detailed case studies of the SQG program in each state.[7] The results can be summarized as follows:

- Program Administration: While resources available for administering the program to regulate all generators were significant, the states allocated little or no resources for SQGs specifically. No identification numbers were issued to SQGs; therefore, the costs of such an activity under the federal regulation will be incremental to whatever program administration costs are being incurred currently. In most states, there is some form of reporting and recordkeeping activity. There are no large incremental costs for these activities included in Exhibit 5-1. The costs for oversight of state programs consist of 10 fulltime persons in each of the regions and, therefore, will be incurred regardless of state program characteristics.

- Technical Assistance and Public Education Program Costs: In each of the five states studied some form of outreach program exists which consists of annual seminars, conferences and a newsletter which on occasion includes some information useful to SQGs. The level of expenditure on such programs in Illinois (the only state for which information is available) is around $30,000 or 15 percent of the cost envisioned under the EPA funded outreach program. Because of the large number of states which do not regulate SQGs at all, it is not unreasonable to assume that the costs being incurred currently on outreach programs nationwide is 5 to 10 percent of the total cost for "Technical Assistance and Public Education Program" shown in Exhibit 5-1. These costs, therefore, maybe overstated by this percentage.

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[6]These are California, Illinois, Kansas, Louisiana, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Oregon, Rhode Island, South Carolina, Texas, Vermont, Washington, and Guam.

[7]"A Study of State Programs for the Regulation of Small Quantity Generators of Hazardous Waste," submitted to EPA-OSW, The Cadmus Group, Inc., July 1984.

- Inspection and Enforcement: The inspection costs presented in Exhibit 5-1 assume that 7 to 10 percent of the SQGs will be inspected annually. States currently inspect SQGs at a rate anywhere from once in ten years to once a year. Certain states, due to lack of resources, concentrate on large generators of waste. The inspection costs stated in Exhibit 5-1, therefore, may be a slight overestimate because they include the costs incurred on the inspections which take place currently. In a similar manner, the enforcement cost estimate may also be overestimated by a small amount.

In summary, the costs estimated in Exhibit 5-1 may be overestimated by perhaps 10 percent. In any case, these costs are highly dependent on the Agency's compliance monitoring and enforcement program and will change if this program is altered in any way.

6. PROJECTED ECONOMIC EFFECTS

This chapter presents the results of the analysis of potential economic impacts. Because most of EPA's focus has been on the G2-F2 regulatory alternative, this analysis also focuses mostly on that alternative. This is supplemented by qualitative analysis of other regulatory alternatives considered. This chapter also discusses the impacts of the regulations on small entities.

6.1 INTRODUCTION

Several assumptions were required to complete this analysis because of both the complexity of the issues and data limitations. The SQG regulations and impacts are a function of numerous, highly variable factors that need to be considered to provide insight on the magnitude of impacts. At the plant level, the impacts are a function of:

- waste type;
- waste volume;
- current management practices;
- disposal option;
- location of disposal option;
- proximity and volume of waste from other SQGs;
- financial viability of firms;
- industry characteristics and structure; and
- pricing factors.

Each of these factors could be studied in considerable detail. For example, the Abt SQG survey includes over 20 types of waste. These are managed by SQGs in numerous forms of disposal, treatment, recycling, reuse, or combinations. Moreover, these conditions are spread over 300 or so industries with different types and sizes of firms. In order to perform our analysis, we had to make some simplifying assumptions regarding the management of these wastes as well as for other aspects of the analysis.

Some important assumptions made to conduct this analysis are as follows:

- Monetary values are in 1984 dollars unless noted otherwise.

- All initial costs are annualized so that compliance costs can be expressed as an even flow of costs to be compared to financial flows, such as revenues and profits. Related to this is the implicit assumption that the financial flows measured and used in the analysis are accurate depictions of the economic status of the SQGs modeled.

- Annualized costs are based on a real (after adjustment for inflation) discount rate of 3 percent over a 10-year period. The resulting (capital) recovery factor is:

$$RF = \frac{(i)(1+i)^{n}}{(1+i)^{n}-1} = .117$$

- Incremental compliance costs are used to assess impacts, i.e., full compliance costs less baseline costs.

- Costs and impacts are on a pre-tax basis, hence, this analysis is fairly conservative since deductibility of these costs would make them smaller than pre-tax amounts.[1]

- Compliance costs are based on the primary type of waste generated and the total volume of waste generated by a facility, which includes the primary plus any other wastes generated.

- Other Federal and state regulations that may be enacted in the near future are not considered here. As noted in Chapter 7, future regulations may have a substantial impact on SQGs.

6.2 EFFECTS UNDER REGULATORY ALTERNATIVE 1

Regulatory Alternative 1 includes minimum generator requirements (Option G2) and delayed SQG requirements (equal to large quantity generators requirements) for on-site waste management (Option F2). This section evaluates the economic impacts of this regulatory alternative on firms, industries, and society.

6.2.1. Firm/Plant Level Effects

6.2.1.1 Firm/Plant Level Compliance Costs and Management Options

The unit compliance costs developed for this analysis cover many technical options. However, for purposes of analyzing the impact of compliance costs on plants and firms, it was not initially necessary to assign specific baseline and compliance management options for each of the model plants developed in the study and to comprehensively apply the associated unit

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[1]Chapter 7 discusses the implications of using pre-tax costs versus post-tax costs.

costs. Therefore, the baseline assumed was off-site disposal in a sanitary landfill. The post-regulation compliance management option assumed was a Subtitle C secured landfill. This results in, generally, a "maximum cost" scenario because much of the waste currently is either recycled, disposed at Subtitle C facilities, or disposed in sewers (POTW). These practices will not require major changes in waste management, so compliance costs will actually be much lower than those associated with shifting from a sanitary landfill to a secured landfill. Chapter 4 provides more detailed cost comparisons for different baseline and compliance management practices.

The model plant "maximum" impacts will likely be experienced by some but not all regulated SQGs in the particular sector represented. However, if the firms can meet the maximum compliance requirement and still remain viable, then we can be confident that few closures will occur and that firm-level impacts will not be significant.

6.2.1.2 Compliance Costs Relative to Sales and Profitability

A first screening of model plants was conducted to identify plants in the affected industries that may potentially experience significant impacts under the SQG regulations. The models for this subset of plants so identified were then subjected to a second screening to further investigate the financial effects of the regulation. A third screen was also available to be applied to some models if the initial screens indicated (1) compliance costs as a percent of sales equal to or greater than 1.0, and (2) compliance costs as a percent of profits equal to or greater than 25.0.

The results of the second screening are shown in Appendix D. Results for over 280 model plants indicate that most experience insignificant impacts. Over 80 percent of all the models show that incremental costs are a relatively small proportion of profits, less than 10 percent. A few of the models, mostly in the service industries, show incremental costs as a proportion of profits to be in excess of 10 percent. This reflects primarily the relatively low profitability of these models under baseline conditions (a recessionary period for many of the service industries). If data on profits for more recent years were used, the impacts would very likely be less. Moreover, some service institutions are low or nonprofit operations by design, such as private or public golf clubs, hospitals, and other public institutions.

Some of this information on the magnitude of impacts is summarized in Exhibit 6-1, which shows compliance costs as a percentage of sales and profits. Twenty-seven, or 54 percent, of the 50 models showing the greatest effects are in the service industries (SICs 7000-8000). In contrast, for all the 289 models developed, only 67 models or 23 percent, represent establishments in the service industries. Seventeen (34 percent) of the 50 models were in the manufacturing industries, compared with a total of 201 models (70 percent) developed to represent this sector among all 289 models analyzed. Three models were developed to represent the wholesale trade industries. None of these were included among the most affected industries. Finally, six models were developed for the agricultural service industries. Half of these are included in Exhibit 6-1.

EXHIBIT 6-1

SQG MODEL PLANT OPERATIONAL AND FINANCIAL CHARACTERISTICS AND COMPLIANCE COSTS

(50 MODELS MOST AFFECTED)

SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	EMPLOYEE 1/ SIZE CATEGORY	ANNUAL 2/ WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	----($1000)----		($)	-------(PERCENT)-------	
7217	CARPET AND UPHOLSTERY CLEANING	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	SMALL	9,400	104.0	10.0	4,700	4.5	47.0
7349	BUILDING MAINTENANCE SERVICES, N.E.C.	OTHER SERVICES	WASTES WITH AMMONIA	SMALL	3,000	87.8	11.6	3,046	3.5	26.3
3471	PLATING AND POLISHING	METAL MANUFACTURING	SPENT PLATING WASTES	SMALL	6,200	191.0	17.0	5,275	2.8	31.0
782	LAWN AND GARDEN SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	3,300	151.9	11.0	3,206	2.1	29.1
7395	PHOTOFINISHING LABORATORIES	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	SMALL	4,700	194.4	12.7	3,942	2.0	31.0
7216	DRY CLEANING PLANTS, EXCEPT RUG	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	SMALL	2,200	114.0	13.0	2,229	2.0	17.1
7622	RADIO AND TELEVISION REPAIR	EQUIPMENT REPAIR	IGNITABLE WASTES	SMALL	1,600	105.8	11.7	2,002	1.9	17.1
7333	COMMCERCIAL PHOTOGRAPHY AND ART	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	SMALL	2,800	162.0	15.0	2,938	1.8	19.6
2751	COMMERCIAL PRINTING, LETTERPRESS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	SMALL	2,500	162.4	12.4	2,777	1.7	22.4
7992	PUBLIC GOLF COURSES	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	3,000	191.4	13.1	3,046	1.6	23.2
7342	DISINFECTING AND EXTERMINATING SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	1,000	133.6	11.5	2,056	1.5	17.9
7997	MEMBERSHIP SPORTS AND RECREATION CLUBS	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	1,500	155.2	5.6	2,226	1.4	39.8
2752	COMMERCIAL PRINTING, LITHOGRAPHIC	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	SMALL	1,000	170.1	11.8	2,056	1.2	17.4
7397	COMMERCIAL TESTING LABORATORIES	ANALYTIC & CLINICAL LABS	STRONG ACID OR ALKALINE WASTES	SMALL	2,700	182.8	11.8	2,137	1.2	18.1
4832	RADIO BROADCASTING	EQUIPMENT REPAIR	IGNITABLE WASTES	MEDIUM	9,100	398.0	22.0	4,601	1.2	20.9
7332	BLUEPRINTING AND PHOTOCOPYING	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	SMALL	850	183.0	12.0	2,056	1.1	17.1
1721	PAINTING, PAPER HANGING, AND DECORATING	CONSTRUCTION	IGNITABLE PAINT WASTES	SMALL	500	185.4	18.3	1,926	1.0	10.5
7261	FUNERAL SERVICE AND CREMATORIES	OTHER SERVICES	WASTE FORMALDEHYDE	SMALL	2,300	232.0	20.0	2,388	1.0	11.9
2434	WOOD KITCHEN CABINETS	FURNITURE/WOOD MANUF & REF	IGNITABLE WASTES	SMALL	900	183.9	13.2	1,846	1.0	14.0
1741	MASONRY AND OTHER STONEWORK	CONSTRUCTION	STRONG ACID OR ALKALINE WASTES	SMALL	1,000	163.7	16.2	1,623	1.0	10.0
3471	PLATING AND POLISHING	METAL MANUFACTURING	SPENT PLATING WASTES	MEDIUM	9,600	738.0	36.7	7,324	1.0	20.0
2795	LITHOGRAPHIC PLATEMAKING SERVICES	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	12,000	851.6	54.8	7,652	0.9	14.0
7997	MEMBERSHIP SPORTS AND RECREATION CLUBS	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	6,000	514.0	14.1	4,614	0.9	32.7
2893	PRINTING INK	FORMULATORS	SPENT SOLVENTS	SMALL	2,500	224.0	13.0	1,884	0.8	14.5
3599	MACHINERY, EXCEPT ELECTRICAL, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	1,400	193.6	18.2	1,590	0.8	8.7
3479	METAL COATING AND ALLIED SERVICES	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	500	202.0	15.7	1,533	0.8	9.8
7539	AUTOMOTIVE REPAIR SHOPS, N.E.C.	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	202.2	14.3	1,533	0.8	10.7
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	500	181.7	9.1	1,533	0.8	16.9
7531	TOP AND BODY REPAIR SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	201.7	11.9	1,533	0.8	12.9
3961	COSTUME JEWELRY	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	2,300	229.7	14.6	1,832	0.8	12.5
7218	INDUSTRIAL LAUNDERERS	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	MEDIUM	12,000	711.0	22.0	5,552	0.8	25.2
7535	PAINT SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	216.0	11.4	1,533	0.7	13.5
3911	JEWELRY, PRECIOUS METAL	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	SMALL	1,500	259.9	15.8	1,731	0.7	11.0
782	LAWN AND GARDEN SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	4,800	624.3	28.1	3,994	0.6	14.2
711	SOIL PREPARATION SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	1,800	379.9	21.0	2,394	0.6	11.4
7216	DRY CLEANING PLANTS, EXCEPT RUG	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	MEDIUM	2,200	364.0	21.0	2,229	0.6	10.6
7395	PHOTOFINISHING LABORATORIES	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	MEDIUM	4,700	648.0	37.2	3,942	0.6	10.6
7261	FUNERAL SERVICE AND CREMATORIES	OTHER SERVICES	WASTE FORMALDEHYDE	MEDIUM	6,700	690.0	41.0	4,104	0.6	10.0
7342	DISINFECTING AND EXTERMINATING SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	2,500	467.9	20.9	2,777	0.6	13.3
7332	BLUEPRINTING AND PHOTOCOPYING	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	MEDIUM	3,400	613.0	46.0	3,259	0.5	7.1
2741	MISCELLANEOUS PUBLISHING	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	4,300	711.2	36.3	3,733	0.5	10.3
2791	TYPESETTING	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	1,800	474.2	21.7	2,394	0.5	11.0
7534	TIRE RETREADING AND REPAIR SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	310.8	14.4	1,533	0.5	10.6
3964	NEEDLES, PINS, AND FASTENERS	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	2,300	375.3	20.8	1,832	0.5	8.8
7333	COMMCERCIAL PHOTOGRAPHY AND ART	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	MEDIUM	3,400	673.0	35.0	3,259	0.5	9.3
8222	JUNIOR COLLEGES	ANALYTIC & CLINICAL LABS	OTHER REACTIVE WASTES	MEDIUM	3,400	602.8	52.2	2,834	0.5	5.4
2789	BOOKBINDING AND RELATED WORK	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	2,000	554.0	29.3	2,504	0.5	8.5
7397	COMMERCIAL TESTING LABORATORIES	ANALYTIC & CLINICAL LABS	STRONG ACID OR ALKALINE WASTES	MEDIUM	4,300	605.2	38.5	2,649	0.4	6.9
7535	PAINT SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	MEDIUM	2,500	432.0	16.2	1,884	0.4	11.6
2435	HARDWOOD VENEER AND PLYWOOD	FURNITURE/WOOD MANUF & REF	SPENT SOLVENTS	MEDIUM	9,000	945.9	51.8	3,398	0.4	6.6

1/ SIZE CATEGORIES: SMALL-1 TO 9 EMPLOYEES; MEDIUM-10 TO 49 EMPLOYEES.

2/ TOTAL WASTE FROM ALL WASTE STREAMS.

For these most impacted plants, ten models are in the manufacturing industry group, six models each are in the photography and printing/ceramics group, and five models each are in the vehicle maintenance and pesticide application services group. The most predominant waste generated by the 50 models is spent solvents, with 12 of the models generating this waste type. Seven models each generate pesticide washing solutions and photographic wastes.

Thirty-seven of the 50 models, or 74 percent, have revenues of less than $500,000. In the remaining 239 model plants developed, only one had revenues of less than $500,000. About half of the 50 models have revenues of less than $200,000 annually. Only 13 show sales in excess of $500,000. In comparison, about 90 percent of all of the models developed have revenues exceeding $500,000. Of the 50 models showing the greatest effects, 43, or 86 percent, have returns on sales between 5 and 10 percent. Four models have returns on sales less than 5 percent. However, when comparing compliance costs with revenues, over half of the models show these costs as a percent of sales to be less than one percent.

Thirty-three of the 50 models fall in the smallest size category with less than 10 employees. Seventeen are in the medium category while none fall in the large category. In terms of waste stream amounts, 31 models, or 62 percent of the 50 models, have streams of less than 3,000 kg/yr. Thirteen models have annual waste streams falling between 3,000 and 6,000 kg and 6 models have streams exceeding 6,000 kg/yr.

In terms of compliance costs, 32 of the 50 models show costs of less than $3,000 and ten models incur costs between $3,000 and $4,000. Eight models have costs greater than $4,000. Costs per metric ton ranged from $.34/MT for a generator with 12,000 kg of spent solvents to $3.85 MT for a generator with 500 kg of ignitable paint wastes.

6.2.1.3 Firm/Plant Closure Possibilities

In general the profits and sales comparisons suggest few closures are likely. Only six models met the tests for further analysis of possible closure. All of these are small models (listed in Exhibit 6-2) and have compliance costs as a percent of sales greater than 1 percent and costs as a percent of profits greater than 25 percent.

The greatest potential for closure due to compliance costs is shown for the Carpet and Upholstery Cleaning (SIC 7217) model with the costs as a percent of sales exceeding 4 percent. Costs as a percent of profits for this industry amounted to almost 50 percent. Four of the models including the Carpet Cleaning model, fall in the service industries group. The Building Maintenance Service (SIC 7349) model shows the next greatest potential impact, with compliance costs as a percent of sales at 3.5 percent. For this model, compliance costs as a percent of profits exceed 25 percent. Other models in the service industries group were Photofinishing Laboratories (SIC 7395) and Membership Sports and Recreation (SIC 7997). Compliance costs as a percentage of sales for both of these models exceed 1.5 percent. Costs as a percent of profits exceed 30 percent as well. The Plating and Polishing (SIC 3471) model

EXHIBIT 6-2

SQG MODELS WITH GREATEST POTENTIAL IMPACTS

SIC Code	Industry	Compliance Costs[1/] Size Category	Percent of Sales	Percent of Profits	NPV[2/] ($1,000)
7217	Carpet and upholstery cleaning	Small	4.5	47.0	18.4
7349	Building maintenance service	Small	3.5	26.3	45.8
7395	Photofinishing laboratories	Small	2.0	31.0	40.0
7997	Membership sports and recreation	Small	1.4	39.8	11.4
3471	Plating and polishing	Small	2.8	31.0	66.9
782	Lawn and garden services	Small	2.1	29.1	37.6

1/ Second screening analysis.

2/ Third screening analysis.

shows compliance costs as a percent of sales of almost 3 percent, and costs as a percent of profits exceeding 3 percent. The Lawn and Garden Services (SIC 782) model in the agricultural service industry group, shows potential impacts slightly higher than Plating and Polishing, with costs as a percent of sales at about 2 percent.

For each of these model plants, a third and more detailed screening was conducted to determine if plant closures appear probable. This screen used discounted net present value (NPV) analysis of cash flows to determine if closure is likely. The NPV including compliance costs, of all models were greater than zero, indicating that closures are unlikely because of the SQG regulations.

6.2.2 Industry Compliance Costs

Impacts of the compliance costs on the major industry groups are relatively insignificant. The costs of compliance as a percent of industry revenues are not expected to exceed 0.2 percent for any individual industry.

Exhibit 6-3 shows, for each of the major industry groups, the types and amounts of wastes generated, the costs expressed as annual revenue requirements, the major SIC industries in the group along with the associated revenues, and the impacts expressed as incremental costs as percentage of total revenues. In metal manufacturing, 34,600 MT of spent solvents are generated. The costs of disposing of this waste amounts to almost $7 million. Other wastes generated in this group are acids/alkalis (12,000 MT) and spent plating wastes (4,500 MT). The total amount of waste is about 60,000 MT. The total cost to be incurred by this industry group is $10 million. The SIC industries included in metal manufacturing are classified in the 2-digit groups from SIC 34 to SIC 39. Incremental compliance cost as a percent of total revenue of these 2-digit SIC industry groups is .001 percent (the total revenues exceed $800 million).

The vehicle maintenance industry generates close to 50,000 MT of waste, primarily spent solvents (35,200 MT). Over 12,000 MT of acids and alkalis are generated in this group. Total compliance costs for managing the wastes generated by this industry group are about $9 million. This amounts to less than .1 percent of the total revenues generated by the 3-digit SIC industry group of automotive repair shops.

The photography and printing groups generate 16,100 MT and 13,200 MT of wastes respectively. In each group, photographic waste is the largest amount of waste generated. Compliance costs for each of the groups are about $2 million. The remaining groups shown on Exhibit 6-3 each generate less than 10,000 MT annually. The total compliance cost in each of these groups is less than $4 million (revenues for SICs 711, 721, 782 are not available). These costs are relatively insignificant when compared to the revenues of the applicable SIC industry groups. The compliance costs in the groups are less than .05 percent of revenues.

EXHIBIT 6-3

INDUSTRY LEVEL INCREMENTAL COMPLIANCE COSTS AND ECONOMIC IMPACTS

INDUSTRY GROUP - MAJOR 1/	Waste		Incremental Compliance Costs		Industry Profile			Impact
	Type	Quantity 2/	ARR/MT 3/	Total ARR 4/	SIC	Selected Industries 5/	Revenues 6/	Incremental Compliance as % of Total Revenues
		(1000 MT)	($)	($1000)		Industry (Industry Group)	(million dollars)	($)
1. Metal Manufacturing	Spent solvents	34.6	194	6,712	34	Fabricated metal products	144,038	
	Acids and alkalis	12.0	116	1,392	35	Machinery, except electrical	195,500	
	Spent plating wastes	4.5	190	885	36	Electric and electronic equipment	141,493	
	Others	7.0	206	1,442	37	Transportation equipment	267,126	
	Subtotal	58.1	179	10,431	38	Instruments and related products	46,236	
					39	Miscellaneous manufacturing industry	30,641	
						Total	825,034	.001
2. Vehicle Maintenance	Spent solvents	35.2	194	6,829	753	Automotive repair shops	20,432	.04
	Acids/alkalis	12.5	116	1,450				
	Ignitable wastes	1.0	410	410				
	Others	0.2	206	41				
	Subtotal	48.2	181	8,730				
3. Photography	Photographic	7.9	62	490	733	Mailing, reproductive, stenographic	5,341	
	Wastes containing silver	7.7	106	816	7395	Photo finishing laboratories	2,989	
	Spent solvents	0.3	194	58		Total	8,330	.02
	Others	0.2	206	41				
	Subtotal	16.1	87	1,405				
4. Printing	Photographic	6.1	62	378	27	Printing and publishing	79,546	.002
	Spent solvents	3.6	194	698				
	Acids/alkalis	0.8	116	93				
	Spent plating	0.7	190	133				
	Ignitable wastes	0.3	410	123				
	Others	1.7	206	350				
	Subtotal	13.2	134	1,775				
5. Laundries	Dry cleaning filtration residues	8.3	443	3,677	721	Laundry, cleaning and garment services	10,926	.03
	Subtotal	8.3	443	3,677				
6. Other services	Formaldehyde	5.4	116	626	7261	Funeral services and crematories	4,512	.02
	Ignitable wastes	0.7	410	287				
	Wastes containing ammonia	0.3	206	62				
	Others	0.5	206	103				
	Subtotal	6.5	167	1,078				

EXHIBIT 6-3 (continued)

INDUSTRY LEVEL INCREMENTAL COMPLIANCE COSTS AND ECONOMIC IMPACTS

INDUSTRY GROUP - MAJOR 1/	Waste		Incremental Compliance Costs		Industry Profile			Impact
	Type	Quantity 2/	ARR/MT 3/	Total ARR 4/	SIC	Selected Industries 5/	Revenues 6/	Incremental Compliance as % of Total Revenues
		(1000 MT)	($)	($1000)		Industry (Industry Group)	(million dollars)	($)
7. Pesticide applicators	Pesticide solutions	3.8	199	756	711	Soil preparation services	N/A	
	Pesticide containers	2.0	206	412	721	Crop planting and protection	N/A	
	Waste pesticides	0.6	206	124	782	Lawn and garden services	N/A	N/A
	Others	0.1	206	21				
	Subtotal	6.5	202	1,313				
8. Laboratories	Spent solvents	2.7	194	524	7391	Research and development labs	3,233	
	Ignitable waste	1.6	410	656	7397	Commercial testing laboratories	1,095	
	Acids/alkalis	0.7	116	81	8062	General medical & surgical hospitals	N/A	
	Other	0.9	206	185		Total	4,328	.03
	Subtotal	5.9	245	1,446				
9. Other manufacturing	Spent solvents	3.2	194	621	3079	Miscellaneous plastic products	37,813	
	Ignitable waste	1.1	410	451	31	Leather and leather products	12,172	
	Heavy metal waste	0.4	206	82	3291	Abrasive products	3,122	
	Arsenic waste	0.1	206	21	3293	Gaskets, packing & sealing devices	2,022	
	Others	0.1	206	21		Total	55,129	.002
	Subtotal	4.9	244	1,196				
10. Furniture manufacturing and refinish	Ignitable paint waste	1.3	542	705	243	Millwork, plywood & structural members	18,211	
	Spent solvents	0.9	194	175	251	Household furniture	16,627	
	Ignitable waste	0.6	410	246	2521	Wood office furniture	979	
	Others	0.3	206	62	2541	Wood partitions and fixtures	1,769	
	Subtotal	3.1	383	1,188		Total	37,586	.003

1/ Exhibit 3-3, Draft Regulatory Analysis for Proposed Regulations under RCRA for Small Quantity Generators of Hazardous Wastes, Industrial Economics, Inc., Cambridge, Massachusetts, April 1985.

2/ Exhibit 3-2, Draft Regulatory Analysis for Proposed Regulations under RCRA for Small Quantity Generators of Hazardous Wastes, Industrial Economics, Inc., Cambridge, Massachusetts, April 1985.

3/ From Section 4.4, Average unit compliance costs for individual waste stream or overall average for all waste streams.

4/ Calculated as product of quantity and "ARR/MT."

5/ Applicable 2, 3, and 4-digit SIC industries within major industry groups as defined by Abt Associates for Survey of SQGs.

6/ Revenues (value of shipments) from the 1977 Census inflated to 1984 dollars.

With the very low aggregate compliance costs and few anticipated closures, industry effects on production, employment, profitability and prices are likely to be insignificant. Individual SQGs, especially small-sized, large-volume generators, may experience significant impacts, but these will be limited in number. Moreover, SQGs account for less than half of any given industry's output, often less than even 5 percent.

6.2.3 Effects on Society

The effects of SQG regulations on society mainly consist of the additional costs that will be borne by SQGs, their consumers, and the taxpayers, through increased government costs. Thus, to the extent that costs of compliance are eventually "passed-through" to consumers in the form of higher prices for the products produced by SQGs, then consumers will bear the costs outlined in Chapter 4 and in this Chapter. On the other hand, if these costs cannot easily be passed-through to consumers, then the owners of SQG establishments or the owners of factors of production used in these firms will bear these costs.

In either event, society as a whole bears these costs, regardless of the identities of the particular parties that ultimately bear them. This applies with equal force to the tax deductibility of compliance costs. If SQGs can deduct the costs imposed by the regulations, then the government also bears some of the costs in the form of reduced tax revenues. Thus, it is the sum of the post-tax costs of compliance and the implied reduction in tax revenues received by the government that measures the total costs to society. Chapter 4 calculated total costs of the SQG regulations on a pre-tax basis as about $58 million per year. Hence, this plus the approximately $12 million per year in government costs is the total burden of the regulations on society.

6.3 EFFECTS UNDER OTHER REGULATORY ALTERNATIVES

The economic effects of other regulatory alternatives are addressed here qualitatively in terms of how they differ from Regulatory Alternative 1 (Options G2-F2). The other regulatory alternatives are:

Regulatory Alternative 2 (Options G2-F1)
Regulatory Alternative 3 (Options G1-F1)
Regulatory Alternative 4 (Options G1-F2)
Regulatory Alternative 5 (Options G3-F1)
Regulatory Alternative 6 (Options G3-G2)

The effects discussed are primarily firm-level impacts effects because industry level impacts will be insignificant (in light of the analysis of section 6.2) under all regulatory alternatives.

6.3.1. Effects Under Regulatory Alternative 2

Effects under this regulatory alternative will be essentially the same as for Regulatory Alternative 1. The only difference between the two

alternatives is that the on-site management options under F1 will become effective six months earlier than under F2. This would result in short-term adjustments and timing of impacts slightly different from alternative 1, but not significantly different in magnitude. The compliance costs for individual generators will not be altered much, particularly because on-site management is not common among small quantity generators.

6.3.2 Effects Under Regulatory Alternative 3

The effects of this regulatory alternative will be significantly greater for SQGs in comparison to Regulatory Alternative 1. This is primarily attributed to the costs associated with full recordkeeping, full manifesting and biennial reports associated with generator option G1 of this alternative. Incremental compliance costs for generators will be in the range of 5 to 25 percent higher than for comparable G2 option costs. Moreover, the highest difference is associated with the smallest generators. Regressivity will increase costs disproportionately for the smallest generators who already would experience proportionately higher unit compliance costs under Regulatory Alternative 1.

6.3.3 Effects Under Regulatory Alternative 4

Economic effects under this alternative will be essentially the same as under Regulatory Alternative 3. The only difference between the two alternatives is the six month delay in meeting on-site management requirements under Alternative 4. This delay is not expected to significantly alter long-term impacts.

6.3.4 Effects Under Regulatory Alternative 5

The economic impacts associated with this alternative will be greater than Regulatory Alternative 1, but less than Regulatory Alternatives 3 or 4. A preliminary analysis of incremental compliance costs showed that plant- or firm-level compliance costs under this alternative would be about 3 to 12 percent more than for compliance under Regulatory Alternative 1. Again, these are mainly additional recordkeeping costs because the biennial report is not required.

6.3.5 Effects Under Regulatory Alternative 6

This alternative differs from Regulatory Alternative 5 only by delaying on-site management requirements by six months. As in previous cases, this difference should not change the economic impacts significantly.

6.4 EFFECTS ON SMALL ENTITIES

The Regulatory Flexibility Act requires agencies to prepare initial and final regulatory flexibility analyses for any rule that will cause a significant impact on a substantial number of small entities. The key steps in preparing these analyses are as follows:

- Identify the universe of "small entities" affected by the rule;
- Determine if a "substantial number" of small entities will be affected by the rule; and
- Evaluate if the rule will have "significant" impacts on these "small entities".

The Small Quantity Generator regulations primarily affect small firms. Therefore, the concerns of the Regulatory Flexibility Act for the effects of the regulations on small businesses are addressed to a large extent by the overall economic analysis performed on the regulations.

Three commonly accepted tests to measure whether or not small businesses would be severely impacted are:

(1) Annual compliance costs will increase the relevant production costs for small entities by more than five percent.

(2) Capital costs of compliance will represent a significant portion of the capital available to small entities, taking into account internal cash flow plus external financing capabilities; or

(3) The costs of the regulation will likely result in closure of small entities.

The significance of SQG compliance costs on small businesses can be analyzed using the results described in section 6.2 for the different types and sizes of model plants modeled. In general, the analysis in section 6.2 suggests that the SQG regulations will not cause significant impacts on small firms. None of the model plants established for this analysis show cost increases of more than five percent of sales as a direct result of compliance costs. The favored regulatory alternative requires no significant capital outlays and thus should not affect capital requirements or availability. Finally, even the most severely impacted model plants would not close under the assumptions of this exercise and would continue to operate at a profit.

In summary, it appears that the impact on small firms will not cause a significant number of hardships. There will be cases where compliance costs for some individual firms may be severe, i.e., on-site management or transportation greater than 200 miles. These are likely to be isolated cases.

7. SUMMARY AND LIMITATIONS OF THE ANALYSIS

7.1 SUMMARY OF THE RESULTS

Chapters 4, 5, and 6 report the results of our analysis of the incremental costs of compliance of the regulations proposed for SQGs. It is useful to summarize those results, to discuss their sensitivity to changes in important input data, and to highlight some limitations of the analysis and results. This section summarizes the results and the following two sections discuss sensitivity of the results and limitations of the analysis.

Analytically, the analysis of the costs of the regulation was divided into (1) incremental costs to society as a whole, (2) costs to government, and (3) economic impacts on firms and industries. Our results for each of these categories are summarized below.

7.1.1 Incremental Costs to Society

Analytically, our method for estimating the incremental compliance costs of the regulation was to calculate the costs associated with managing hazardous wastes after the regulation and to subtract from these the costs of managing these wastes prior to the regulation. On a per metric ton basis, the average incremental compliance cost over all wastes is about $206. Because of differences in baseline practices and, hence, the cost of compliance, the incremental costs vary substantially across different wastes. In fact, the baseline method of waste management by SQGs is adequate to comply with the regulations in many cases. Others will have to change waste management practices in order to comply. After allocating these incremental compliance costs to the universe of SQGs according to the types of wastes they generate and their baseline waste management practices, our estimate of the total incremental cost of the G2-F2 regulatory alternative is about $58 million. Much of this total is focused on a few types of wastes (spent solvents, dry cleaning residues, acids and alkalies, and ignitable waste) that constitute a large proportion of the wastes generated by SQGs.

This $58 million estimate is a cost to society because it is based on pre-tax costs of compliance. Hence, if the approximately $12 million annual government costs are added to the $58 million compliance costs, total social costs of the regulation are approximately $70 million per year.

7.1.2 Costs to the Government

Our analysis of the government costs of the regulations focused on estimating costs for program administration, technical assistance and public education programs, and compliance monitoring and enforcement. Under the G2-F2 regulatory alternative, we estimate that program administration costs will be about $1 million, technical assistance and public education program costs will be between $8 and $10 million, and compliance monitoring and enforcement costs will be $2 to $2.5 million. In total, our estimates of the government costs due to the regulation range from about $11 to $14 million for the first year that the regulations are in place. Our best estimate of these costs is about $12 million.

7.1.3 Economic Impacts

Our method for analyzing the economic impacts of the regulations on SQG firms and on industries with many potentially affected parties was to evaluate the magnitude of the incremental costs imposed by the regulations relative to sales, profits, and other financial flows of the potentially affected firms. By constructing numerous model plants and then assessing the potential economic impacts of the regulations on the viability of these enterprises, our conclusion is that the regulations will not cause significant industry impacts and that few, if any, firms will suffer substantial hardship by complying. In almost all cases, the model plants analysis indicates that the ratios of incremental compliance costs to sales and profits do not exceed levels that would indicate serious financial hardships, and that the discounted cash flows of the SQGs most affected are still positive after including the compliance costs associated with the SQG regulations.

7.2 SENSITIVITY OF THE RESULTS

The analysis of the total compliance costs and the economic impacts of SQG regulations requires a large amount of information. Some of the data that substantially affect the results are the types and volumes of waste generated; current waste management practices; compliance options; financial size of business; profitability of business; proximity to other SQGs, transporters,and disposal sites; reuse and recycling practices; and specific SQG regulatory alternatives. Many of these have been discussed individually or jointly in previous chapters of this report.

There are other factors that also can substantially affect the compliance costs and the estimated impacts. These include tax considerations, discount rates used for annualizing costs, and other proposed EPA regulations.

7.2.1 Alternative Waste Generation Rates of SQGs

The compliance cost estimates presented in Chapter 4 assumed that SQGs generate 6,000 kg/yr. For purposes of estimating social costs of compliance, using this median generation rate is reasonable, but some sensitivity analysis is still appropriate.

Two alternative SQG waste generation rates were also modeled, 1,200 kg/yr and 12,000 kg/yr, based on the detailed compliance cost information presented in Exhibits 4-5 through 4-15. Using these extreme values for quantities of wastes generated results in a substantial change in the total compliance costs ($220 million for the 1,200 kg/yr rate and $37 million for the 12,000 kg/yr rate). However, these are truly extreme cases. The Abt data suggest that the mean generation rate is between 3,600 kg/yr and 6,000 kg/yr.

Although only the 1,200, 6,000, and 12,000 kg/yr rates are explicitly modeled here, it is possible to interpolate (nonlinearly) to obtain rough estimates of the total compliance costs for generation rates of 3,600 and 4,800 kg/yr (the midpoint between 3;600 and 6,000 kg/yr). The implied estimates of total compliance costs range from $85 million for the 3,600 kg/yr

generation rate, $68 million for the 4,800 kg/yr rate, and, as presented earlier, $58 million for the 6,000 kg/yr rate. Thus, regardless of the specific average waste generation rate for SQGs selected within the range provided by the Abt data, the costs never exceed $100 million per year. Hence, the total compliance cost estimate computed using the 6,000 kg/yr generation rate is fairly robust.

7.2.2 Impact of Multiple Waste Streams on Baseline and Compliance Costs

The analysis of the baseline and total compliance costs of SQG regulations was based on the simplifying assumption that each SQG generates only one waste stream. Further analysis of the top ten waste streams generated by SQG facilities, however, indicates that many industries are likely to generate more than one waste. For instance, users or formulators of pesticides who report generating pesticide washing and rinsing solutions are also likely to produce waste pesticides and empty pesticide containers as part of their facility's operations.

An estimate of the number and type of waste streams generated by SQG facilities was developed to determine whether or not baseline or compliance costs would be impacted by more than one waste stream. SQG facilities are likely to generate two or three waste streams, although in some industries, as many as five different waste streams may be generated. For example, a small metal fabricating shop will probably generate three to five of the following wastes: ignitable paint wastes, spent solvents, paint wastes with heavy metals, and spent plating and cyanide wastes if metal finishing operations are also conducted. Industries in which it is likely that only one waste stream is generated are funeral services (wastes containing formaldehyde) and dry cleaning establishments (filtration residues). These two industries, respectively, account for the majority of the waste formaldehyde and dry cleaning wastes generated each year by small quantity generators.

The anticipated impact on the estimated baseline and compliance costs of managing multiple waste streams at an SQG facility is believed to be negligible. In considering impacts to baseline management costs, facilities with more than one waste stream are not very likely to treat their wastes on site, particularly if it necessitates more than one treatment system to be installed. In these instances, POTW disposal and off-site management are the most likely compliance practices, with a limited percentage of facilities operating their own treatment systems only for wastes that can be treated in one system. Costs for commercial treatment or disposal should also remain relatively unchanged from previous estimates on the basis that many of the wastes are either combined in the same container (i.e., the wastes are compatible) or have very similar treatment or disposal prices. Prices for commercial transportation are based on quantity shipped and therefore should not be affected.

Baseline and incremental compliance costs for container storage also remain unchanged from previous estimates because the existing assumption allows for a sufficient number of containers and space to segregate ignitable, reactive, and incompatible wastes generated by an SQG with multiple waste

streams. In cases where incompatible or reactive wastes are generated and waste segregation with separate containers is necessary (e.g., spent plating wastes and cyanide wastes at a metal finishing operation) the existing cost estimates remain valid.

7.2.3 Tax Considerations

Tax deductibility of costs is, in effect, a subsidy from government (society) through reduced tax obligations. One implication of tax deductibility is that the net cost actually faced by the regulated firm is less than the pre-tax cost used in the analysis of this report for assessing the economic impacts of SQG regulations. For the cost to society, it is the pre-tax cost that is relevant. For economic impacts on firms and industries, the post-tax costs is the appropriate measure of costs faced by regulated parties. Thus, using the pre-tax costs of the regulation in the economic impacts analysis is conservative in the sense that the net of tax costs faced by regulated firms will be smaller than those used in the analysis.

The tax deductibility issue, however, is important in SQG regulations for another reason -- because of the great variance in marginal tax rates among generators. Small quantity generators can fall in any of the tax increments of the Federal (and state) tax laws. Current corporate marginal tax rates are:

Profit Before Tax	Marginal Tax Rate
$1 - $25,000	15%
75,000 - 50,000	18
50,001 - 75,000	30
75,001 - 100,000	40
100,001 or more	46

Under traditional regulations, such as large quantity generator regulations, most, if not all, of the regulated business community are assumed to have similar marginal tax rates. This is not the case with SQG regulations.

Tax considerations cause the direct impacts on generators to be potentially regressive, i.e., small, low quantity generators incur a higher direct impact than large, higher quantity generators. Furthermore, this means that it is possible for generators of equivalent quantities of wastes to experience different effects of the regulation if their marginal tax rates are substantially unequal. For example, after-tax compliance costs for two generators producing the same quantity and type of waste, and with similar current management and compliance options could differ by as much as 31 percent. Specifically, a firm with $25,000 or less in profits before tax (PBT) would face 85 percent of the expensed compliance costs, but a similar type of generator with over $100,000 in PBT would face only 54 percent of the costs.

This tax effect appears to be significant. This study considered 289 types of model plants representing significant numbers of SQGs. A tabulation of these by PBT showed the following distribution.

Profit Before Tax Level	Percent of Model Plants	Incremental Compliance Costs Net of Tax Cost per $100
≤ 25,000	17	$85
25,000 - 50,000	17	82
50,001 - 75,000	8	70
75,001 - 100,000	5	60
100,001 or more	53	54

7.2.4 Annualizing and Discount Rates

Selecting the appropriate discount rate to use in calculating present values of costs and benefits and in annualizing costs of compliance is a difficult task. Rates used in these contexts vary widely and, to date, little consensus has been reached on what rates are correct in different contexts, although work in this area is ongoing. For the analysis in this report, a 3 percent (after inflation) rate was used in all areas of the study. There seems to be some agreement that real rates of discount in this range are appropriate when examining costs and benefits from a social perspective.

On the other hand, it can be argued that small firms, especially at the present time, are faced with much higher real interest rates, on the order of 10 percent. In a study such as this one, one might decide to calculate all annualized costs and present values using two discount rates, one derived from a social perspective and one derived from a private firm's perspective. It was determined that the benefits of doing so in this study were not worth the added complexity and cost. As it turns out, annualizing the initial costs imposed by the SQG regulations using a 10 percent rate of interest and the post-tax costs is quite close to the results obtained by annualizing pre-tax costs using a 3 percent rate of discount. For the economic impacts analysis, as a consequence, using a lower rate than 10 percent offsets the fact that pre-tax, rather than post-tax, costs are used in the calculations. Given the degree of aggregation and the uncertainties about some of the other input data, adopting this simpler approach of using only one interest rate for both the social costs analysis and the economic impacts assessment seemed reasonable.

7.2.5 Other EPA Regulations

Small quantity generators may also be affected by other current or pending regulations which may alter their responses to SQG regulations and their financial viability. One such pending regulatory action is the potential banning of wastes from land disposal (the Land Disposal Restrictions Program). This may have significant ramifications for individual generators depending primarily on the specific wastes banned, the generator's location relative to other off-site disposal options, and its ability to treat waste on-site. The extent of these potential problems cannot be addressed at this time, but could be incorporated in related SQG analysis when more specific information is available on the Land Disposal Restrictions Program.

Banning certain SQG wastes from land disposal should not have a significant effect on the overall available capacity of treatment alternatives because SQGs generate only a small amount of hazardous waste, less than 1 percent of the total. Furthermore most of the hazardous waste from SQGs is recycled or treated or disposed through POTWs and hence, will not be affected by land disposal regulations.

SQGs will also be affected by several other pending OSW regulatory activities. These include:

- Tank regulations;
- Used/waste oil regulations;
- Burning/blending hazardous waste as fuel; and
- Prohibiting nonhazardous liquids from Subtitle C facilities.

Finally, some SQGs also are currently subject to Clean Water Act and Clean Air Act regulations. While these and other regulations may be minor taken individually, the combination of existing and planned regulations may impose significant financial burdens on individual SQGs which this study did not address.

7.3 LIMITATIONS OF THE ANALYSIS

In any study of the costs and impacts of regulations, certain limitation of data and results exist. This is especially true of the analysis of the SQG regulations primarily because of the nature of the regulations. These regulations do not necessarily affect most firms in an industry, but they affect a large number of diverse and dissimilar firms in many industries. Hence, data requirements for studying the costs and impacts of these regulations naturally outstrip available information.

Some specific limitations of the current study, some of which are potentially remediable given additional data development and research are as follows:

- The SQG survey conducted by Abt covered only 60 percent of the SICs potentially affected by SQG regulations. For those industries covered, the data were generally incomplete -- data were not available for the appropriate sizes of firms and, frequently, the observations within size categories were very limited. Thus, extensive use of analogous industry assumptions were required to estimate the number and characteristics of SQGs in certain 4-digit SICs and to estimate waste types and quantities for model plants.

- Compliance costs are location dependent, i.e., proximity to TSD facility, but no data were available from which to adjust model plant, industry, or aggregate compliance costs for this variable.

- Firm impacts and closure analysis are based on median values obtained from the Small Business Administration's FINSTAT data. In some model plant categories (1-9 employees), financial variability among firms is great and some closures would occur among low profit firms. Within the context of our economic analysis, these would be considered to be atypical operations even though several, in absolute numbers, may exist in certain segments of certain industries.

- In many cases, it was difficult to interpret the responses in the survey of SQGs, especially regarding current waste management practices. Multiple practices were reported and some categories were quite vague, so that considerable professional judgement had to be exercised in identifying current practices.

- The assumption made throughout the analysis in this report is that there will be full compliance with the SQG regulations. To the extent that this is not true, both costs and benefits will presumably be reduced.

Some of these limitations are potentially remediable given additional data collection and development, but it is not clear how much additional information would be gained from doing so.

APPENDIX A

WASTE STREAM CHARACTERIZATIONS

This appendix documents the major characteristics of the twenty-seven waste streams defined by Abt Associates as those produced by small quantity generators. Each characterization is divided into two sections: the first provides information on the quantities of waste generated and the second describes properties of a typical waste from the category. For each waste stream, the first exhibit lists the SICs that are the main generators of that waste and the second exhibit lists the major constituents of the waste stream and summarizes the properties that are relevant to waste management practices.

In this Appendix, the waste streams are numbered sequentially to avoid confusion. However, to aid cross-reference to Abt survey information, the waste stream number as designated by Abt is given in parentheses after the name of each waste.

A1. WASTE PESTICIDES (WASTE STREAM NUMBER 1)

Waste pesticides are generated by industries that use, produce, formulate, or distribute pesticides. There are a total of 25 SICs identified by Abt (1984) that produce waste pesticides in concentrated form rather than dilute rinsing solutions or empty containers.

A1.1 Quantities Generated

Exhibit A1-1 lists the SIC codes of the 25 industries generating waste pesticides and the quantity generated by each according to the 1984 Abt Survey. Total waste quantity is 104,768.7 kg/month. Abt data show that 25.8 percent of the firms generating waste pesticides produce a total waste quantity of greater than 100 kg/month. These firms produce 68.1 percent (or 71,397 kg/month) of the total amount of waste pesticides.

Question 22 of the Abt survey provided respondents the opportunity to indicate which wastes they generated, in addition to those for which they received specific questionnaires, by simply checking a space next to each waste category generated. No quantity data were requested to supplement the yes or no answer. For waste pesticides, 26 additional industries were so identified.

A1.2 Waste Characteristics

Exhibit A1-2 shows a typical waste stream in this category determined by analogy with two WET model[1] waste streams (numbers 02.03.90 and 02.03.91). Exhibit A1-3 shows a waste toxaphene stream adapted from WET model stream 02.03.01, generated by SIC 2879, formulators of agricultural and household pest control chemicals. The WET model estimates a 30,000 ppm pesticide concentration for chlordane and parathion and 10,000 ppm for toxaphene; the 10,000 ppm estimate in Exhibit A1-2 is arrived at using an average solubility for several widely used pesticides.

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[1] ICF Incorporated. 1984. The RCRA Risk-Cost Analysis Model, Phase III Report. Prepared for the Office of Solid Waste, U.S. Environmental Protection Agency, March 1, 1984. This model is commonly known as the waste-environment-technology (WET) model.

EXHIBIT A1-1

GENERATORS OF WASTE PESTICIDES

SIC Code	Quantity (kg/month)[1]
711	82
721	46,489
724	849
780	942
782	5,504
783	162
2800	988
2819	.7
2820	489
2840	4
2841	146
2870	1,491
2879	193
5161	4,215
5191	8,655
5251	8,807
5311	305
7341	14,227
7349	6,410
7391	5
7900	5
7990	3
7992	4,225
8249	496
8421	78
Total SICs 25	Total Waste 104,768.7[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A1-2

WASTE PESTICIDES

State:	Liquid
Generation:	Intermittent (users, distributors) or continuous (producers)
Fraction Non-water:	.25
Fraction Suspended:	.2
Solids Specific Gravity:	1.1
Average Specific Gravity:	N/A*
Heating Value:	30,000 kJ/Kg
Fraction Chlorine:	N/A
Fraction Ash:	.2
BOD	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Pesticide	10,000-30,000	*	*.

*Pesticide specific.

EXHIBIT A1-3

TOXAPHENE WASTE

State:	Liquid
Generation:	Continuous
Fraction Non-water:	.25
Fraction Suspended:	.22
Solids Specific Gravity:	1.3
Heating Value:	10,000 kJ/Kg
Fraction Chlorine:	0.0
Fraction Ash:	.2
BOD	N/A

Constitutent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Toxaphene	10,000	414	.3

A2. PESTICIDE RINSING SOLUTIONS (WASTE STREAM NUMBER 2)

Pesticide rinsing solutions are obtained when pesticide containers are rinsed prior to disposal. These wastes are generated by 32 industries which are users or producers of pesticides.

A2.1 Quantities Generated

Exhibit A2-1 lists the 32 industries generating pesticide rinsing solutions and the quantities generated by each as reported in the 1984 Abt survey. Total quantity is 505,758 kg/month.

The Abt data indicates that 36.6 percent of the firms generating rinsing solutions produce more than 100 kg/month of total waste. These firms account for 82.6 percent (or 418,532 kg/month) of total pesticide rinsing solutions. Question 22 of the Abt survey identifies an additional 25 SIC codes that generate pesticide rinsing solutions, but for which quantity data are unavailable.

A2.2 Waste Characterization

Exhibit A2-2 shows a typical pesticide rinsing solution waste stream. The concentration of pesticide (ppm) is estimated from ERCO (1978), which notes that one rinse of containers generated a solution containing 2,000-10,000 ppm pesticide. One rinse was assumed for all rinsed containers. Solubilities (in mg/l) of several widely used pesticides were used to obtain a "typical" concentration of 10,000 ppm of pesticide in the original solution, therefore, the low end of the reported scale, i.e., 2,000 ppm was taken as the concentration in the rinsing solution.

EXHIBIT A2-1

GENERATORS OF PESTICIDE RINSING SOLUTIONS

SIC Code	Quantity (kg/month)[1]
711	6,501
721	76,898
729	10,551
780	14,275
782	108,104
783	1,584
1711	97
2800	2,742
2819	103
2820	1,467
2834	342
2840	12,069
2841	6,418
2842	4,353
2843	6,806
2844	495
2870	784
2879	1,306
2899	57
5161	716
5191	4,946
5251	4,320
7342	168,144
7349	6,891
7391	313
7900	1,234
7990	284
7992	60,524
8249	911
8420	1,984
8421	538
8922	35
Total SICs 32	Total Waste 505,758.0[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A2-2

PESTICIDE RINSING SOLUTION WASTE

State:	Liquid
Generation:	Intermittent
Fraction Non-water:	.002
Fraction Suspended:	0.0
Average Specific Gravity	1.0
Fraction Ash:	.02*
Fraction Chlorine:	Dependent on pesticide
Heating Value:	Dependent on pesticide
pH:	N/A
BOD:	0.0 (generally not biodegradable)

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Pesticide	2,000	N/A**	N/A**

*Basically dirt, estimated by analogy to WET wastewater streams.

**Pesticide specific.

A3. EMPTY PESTICIDE CONTAINERS (WASTE STREEM NUMBER 3)

This waste stream is generated by 26 industries which use or produce pesticides and thus generate empty containers.

A3.1 Quantities Generated

Exhibit A3-1 shows the generating 26 industries and quantities generated by each according to the 1984 Abt survey. Total waste quantity is 304,879.9 kg/month. Abt data show that 16.7 percent of the firms generating empty pesticide containers produce greater than 100 kg/month of waste. These firms produce 64.7 percent (197,185.2 kg/month) of total empty pesticide containers. Question 22 of the Abt survey identifies an additional 44 SIC codes as producers of this waste.

A3.2 Waste Characteristics

Exhibit A3-2 shows a waste stream with typical characteristics. TRW (1979) data were used extensively to estimate the amount of pesticide remaining in each container and thus the concentration of pesticide in the waste. Specifically, an estimate of 93 ml of pesticide solution remaining in each five gallon container was scaled up to 30 gallon and 55 gallon container size, and multiplied by TRW's estimated distribution of container sizes to obtain an average amount of pesticide solution remaining in containers. This was translated into parts per million using average density (g/ml) and solubility (mg/l) values for several well known pesticides, giving an average of about 500 ppm. Clearly, this number is pesticide specific and may vary substantially depending on the type of pesticide in the waste containers. The specific gravity of solids was estimated assuming that the containers are rigid PVC or that they are aluminum, giving widely varying results. Both are reported in Exhibit A3-2.

EXHIBIT A3-1

GENERATORS OF EMPTY PESTICIDE CONTAINERS

SIC Code	Quantity (kg/month)[1]
700	277
711	578
721	119,055
729	261
780	3,586
782	65,353
783	3,813
1623	11,705
1711	4
2800	105
2819	178
2820	54
2841	4
2842	11
2870	123
2879	3,935
4210	624
5161	438
5191	2,990
5531	79
7342	51,699
7349	6,434
7391	24
8249	1,194
8421	223
8922	3
Total SICs 26	Total Waste 304,879.9[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A3-2

EMPTY PESTICIDE CONTAINER WASTES

State:	Solid
Generation:	Intermittent
Fraction Nonwater:	1.0
Fraction Suspended:	Not applicable
Solids Specific Gravity:	Aluminum containers - 2.7 Rigid PVC containers - 1.4
Average Specific Gravity:	Aluminum containers - 2.7 Rigid PVC containers - 1.4
Heating Value:	0.0
Fraction Chlorine	Aluminum containers - 0.0 Rigid PVC containers - .5
Fraction Ash:	0.0
pH:	7.0
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Pesticide	500*	N/A*	N/A*

*Pesticide specific.

A4. HEAVY METAL DUST (WASTE STREAM NUMBER 6)

Heavy metal dust is generated by highly diverse industries, from inorganic chemical production to transportation equipment. Thus a single characterization that will apply to waste generated by all industries is difficult, as different metals are likely to appear in varying amounts in the wastes.

A4.1 Quantities Generated

Exhibit A4-1 shows the 13 generating industries and the corresponding kg/month of wastes produced according to Abt survey data. Total quantity is 14,413.3 kg/month. Abt data indicate 45.1 percent of the firms generating heavy metal dust generate greater than 100 kg/month of total waste. These firms account for 94.3 percent (or 13,597.6 kg/month) of total heavy metal dust. Question 22 of the Abt survey identifies an additional 36 SIC codes which generate heavy metal dust.

A4.2 Waste Characteristics

A typical heavy metal dust stream is shown in Exhibit A4-2, adapted from a WET model stream (05.01.01) generated by SIC 3312, steel production. Other heavy metal dust waste streams included in the model's data base give metal concentrations ranging from 180 ppm (cadmium concentration in electric arc furnace dust) to 120,000 ppm (lead concentration in emission control dust from lead smelting). Clearly the metal concentration is highly variable, though the other characteristics are roughly constant.

EXHIBIT A4-1

GENERATORS OF HEAVY METAL DUST

SIC Code	Quantity (kg/month)[1]
2800	4
2810	4,520
2819	1,298
2840	2
2893	6,901
2899	174
3200	19
3211	5
3540	21
3674	.4
3710	1,467
3851	1
7391	1
Total SICs 13	Total Waste 14,413.3[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A4-2

HEAVY METAL DUST

State:	Solid
Generation:	Continuous
Fraction Nonwater:	1.0
Fraction Suspended:	Not applicable
Solids Specific Gravity:	4.41
Average Specific Gravity:	4.41
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	0.0
pH:	12.6
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Cadmium	1,000	112	0
Chromium VI	500	52	0
Lead	15,000	207	0

A5. CYANIDE WASTES (WASTE STREAM NUMBER 8)

Cyanide wastes are primarily generated by SICs 3470 (metal services) and 1711 (plumbing, heating, and air conditioning). The 1984 Abt survey identified 15 other SICs that are generators of cyanide wastes and provided quantity data.

A5.1 Quantities Generated

Exhibit A5-1 lists the 17 SICs generating cyanide wastes and the quantity generated by each according to the 1984 Abt survey. Total waste quantity is 178,833.4 kg/month. Abt data show that 70.2 percent of the firms generating cyanide wastes produce over 100 kg/month total waste and generate 99.2 percent (or 177,386.4 kg/month) of the total cyanide waste. Question 22 of the Abt survey identified 18 other SICs that generate cyanide wastes but for which no quantity data are available.

A5.2 Waste Characteristics

Exhibit A5-2 describes a typical cyanide waste determined by analogy with the waste streams included in the RCRA Risk-Cost Analysis Model. We compared the SICs given by the model and the SICs listed in Exhibit A5-1. Four of the SICs listed in Exhibit A5-1--2819, 339, 347, and 3692--appear in the model. We also had to determine whether the waste streams representing those four SICs were cyanide wastes. Cyanide wastes contain hydrogen cyanide or its alkali metal salts which are lethal to man at very low doses.

Nine waste streams that represent SIC 2819 (industrial inorganic chemicals) are included in the WET model and are shown in Exhibit A5-3. They include hydrogen cyanide and the following salts: barium, calcium, copper, nickel, potassium, silver, sodium and zinc. Each of these nine streams is a RCRA P-listed waste that contains 10 percent of cyanide and 90 percent of inert materials. P-listed wastes are discarded commercial chemical products and are often generated by small quantity generators. Quantity information from the WET model (Exhibit A5-3) indicates that only two streams, copper and hydrogen cyanide, are above the 1,000 kg/month limit.

There are two waste streams in the model which represent SIC 339 (miscellaneous primary metal products) (Exhibit A5-3). They are both RCRA F-listed wastes (F010 and F012) that contain 1.76 and 5 percent of cyanide. F-listed wastes are hazardous wastes from non-specific sources. Only F012, quenching wastewater treatment sludge from metal heat treating operations where cyanides are used in the process, is generated in small quantities (1 kg/day).

Four waste streams represent SIC 347 (electroplating). Three of them contain cyanide as well as other metals such as cadmium, copper, chromium and nickel. Two of these streams are RCRA F-listed wastes and contain 50 and 75 ppm of cyanide. The other streams are not listed under RCRA. The spent electroless nickel plating process solution is the only stream generated in small quantities (30 kg/day). Exhibit A5-3 indicates the concentrations of the constituents of concern and the quantity generated for each of the streams previously mentioned.

EXHIBIT A5-1

GENERATORS OF CYANIDE WASTES

SIC Code	Quantity (kg/month)[1]
711	40,873
2711	5,286
2800	133
2819	81
2893	168
2899	217
3400	4,055
3470	51,264
3471	14,015
3479	233
3500	11
3600	18,160
3674	12
3692	16
3822	22,054
3910	22,186
3911	70
Total SICs: 17	178,833.4[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A5-2

CYANIDE WASTE

State:	Liquid
Generation:	Intermittent
Fraction Non-water:	0.2
Fraction Suspended:	0.02
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.0
Heating Value:	0.0
Fraction Chlorine:	0.0
Fraction Ash:	0.0
BOD	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Cyanide	50,000	27	658.7
Chromium	50,000	52	0
Nickel	50,000	59	0

EXHIBIT A5-3

CYANIDE WASTES GENERATED BY SIC CODES LISTED IN EXHIBIT A5-1 AND INCLUDED IN WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per Facility (kg/day)
2819	P013	060111	Barium Cyanide Cyanide (0.1)	0.0
2819	P021	060112	Calcium Cyanide Cyanide (0.1)	3.0
2819	P029	060113	Copper Cyanide Cyanide (0.1)	3,187.0
2819	P074	060114	Nickel Cyanide Cyanide (0.1)	0.2
2819	P098	060115	Potassium Cyanide Cyanide (0.1)	0.1
2819	P104	060116	Silver Cyanide Cyanide (0.1)	0.1
2819	P106	060117	Sodium Cyanide Cyanide (0.1)	5.0
2819	P121	060122	Zinc Cyanide Cyanide (0.1)	0.3
2819	P063	060505	Hydrogen Cyanide Cyanide (0.1)	76,481.0
3398	F010 F011	010302	Heat Treatment Wastes Cyanide (0.05)	200.0
3398	F012	010303	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process Cyanides (0.0176)	1.0
3471	F006 F008	010116	Wastewater treatment sludges from electroplating operations Copper (0.0018), Chromium (0.00068), Cadmium (0.00035), Lead (0.0004), and Nickel (0.00365)	300.0

EXHIBIT A5-3 (Continued)

CYANIDE WASTES GENERATED BY SIC CODES LISTED IN EXHIBIT A5-1 AND INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per Facility (kg/day)
3471	F007 F009	010202	Spent cleaning and electroplating process solutions Cadmium (0.0001), Copper (0.00014), Cyanide (0.000075), Chromium (0.00017), and Nickel (0.0015)	1,200.0
3471	N/A	010204	Spent electroless nickel plating process solutions. Copper (0.000024), Cyanide (0.000006), Fluorides (0.000009), and Nickel (0.000023)	30.0
3471	N/A	010205	Untreated rinse water from electroplating Copper (0.000006), cyanide (0.00005), Chromium (0.000017), Nickel (0.000002), and Zinc (0.000003).	10,500.0

To obtain additional information we also considered waste streams from the WET model representing SICs that were not included in the Abt survey because they are large quantity generators. Three streams representing three different SICs are included in the model. They contain cyanides at concentrations ranging from 80 to 7,400 ppm as well as other hazardous constituents such as phenol, arsenic, chromium, acrylonitrile and acetonitrile. Exhibit A5-4 contains a summarized description of these three waste streams. According to the model, one of the streams, F019, wastewater treatment sludges from the chemical conversion coating of aluminum, is generated in small quantities (9 kg/day) and so it should have been included as a waste from small quantity generators.

We combined the sixteen waste streams described in Exhibit A5-3 with the three waste streams described in Exhibit A5-4 to determine the characteristics of a cyanide waste. It appears that small quantity generators are more likely to generate P-listed wastes or commercial discarded products rather than high volume wastewaters. Therefore, a "typical" cyanide waste would probably contain cyanide and one or two metals such as chromium or nickel at concentrations of between 10,000 and 100,000 ppm.

EXHIBIT A5-4

CYANIDE WASTES INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per Facility (kg/day)
3312	K060	010301	Ammonia still lime sludge from coking operations Cyanide (0.0074), phenol (0.001) and arsenic (0.0011)	3,200.0
N/A	F019	010304	Wastewater treatment sludges from the chemical conversion coating of aluminum cyanide (0.00008) and chromium (0.0001)	9.0
2869	K011 K013 K014	020202	Bottom streams from the production of acrylonitrile Acrylonitrile (0.0004), cyanide (0.0003), and Acetonitrile (0.006).	1,452,500.0

A6. PHOTOGRAPHIC WASTES (WASTE STREAM NUMBER 9)

Photographic wastes are generated by the printing, publishing, photocopying, photographing, and photofinishing industries. This waste overlaps with waste number 33, ink sludge with chromium or lead, generated by the printing and publishing industry (SIC 27) and waste number 16, spent solvents.

A6.1 Quantities Generated

Exhibit A6-1 lists the 34 SICs generating this waste and the quantities produced by each, according to the 1984 Abt survey. Total quantity is 35,922.1 kg/month. Abt data indicates 18.9 percent of the firms generating photographic wastes generate more than 100 kg/month total waste, and this 18.9 percent generates 76.1 percent (or 1,168,561.3 kg/month) of the total photographic waste. Question 22 of the Abt survey identifies an additional 32 SICs generating photographic wastes.

A6.2 Waste Characteristics

The wastes generated by the industries listed are for the most part included in other waste categories, particularly solvents (9) and waste ink (33). TRW (1979) indicates wastes produced by SIC 27 include solvents, dyes, inks, oils, other organics, and photographic chemicals such as developers. Wastes generated by photofinishing laboratories are primarily solvents such as acetone and methanol (Forbes 1984). A representative solvent waste stream is shown in Exhibit A6-2. Wastes generated by SIC 7332 include toner (dry ink) wastes, and ammonia containers. TRW indicates that only one third of the establishments will generate ammonia containers because the other two thirds employ a process using gaseous ammonia. Exhibit A6-3 shows this typical ammonia stream, based on data supplied in the TRW report and assuming a 50 percent ammonia solution. TRW estimates 193 kg/month of this waste are generated by SIC code 7332. Exhibit A6-4 shows the waste ink steam (waste 33). Wastes generated by photo processing and photofinishing establishments, that contain photographic silvers are included and characterized under waste 28, solution with photo silver, rather than here.

EXHIBIT A6-1

GENERATORS OF PHOTOGRAPHIC WASTES

SIC Code	Quantity (kg/month)[1]
2200	35
2260	35
2620	115
2621	173
2700	3,201
2710	959
2711	196,550
2721	6,583
2730	522
2731	1,568
2741	63,961
2750	181,149
2751	144,632
2752	43,712
2753	13,242
2754	802
2760	1,404
2761	9,854
2790	201
2791	52,913
2793	4,875
2795	33,323
2823	1,019
3555	4,383
3823	3,179
3993	56
4899	2,940
5161	2,576
7300	1,511
7330	3,932
7332	32,499
7333	183,057
7395	512,669
8249	289
Total SICs 34	Total Waste 1,535,922.1[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A6-2

PHOTOGRAPHIC WASTE

State:	Liquid
Generation:	Intermittent
Fraction Non-water:	0.9
Fraction Suspended:	0.1
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.2
Heating Value:	15,000 kJ/Kg
Fraction Chlorine:	0.0
Fraction Ash:	0.1
BOD	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Acetone	200,000	58	185.0
Methanol	200,000	32	96.0

EXHIBIT A6-3

BLUEPRINTING AMMONIA WASTES

State:	Solid
Generation:	Intermittent
Fraction Nonwater:	1.0
Fraction Suspended:	Not applicable
Solids Specific Gravity:	.95*
Average Specific Gravity:	.90
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	0.0
pH:	11.0**
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Ammonia	389,000	17	6.46×10^3

* Assuming polyethene containers.

**Estimated.

EXHIBIT A6-4

INK SLUDGE WITH CHROMIUM OR LEAD

State:	Liquid
Generation:	Continuous
Fraction Nonwater:	.07
Fraction Suspended:	.06
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.0
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	.05
pH:	12.5
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Chromium VI	150	52	0
Lead	760	207	0
Toluene	100	92	28.7

A7. REACTIVE WASTES (WASTE STREAM NUMBER 10)

Reactive wastes are generated primarily by SIC coes 8062 and 8221, representing hospitals and universities.

A7.1 Quantities Generated

Exhibit A7-1 lists the 23 SICs generating reactive wastes and the quantity generated by each according to the 1984 Abt survey. Total waste quantity is 98,166.9 kg/month. About 60 percent of this quantity is generated by hospitals and universities (SICs 8062 and 8221). Abt data show that 30.5 percent of the firms generating reactive wastes produce a total waste quantity greater than 100 kg/month. These firms produce 92.5 percent (or 90,825.6 kg/month) of the total amount of reactive wastes. Question 22 of the Abt survey identified an additional 10 SICs that generate reactive wastes, for which no quantity data are available.

A7.2 Waste Characterisitcs

The WET Model waste stream data base was used to characterize reactive wastes generated by small quantity generators. Because the main generators of reactive wastes are hospitals and universities, reactive wastes are not likely to include explosives, such as trinitrotoluene. Therefore, a typical reactive waste would contain cyanide at a concentration of about 100 ppm, and a heavy metal such as nickel at a concentration of about 1,000 ppm. Exhibit A7-2 lists the main characteristics of a reactive waste.

We compared the SICs given by the model with the SICs listed in Exhibit A7-1. Only SIC 2869 appears in the model, and it was necessary to determine whether the waste streams representing this SIC were reactive wastes.

A reactive waste exhibits any of the following properties (40 CFR 261.23):

- is normally unstable and readily undergoes violent change without detonating.
- forms potentially explosive mixtures with water.
- when mixed with water, generates toxic gases, vapors or fumes.
- is a cyanide or sulfide bearing waste which can generate toxic gases.
- is capable of detonation or explosive reaction.
- is a forbidden explosive.

EXHIBIT A7-1

GENERATORS OF REACTIVE WASTE

SIC Code	Quantity (kg/month)[1]
2800	4,350
2819	616
2834	38
2869	1,250
2899	2,199
3079	3,918
3350	81
3500	4
3599	30
3674	28
7391	7,267
7397	319
8060	1,174
8062	26,794
8069	18
8071	468
8200	8
8211	2,578
8220	43
8221	33,367
8222	3,606
8249	10
8922	0.4
Total SICs 23	Total Waste 98,166.9

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A7-2

REACTIVE WASTE

State:	Liquid
Generation:	Continuous
Fraction Non-water:	0.06
Fraction Suspended:	0.05
Solids Specific Gravity:	2.5
Average Specific Gravity:	1.2
Heating Value:	0.0
Fraction Chlorine:	0.0
Fraction Ash:	0.0
BOC:	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mmHg)
Cyanide	0.000075	27.0	658.7
Nickel	0.0015	59.0	0

Moreover, for each listed waste included in 40 CFR Part 261, Subpart D, a hazard code indicates the basis for listing the waste. There is only one stream in the model generated by SIC 2869 and listed because of its reactivity. Exhibit A7-3 contains a summarized description of the stream. Cyanide is one of the constituents of concern, present at a concentration of 3,000 ppm.

Exhibit A7-4 presents reactive wastes included in the model. They are generated in large quantities (above 1,000 kg per month) by SICs 3471 (electroplating and metal finishing), 3398 (metal heat treating), 2865 (industrial organic chemicals) and 2892 (explosives manufacturing). They contain heavy metals, cyanide, 2,4,6-trinitrotoluene and toluene-2,4,-diisocyanate.

EXHIBIT A7-3

REACTIVE WASTES GENERATED BY SICs LISTED IN EXHIBIT A7-1 AND INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per facility (kg/day)
2869	K011 K013 K014	020202	Bottom streams from the production of acrylonitrile (0.0004), cyanide (0.003) and acetonitrile (0.006).	1,452,500.0

EXHIBIT A7-4

REACTIVE WASTES INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per facility (kg/day)
3471	F006 F008	010116	Wastewater treatment sludges from electroplating operations Copper (0.0018), chromium (0.00068), cadmium (0.00035), lead (0.0004) and nickel (0.00365)	300.0
3471	F007 F009	010202	Spent cleaning and electroplating process solutions Cadmium (0.0001), copper (0.00016), cyanide (0.000075), chromium (0.00017) and nickel (0.0015).	1,200.0
3398	F010 F011	010302	Heat treatment wastes Cyanide (0.05)	200.0
2865	K027	030505	Centrifuge and distillation residues from toluene diisocyanate production Toluene-2,4,-diamine (0.000001) and Toluene,2,4,-diisocyanate (0.00001)	37,000.0
2892	K044 K046	010504	Waste treatment sludges from the manufacturing and processing of explosives Lead (0.005)	160.0
2892	K047	020228	Pink/red water from TNT operations 2,4,6-trinitrotoluene (0.00013)	55,890.0
2892	K045	030512	Spent carbon from the treatment of wastewater containing explosives 2,4,6-trinitrotoluene (0.0365)	166.0
2865	U223	060428	Toluene diisocyanate Toluene-2,4-dissocyanate (0.1)	141.0

A8. STRONG ACID OR ALKALINE WASTES (WASTE STREAM NUMBER 12)

Strong acid or alkaline wastes are primarily generated by SICs 7539 (Automotive Repair shops), 4210 (Trucking) and 3300 (Metals). There are also 91 other SICs identified by Abt (1984) as generators of this waste. Quantities and characteristics of strong acid or alkaline wastes are difficult to estimate because of the heterogeneity of the streams generated by numerous SICs and the variation within each SIC.

A8.1 Quantities Generated

Exhibit A8-1 lists the 94 SICs generating strong acid or alkaline wastes and the quantity generated by each according to the 1984 Abt Survey. Total waste quantity is 2,482,578.3 kg/month. The Abt survey shows that 43.3 percent of the firms generating strong acid or alkaline wastes produce a total waste quantity greater than 100 kg/month. These firms produce 93.4 percent (or 2,318,450.9 kg/month) of the total amount of strong acid or alkaline wastes. Question 22 in the Abt survey identified an additional 22 SICs that generate strong acid or alkaline wastes, for which no quantity data are available.

A8.2 Waste Characteristics

Exhibit A8-2 contains the characteristics of a typical strong acid or alkaline waste. We compared the SICs represented in the WET model and the SICs listed in Exhibit A8-1. Four of the SICs listed in Exhibit A8-1--2819, 2861, 2869, and 2893--appear in the model. We also had to determine whether the waste streams representing those four SICs were strong acid or alkaline wastes. The pH of a stream measures the acidity of the stream; a low pH (less than 2) corresponds to a strong acid waste, a high pH (greater than 12) corresponds to a strong alkaline waste. There is no information on the pH of the stream representing SIC 2819 (Industrial Inorganic Chemicals). Streams representing SIC 2861 (Gum and Wood Chemicals) have a neutral pH and thus are not acidic or alkaline. The two remaining SICs--2869 (Industrial Organic Chemicals) and 2893 (Printing Ink)--are represented by two alkaline and two acidic streams. Exhibit A8-3 indicates the constituents of concern, their concentrations, and the pH of each stream. Detailed information contained in the characterization profiles developed for each waste stream in the model shows that the acidity of these wastes is due to the presence of chlorhydric and sulfuric acid in high concentrations (16 and 20 percent) and that the alkalinity of the wastes is due to the presence of sodium hydroxide (9 percent). These chemicals are ot listed as constituents of concern in the exhibit as the WET model waste stream data base focuses on toxic constituents. The four streams listed in Exhibit A8-3 are generated in quantities greater than 1,000 kg/month; which is the upper limit for small quantity generators.

In order to increase our knowledge of strong acid or alkaline wastes, we also considered waste streams from the WET model that represent SICs excluded from the Abt survey because they generate large quantities of waste. We combined the eight waste streams described in Exhibit A8-4 with the four waste

EXHIBIT A8-1

GENERATORS OF STRONG ACID OR ALKALINE WASTES

SIC Code	Quantity (kg/month)[1]
1711	5,242
1743	737
2600	1,414
2621	1,506
2631	47
2649	4,154
2661	470
2700	1,095
2711	226
2731	666
2741	0.2
2750	26,053
2751	7,852
2752	1,052
2753	33,367
2791	3,471
2793	7,967
2800	27,494
2810	0.04
2819	10,485
2821	26
2822	1,177
2830	1,959
2834	969
2840	16,162
2841	296
2842	20,552
2860	558
2861	9
2869	8,367
2893	6,050
2899	13,219
3291	1,317
3300	201,886
3400	18,618
3421	48,728
3429	4,385
3444	5,626
3469	4,603
3470	65,843
3471	79,194
3479	21,768
3490	83,533
3500	56,185

EXHIBIT A8-1 (Continued)

GENERATORS OF STRONG ACID OR ALKALINE WASTES

SIC Code	Quantity (kg/month)[1]
3520	115
3531	131,606
3555	13,794
3559	106
3599	6,925
3600	337
3639	11
3645	9,727
3662	1,624
3670	2,251
3674	117,073
3679	97,490
3692	6
3811	19
3820	461
3822	13,903
3832	61
3842	265
3843	13,982
3851	6,952
3861	41,647
3910	712
3911	5
4210	333,084
5161	34,480
5500	152,096
5511	5,110
5531	34,222
7300	174
7333	133
7349	5,763
7390	566
7391	14,551
7397	18,820
7538	86,175
7539	472,824
7623	2,512
7629	499
8060	4,829
8062	19,850
8069	216
8071	7,750
8072	1,431
8200	6,342

EXHIBIT A8-1 (Continued)

GENERATORS OF STRONG ACID OR ALKALINE WASTES

SIC Code	Quantity (kg/month)[1]
8211	13,345
8220	921
8221	12,678
8222	657
8411	20
8922	132
Total SICs: 94	2,482,578.3[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A8-2

STRONG ACID OR ALKALINE WASTE

State:	Liquid
Generation:	Continuous
Fraction Non-water:	0.06
Fraction Suspended:	0.05
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.1
Heating Value:	0.0
Fraction Chlorine:	0.0
Fraction Ash:	0.05
BOD	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Lead	500	207	0
Chlorhydric Acid	50,000	36.5	0
(or Sodium Hydroxide)	50,000	40	0

EXHIBIT A8-3

STRONG ACID OR ALKALINE WASTES CONTAINED IN THE WET MODEL AND GENERATED BY SICs LISTED IN EXHIBIT A8-1

SIC Code	Waste ID	Name, Constituents of Concern, Concentration	pH	Quantity per Facility (kg/day)
2869	020208	Wastewater from ethylene dichloride production by combined process. 1,2 Dichloroethane (0.00869), Vinyl Chloride (0.0027), Methyl Chloride (0.002), Chloroform (0.001) and Carbon tetrachloride (0.000785)	1	23,600
2869	020214	Quench tower wastes from methyl methacrylate production from acetone cyanohydrin. Methyl methacrylate (0.0003)	1	358,000
2869	020219	Caustic scrubber effluent from perchloro-ethylene and carbon tetrachloride production. Carbon Tetrachloride (0.013)	14	12,000
2893	010503	Mixed metal sludges from ink formulation. Chromium (0.00015), Lead (0.00076) and Toluene (0.0001)	12.5	60

EXHIBIT A8-4

STRONG ACID OR ALKALINE WASTES CONTAINED IN THE WET MODEL AND GENERATED BY SICs NOT LISTED IN EXHIBIT A8-1

SIC Code	Waste ID	Name, Constituents of Concern, Concentration	pH	Quantity per Facility (kg/day)
2812	010101	Lead sludges from the diaphragm cell process in chlorine production. Lead (0.0125)	12	11,800
3312	010201	Spent pickle liquor from steel finishing operations. Chromium (0.00001) and lead (0.0001)	1.5	11,700
3341	010206	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting. Chromium (0.0002), lead (0.00006), and cadmium (0.00011)	2.0	5,030
2879	020227	Untreated wastewater from the production of 2,4-D. 2,4-D (0.000056), and 2,4,6T (0.000056)	0.5	4,783
2992	040202	Acid tar from oil re-refining. Lead (0.01), Benzoanthracene (0.01), and Benzopyrene (0.01)	1.0	14,600
2992	040203	Caustic sludge from re-refining. Lead (0.02), Benzoanthracene (0.04), and Benzopyrene (0.01)	13.0	12,300
3312	050101	Emission control dust from the primary production of steel in electric furnaces. Cadmium (0.001), Chromium (0.0005), and Lead (0.015)	12.6	18,000
3313	050103	Dust and sludge from silicomanganese electric furnaces. Lead (0.0023)	13.0	15,800

streams described in Exhibit A8-3 to determine the characteristics of a strong acid or alkaline waste. Among the twelve waste streams contained in Exhibits A8-3 and A8-4, eight contain lead with concentrations ranging from 60 ppm to 20,000 ppm and four contain chromium with concentrations ranging from 10 ppm to 50 ppm. Therefore, a "typical" acidic or basic waste would probably contain a strong base or acid in the 10,000-100,000 ppm range and a few metals such as lead or chromium in the 100-10,000 ppm range.

A9. IGNITABLE WASTES (WASTE STREAM NUMBER 14)

Ignitable wastes usually contain flammable oils and solvents. SICs 2434 (Glued Wood Products), 3079 (Plastic Products), 5511 (Motor Vehicles), 7349 (Building Maintenance Services), and 8062 (Hospitals) are the main generators of this waste.

A9.1 Quantities Generated

Exhibit A9-1 lists the 88 SICs generating ignitable wastes and the quantity generated by each according to the 1984 Abt Survey. Total waste quantity is 707,078.4 kg/month. Abt data show that 24.3 percent of the firms generating ignitable wastes produce a total waste quantity greater than 100 kg/month. These firms generate 89.3 percent (631,341.5 kg/month) of the total amount of ignitable wastes. Question 22 of the Abt survey identified an additional 24 SICs for which no quantity data are available.

A9.2 Waste Characteristics

Exhibit A9-2 shows a typical ignitable waste. The SICs given by the WET model and the SICs listed in Exhibit A9-1 were compared. Two of the SICs, 2861 and 2869, appear in the model so it was necessary to determine whether the waste streams representing these two SICs were ignitable wastes. Ignitable wastes contain constituents such as acetone, aniline, cyclohexane, tetrahydrofuran, methanol, methyl ethyl ketone, xylene, etc. Some of those constituents are listed as U wastes or discarded commercial chemical products because of both their ignitability and toxicity. However, we believe that constituents listed because of both ignitability and toxicity should be included in categories such as category 15, ignitable paint wastes, and category 27, paint wastes with heavy metals. Therefore, Exhibit A9-3 shows hazardous wastes that contain constituents listed only because of their ignitability. Three of those constituents, acetaldehyde, cyclohexane and xylene, are included in the WET model. Exhibit A9-4 shows WET model waste streams that represent SIC 2869 and contain acetaldehyde, cyclohexane, or xylene. Acetaldehyde is present in four of these five streams in concentrations ranging from 10 to 85.7 percent.

Exhibit A9-5 shows four WET model waste streams representing SICs other than 2869 that contain cyclohexane and xylene. Xylene is present in three of these four streams in concentrations ranging from 10 to 80 percent. All four streams are generated in small quantities (less than 1,000 kg/month).

From the previous descriptions, it appears that the concentrations of hazardous constituents are slightly lower for U listed wastes or discarded commercial chemical products than for other wastes. We also believe that small quantity generators are more likely to generate U wastes. Therefore, a typical ignitable waste would be likely to contain either acetaldehyde or xylene at a concentration of 10 percent.

EXHIBIT A9-1

GENERATORS OF IGNITABLE WASTES

SIC Code	Quantity (kg/month)[1]
1700	569
1711	741
1721	18,100
1752	3,032
1761	16,371
1793	27
2200	1,378
2434	40,419
2500	526
2510	453
2511	1,116
2520	4,332
2521	1,234
2541	767
2600	269
2621	9,128
2631	373
2640	570
2641	294
2647	829
2661	981
2789	20,959
2800	13,410
2819	1,013
2820	5,330
2821	6,369
2822	3,789
2834	11,478
2840	2,566
2842	1,333
2843	2,743
2844	12,047
2861	5,207
2869	8,675
2879	760
2899	10,492
3079	77,773
3131	14,128
3211	687
3251	2,181
3291	2,142
3300	688
3411	73

EXHIBIT A9-1 (Continued)

GENERATORS OF IGNITABLE WASTES

SIC Code	Quantity (kg/month)[1]
3425	274
3442	2,864
3443	299
3444	36
3499	733
3500	26
3531	13
3559	24,969
3569	534
3599	1,040
3670	8,517
3714	260
3829	47
3843	527
3911	201
4469	27,579
4610	68
5160	4
5161	2,059
5230	12
5231	57
5251	517
5511	69,117
7261	5
7300	65
7333	13,780
7349	58,595
7391	6,189
7395	67
7397	15,456
7530	427
7622	10,922
7629	6
7641	9,737
8060	17,384
8062	71,440
8069	2,517
8071	7,509
8072	172
8211	26,484
8220	34
8221	16,683

EXHIBIT A9-1 (Continued)

GENERATORS OF IGNITABLE WASTES

SIC Code	Quantity (kg/month)[1]
8222	73
8411	0.8
8922	4,436
Total SICs: 88	707,078.4

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A9-2

IGNITABLE WASTE

State:	Sludge
Generation:	Intermittent
Fraction Non-water:	1.0
Fraction Suspended:	0.2
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.4
Heating Value:	5,000-10,000 kJ/kg
Fraction Chlorine:	0.0
Fraction Ash:	0.5
pH:	N/A
BOD:	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Acetaldehyde	100,000	44	760.0
Xylene	100,000	106	8.39

EXHIBIT A9-3

WASTES LISTED IN THE WET MODEL BECAUSE OF THEIR IGNITABILITY ONLY

WET No.	Waste Code	Ignitable Constituent
06.04.01	U001	Acetaldehyde or ethanol
N/A	U002	Acetone or 2-propanone
N/A	U008	Acrylic acid or 2-propanoic acid
N/A	U031	n-Butyl alcohol or 1-butanol
N/A	U055	Cumene or benzene, (1-methylethyl)-
06.04.10	U056	Cyclohexane or benzene hexahydro
N/A	U057	Cyclohexanone
N/A	U092	Dimethylamine or methanamine, N-methyl-
N/A	U110	Dipropylamine or 1-propanamine, N-propyl
N/A	U112	Ethyl acetate or acetic acid, ethyl ester
N/A	U113	Ethyl ether or ethane 1,1'-oxybis-
N/A	U124	Furan or furturan
N/A	U125	Furfural or 2-furancarboxaldehyde
N/A	U154	Methanol or methyl alcohol
N/A	U161	Methyl isobutyl ketone or 4-methyl-2-pentanone
N/A	U171	2-Nitropropane or propane, 2-nitro
N/A	U186	1,3-Pentadiene or 1-methylbutadiene
N/A	U213	Tetrahydrofuran
06.04.31	U239	Xylene

EXHIBIT A9-4

WET MODEL WASTES CONTAINING ACETALDEHYDE, CYCLOHEXANE, AND XYLENE GENERATED BY SIC 2869

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Heating Value (kJ/kg)	Quantity per Facility (kg/Day)
2869	N/A	020211	Heavy ends from ethylene oxide production from ethylene oxidation. Acetaldehyde (0.158), Ethylene Oxide (0.197)	10,000	2,800
2869	N/A	030408	Liquid organics from hexamethylene diamine production by 1,6-hexanediol ammonolysis. Cyclohexane (0.2)	25,200	15,900
2869	K010	030414	Distillation side cuts from acetaldehyde production by ethylene oxidation. Acetaldehyde (0.162), Chloroacetaldehyde (0.119), Chloroform (0.02), and Formaldehyde (0.02)	7,700	24,000
2869	N/A	030425	Acetaldehyde column waste from acrolein production by propylene oxidation. Acetaldehyde (0.857), Hydroquinone (0.014), and Acrolein (0.119)	2,700	3,700
2869	U001	060401	Acetaldehyde. Acetaldehyde (0.1)	2,645.3	51

EXHIBIT A9-5

WASTES CONTAINING CYCLOHEXANE AND XYLENE AND GENERATED BY SICs OTHER THAN 2869

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Heating Value (kJ/kg)	Quantity per Facility (kg/Day)
N/A	F003	030111	Xylene spent solvents. m-Xylene (0.8)	42,000	3
N/A	F003	030207	Still bottoms from the recovery of xylene. m-Xylene (0.25)	34,000	1.0
2865	U056	060410	Cyclohexane. Cyclohexane (0.1)	4,653.2	29
2865	U239	060431	Xylene. m-Xylene (0.1)	4,287.7	7

A10. IGNITABLE PAINT WASTES CONTAINING FLAMMABLE SOLVENTS (WASTE STREAM NUMBER 15)

Ignitable paint wastes are primarily generated by SIC 1721, painting contractors. There are 48 other SICs identified by Abt (1984) as generators of ignitable paint wastes.

A10.1 Quantities Generated

Exhibit A10-1 lists the 49 SICs generating ignitable paint wastes and the quantity generated by each according to the 1984 Abt Survey. Total waste quantity is 559,410.6 kg/month. The Abt survey shows that 19.6 percent of the firms generating ignitable paint wastes produce a total waste quantity greater than 100 kg/month. These firms produce 72.6 percent (405,991.4 kg/month) of the total amount of ignitable paint wastes. Question 22 in the Abt survey identified an additional 45 SICs that generate ignitable paint wastes, for which no quantity data are available.

A10.2 Waste Characteristics

Exhibit A10-2 contains the characteristics of a typical ignitable paint waste. None of the SIC codes listed in Exhibit A10-1 appears in the WET model. However, the model contains seven streams containing flammable solvents used in paints. Exhibit A10-3 indicates the concentrations of the constituents of concern and the quantity generated for each of the streams. They contain either toluene or methyl ethyl ketone at concentrations ranging from 1 to 60 percent. One of the streams contains heavy metals and was used to characterize category 27, paint wastes with heavy metals.

Four of the streams represent SIC 2851 (Paint and Allied Products). They all correspond to F005, a RCRA listed hazardous waste from non-specific sources. The total quantity of hazardous waste generated by each of the 1,500 manufacturers within SIC 2851 is 552 kg/month, which is below the 1,000 kg/month limit. Therefore, we believe that firms in SIC code 2851 generate hazardous waste in small quantities and should have been included in the Abt survey. The TRW analysis estimates that 142 manufacturers in SIC code 2851 are small quantity generators and that the remaining 911 firms generate wastes in quantities greater than 1,000 kg/month.

The two remaining wastes streams are RCRA U-listed wastes or discarded commercial chemical products. They represent SICs 2865 and 2869 and contain 10 percent toluene or ethyl methyl ketone and 90 percent inert materials. Both streams are generated in small quantities (120 and 330 kg/month). Consequently, a typical ignitable paint waste containing flammable solvents would contain either toluene or ethyl methyl ketone at a concentration of 10 percent.

EXHIBIT A10-1

GENERATORS OF IGNITABLE PAINT WASTES

SIC Code	Quantity (kg/month)[1]
1721	199,106
2400	312
2430	5,921
2434	21,761
2451	1,222
2500	8,074
2510	30,476
2511	654
2519	30,774
2520	16,335
2521	4,649
2540	2,703
2541	1,514
3479	44
3553	390
3573	19,278
3670	8,835
3811	49
3822	48,590
3823	1,325
3993	22,227
4200	2,417
4210	2,494
2412	10,280
4231	967
4469	7,820
4610	27
4613	14
5161	4,076
5190	453
5198	11,586
5230	50
5231	19,088
5251	4,420
5311	305
5531	2,420
7261	12,569
7349	14,742
7513	29
7531	698
7641	11,636
8062	3,798
8211	13,132
8220	789

EXHIBIT A10-1 (Continued)

GENERATORS OF IGNITABLE PAINT WASTES

SIC Code	Quantity (kg/month)[1]
8221	7,525
8222	1,887
8249	1,211
8331	90
8411	661
Total SICs: 49	559,410.6[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A10-2

IGNITABLE PAINT WASTE

State:	Sludge
Generation:	Intermittent
Fraction Non-water:	1.0
Fraction Suspended:	0.2
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.4
Heating Value:	25,000-40,000 kJ/kg
Fraction Chlorine:	0.0
Fraction Ash:	0.2
BOD:	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Toluene	100,000	92	28.70
Methyl Ethyl Ketone	100,000	72	71.20

EXHIBIT A10-3

IGNITABLE PAINT WASTES INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Heating Value (kJ/kg)	Quantity per Facility (kg/Day)
2851	F005	030109	Toluene spent solvents from manufacture of paint and allied products. Toluene (0.6)	41,600	9.9
2851	F005	030110	Methyl Ethyl Ketone spent solvents from manufacture of paint and allied products. Methyl ethyl ketone (0.6)	33,200	5.6
2851	F005	030205	Toluene still bottoms from solvent recovery in paint manufacture. Toluene (0.2)	34,000	1.9
2851	F005	030206	Methyl Ethyl Ketone still bottoms from solvent recovery in paint manufacture. Methyl ethyl ketone (0.2)	27,100	1.0
N/A	N/A	030301	Paint application sludges. Toluene (0.01); Methyl Ethyl Ketone (0.01); Chromium (0.000056); Lead (0.000040) and Mercury (0.000012)	25,300	1.1
2869	U159	06019	Methyl Ethyl Ketone. Methyl ethyl ketone (0.1)	3,400.3	4.0
2865	U220	060427	Toluene. Toluene (0.1)	4,237.6	11.0

A11. SPENT SOLVENTS (WASTE STREAM NUMBER 16)

This is a broad category of wastes and is generated by numerous different SICs in all of the 23 industry groups. Within each SIC grouping, and even within each SIC, there is a great deal of heterogeneity in the waste solvents produced, making it difficut to estimate the quantities generated and their characteristics.

A11.1 Quantities Generated

Two sources of information were available for the quantities of solvent waste produced by small quantity generators: the TRW analysis of 1979 and the 1984 Abt survey. Exhibit A11-1 lists the 235 SICs reporting small quantity generation of solvent wastes in the Abt survey and the quantities generated. Total waste quantity is 8,780,678.1 kg/month. A comparison of the Abt data and the TRW report showed that most of the codes in the Abt data had also been covered, at least in part, in the TRW analysis. Abt data show that 30.1 percent of the firms generating waste solvents produce in excess of 100 kg/month total waste. These firms account for 81.5 percent (or 7,160,245 kg/month) of the total amount of waste solvents. The Abt survey identified an additional 20 SICs that generate waste solvents. No quantity data are available for these SICs.

A11.2 Waste Characteristics

Because of the large number of generators and the variety of solvents used, it is difficult to determine a characteristic waste in this category. Over thirty different solvents, not all of which are considered hazardous, are regularly used in these industries and disposed of as waste. Some of the most commonly used hazardous solvents are xylene, toluene, toluene diisothiocyanate, trichloroethane, trichloroethylene, methyl ethyl ketone, benzene, chloroform, dichlorobenzene and carbon tetrachloride. Information obtained mainly from WET model data is provided on these waste streams in Exhibit A11-2.

EXHIBIT A11-1

GENERATORS OF SPENT SOLVENTS

SIC Code	Quantity (kg/month)[1]
1600	10,733
1700	142
1711	8,992
1721	109,195
1761	9,032
1793	3.5
1794	6,196
2200	1,864
2231	7,690
2250	5,641
2252	104
2253	2,925
2254	753
2257	2,831
2258	87
2260	16,557
2261	786
2269	75
2270	1,031
2272	1,819
2434	14,339
2435	14,534
2492	3,621
2500	339
2510	454
2511	16,637
2519	8,282
2521	13.6
2522	2,588
2540	93
2541	143
2600	748
2611	2,943
2620	1,127
2621	22,353
2631	3,006
2640	39,579
2641	14,099
2642	2,425
2643	111
2645	878
2646	1,121
2647	639
2648	28
2649	370

EXHIBIT A11-1 (Continued)

GENERATORS OF SPENT SOLVENTS

SIC Code	Quantity (kg/month)[1]
2650	17,768
2651	2,186
2653	146
2661	369
2700	15,352
2710	1,344
2711	53,827
2731	826
2741	9,417
2750	73,512
2751	84,777
2752	21,549
2753	3,009
2754	1,003
2761	6,276
2782	20,867
2791	2,323
2819	1,434
2820	8,677
2821	21,552
2822	9,498
2823	223
2824	2,935
2830	1.38
2834	25,676
2840	4,511
2841	1,296
2842	9,791
2843	2,026
2844	9,398
2860	834
2861	732
2869	17,233
2879	54
2890	4,312
2893	42,632
2899	25,335
3000	1,336
3070	505
3079	267,220
3100	1,286
3111	86
3131	1,692
3140	643
3144	881
3149	9,650

EXHIBIT A11-1 (Continued)

GENERATORS OF SPENT SOLVENTS

SIC Code	Quantity (kg/month)[1]
3171	96
3172	5,557
3200	8,185
3260	56
3290	507
3300	84,957
3357	18,718
3400	363,062
3411	93,753
3412	191,957
3423	62,980
3425	83,533
3429	69,667
3432	6,824
3433	4,546
3440	27,328
3441	102
3442	26,094
3443	23,222
3444	33,676
3452	13,649
3460	12,576
3469	26,459
3470	13,212
3471	2,309
3479	132
3480	152,331
3490	3,412
3499	19,682
3500	732,229
3520	1,915
3523	4,396
3531	100,375
3532	43,090
3533	35,606
3535	1,555
3540	439
3541	34
3542	958
3544	296
3545	52,665
3551	239,388
3552	589
3553	60
3555	438

EXHIBIT A11-1 (Continued)

GENERATORS OF SPENT SOLVENTS

SIC Code	Quantity (kg/month)[1]
3559	7,045
3561	10,364
3563	12,955
3568	5,612
3569	3961
3573	3569
3579	2198
3585	687
3589	9,243
3599	205,443
3600	46,625
3620	55,316
3622	4,572
3644	520
3645	31,120
3651	4,412
3661	622
3662	12,946
3670	48,681
3674	86,312
3679	3,245
3694	11,388
3714	16,959
3811	569
3820	14,138
3822	120,020
3823	827
3825	1,133
3829	3,671
3832	5,401
3841	4,081
3842	944
3843	350
3851	883
3861	643
3873	275
3961	6,843
3993	26,857
4200	1,329
4210	166,210
4213	10,248
4231	176
4469	9,447
4610	545
4612	91

EXHIBIT A11-1 (Continued)

GENERATORS OF SPENT SOLVENTS

SIC Code	Quantity (kg/month)[1]
4613	136
4619	3,412
4800	16,376
5161	11,250
5198	44,697
5231	2,235
5500	806,321
5511	258,281
5520	139,494
5521	21,746
5531	8,370
5541	297,475
5551	108,728
5571	10,873
7200	76
7216	176
7261	11,014
7300	53
7332	1,024
7333	23,482
7342	2,891
7349	222
7390	166
7391	40,644
7395	13,387
7397	26,616
7513	26,567
7530	1,044,832
7531	240,211
7538	53,846
7539	569,797
7620	105
7622	2,420
7623	9,259
7629	4,867
7631	1,484
7641	26,289
7694	22,719
8000	129
8060	20,526
8062	95,157
8069	1,080
8071	44,665
8072	1,386
8200	39
8211	13,207

EXHIBIT A11-1 (Continued)

GENERATORS OF SPENT SOLVENTS

SIC Code	Quantity (kg/month)[1]
8220	2,073
8221	31,583
8222	1,894
8249	4,252
8331	4,996
8411	246
8922	18,670

Total SICs = 235 Total Waste = 8,780,678.1[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add to total due to rounding.

EXHIBIT A11-2

SPENT SOLVENTS

State:	Liquid
Generation:	Intermittent
Fraction Non-water:	1.0
Fraction Suspended:	0.1
Fraction Ash:	0.1
pH:	7

Possible Major Constitutents	Specific Gravity	Heating Value (kJ/kg)	Fraction Chlorine	Molecular Weight	Vapor Pressure
Benzene	.88	41,919	0.0	78	95.2
Carbon Tetrachloride	1.6	1,014	0.94	154	90.0
Chloroform	1.5	3,135	0.9	119	150.5
1,2-Dichlorobenzene	1.3	19,133	0.5	147	1.0
Methyl Ethyl Ketone	0.8	33,969	0.0	72	71.2
Toluene	0.9	42,514	0.0	92	28.7
Toluene Diisocyanate	1.2	24,746	0.0	174	0.1
1,1,1-Trichloroethane	1.3	8,318	0.8	133	0.1250
Trichloroethylene	1.5	7,273	0.8	131	57.9
Xylene	0.9	42,877	0.0	106	8.39

A12. DRY CLEANING WASTES (WASTE STREAM NUMBER 17)

Dry cleaning wastes are distillation residues and filter wastes from dry cleaning establishments (SIC 721), and are generated by a large number of facilities.

A12.1 Quantities Generated

The Abt survey (1984) estimates that the 4-digit SICs comprising SIC 721 generate 1.11 million kg/month of dry cleaning wastes out of a total for all SICs of 1.13 million kg/month. The WET model estimated that 18,000 facilities generated an average of 7.2 kg/day or 216 kg/month of waste, which includes those generators that may be too small to generate the 100 kg/month necessary to be considered a small quantity generator. TRW (1979) estimates 7,182 small quantity generators in SIC codes 7215, 7216, and 7218, generating an average of 302 kg/month. This figure does not include the establishments generating less than 100 kg/month, which total 33,073 according to TRW, nor does it include SIC 7217, carpet and upholstery cleaning, because these facilities use a different type of cleaning fluid. Abt data indicate 16.2 percent of the firms generating waste generate a total quantity of more than 100 kg/month of waste. This 16.2 percent of the firms generate 62.3 percent (or 709,074.5 kg/month) of the total dry cleaning waste. Question 22 of the survey identified an additional 6 SICs generating this waste.

A12.2 Waste Characteristics

Exhibit A12-2 shows a typical waste stream from the dry cleaning industry. It was developed from the WET model waste stream data base, combining the waste streams for distillation residues (03.02.01) and filter wastes (03.02.04).

EXHIBIT A12-1

GENERATORS OF DRY CLEANING WASTE

	SIC Code		Quantity (kg/month)[1]
	7210		80,279
	7216		987,684
	7217		37,938
	7218		11,087
	7349		1,565
	7641		19,745
Total SICs	6	Total waste	1,138,297.7[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A12-2

DRY CLEANING WASTES

State:	Liquid
Generation:	Continuous
Fraction Nonwater:	1.0
Fraction Suspended:	.36
Solids Specific Gravity:	2.5
Average Specific Gravity:	1.41
Heating Value:	15369 kJ/kg
Fraction Chlorine	.45
Fraction Ash:	.28
pH:	N/A
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Tetrachloroethene	530,000	166	14

A13. SOLVENT STILL BOTTOMS (WASTE STREAM NUMBER 18)

Solvent still bottoms are primarily generated by SICs 3599 (Machinery) and 3425 (Fabricated Metal Products). There are 35 other SICs identified by Abt (1984) as generators of solvent still bottoms.

A13.1 Quantities Generated

Exhibit A13-1 lists the 37 SICs generating solvent still bottoms and the quantity generated by each according to the 1984 Abt Survey. Total waste quantity is 164,768.4 kg/month. The Abt Survey shows that 25.9 percent of the firms generating solvent still bottoms produce a total waste quantity greater than 100 kg/month. These firms produce 94.2 percent (155,229.5 kg/month) of the total amount of solvent still bottoms waste. Question 22 in the Abt survey identified 19 other SICs that are generators of solvent still bottoms but provided no quantity data.

A13.2 Waste Characteristics

The WET model waste stream data base was used to characterize this waste because solvent still bottoms as described in the model are all generated in small quantities (less than 1,000 kg per month). Exhibit A13-2 shows the characteristics of a typical solvent still bottoms waste derived from a consideration of WET waste streams 03.02.02, 03.02.03, 03.02.07, and 03.02.08.

The model contains eight solvent still bottoms waste streams (Exhibit A13-4), only one of which is generated by an SIC (2879) listed in Exhibit A13-1. Exhibit A13-3 contains a summarized description of the stream, which is generated in small quantities and contains toluene, phosphorothioic acid ester and phosphorodithioic acid ester. According to the WET model, there are only 17 facilities generating this stream. Results from the Abt survey indicate that there are 738 facilities generating solvent still bottoms in quantities between 100 and 1,000 kg per month. Therefore, we believe that this stream is not the typical solvent still bottom waste and we did not consider compounds such as phosphorodithioic and phosphorothioic acid triethylesters in our characterization. Solvent still bottoms from SICs 721 (Laundries and Dry Cleaning) and 285 (Paint and Allied Products) are covered by other waste streams and are not considered here. Solvent still bottoms therefore include one of the following solvents: toluene, tetrachloroethane, dichloromethane, or xylene; at a concentration of approximately 20 to 25 percent.

EXHIBIT A13-1

SOLVENT STILL BOTTOMS

SIC Code	Quantity (kg/month)[1]
2231	907
2253	8,604
2260	1
2261	12
2521	10,197
2541	498
2621	39
2751	86
2800	1,304
2819	27
2820	424
2821	1,509
2822	910
2842	675
2860	40
2869	53
3079	2,443
3400	1,450
3425	36,755
3444	4
3470	1,273
3471	234
3479	68
3500	1,797
3520	622
3599	65,471
3600	3,592
3661	6
3662	401
3670	3,316
3714	141
3811	4
3822	21,549
3851	143
7333	20
7342	17
7391	171
Total SICs: 37	Total Waste: 164,768.4[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A13-2

SOLVENT STILL BOTTOMS

State:	Sludge
Generation:	Intermittent
Fraction Non-water:	1.0
Fraction Suspended:	0.2
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.4
Heating Value:	5,000-35,000 kJ/kg
Fraction Chlorine:	0.2
Fraction Ash:	0.2
BOD:	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Toluene	200,000	92	28.7
or Tetrachloroethane	200,000	166	14.0
or Dichloromethane	200,000	85	362.4
or Xylene	200,000	106	8.39

EXHIBIT A13-3

SOLVENT STILL BOTTOMS GENERATED BY SIC CODES LISTED IN EXHIBIT A13-1 AND INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per Facility (kg/Day)
2879	K036	030208	Still bottoms from toluene reclamation distillation in the production of disulfoton. Toluene (0.2), phosphorodithioic acid triethylester (0.1), and phosphorothioic acid triethylester (0.01.	22.0

EXHIBIT A13-4

SOLVENT STILL BOTTOMS INCLUDED IN THE WET MODEL

SIC Code	EPA Code	Waste ID	Name, Constituents of Concern, Concentration	Quantity per Facility (kg/Day)
721	F002	030201	Tetrachloroethene distillation residues from dry cleaning Tetrachloroethene (0.6)	5.8
N/A	F002	030202	1,1,1 Tetrachloroethane still bottoms 1,1,1 Tetrachloroethane (0.2)	1.7
N/A	F002	030203	Dichloromethane still bottoms Dichloromethane (0.2)	6.1
721	F002	030204	Tetrachloroethane filter wastes from dry cleaning Tetrachloroethane (0.25)	1.4
285	F005	030205	Toluene still bottoms from solvent recovery in paint manufacture Toluene (0.2)	1.9
2851	F005	030206	Methyl Ethyl Ketone still bottoms from solvent recovery in paint manufacture Methyl ethyl ketone (0.2)	1.0
N/A	F003	030207	Still bottoms from the recovery of xylene m-Xylene (0.25)	1.0

A14. WASTEWATER WOOD PRESERVATIVE (WASTE STREAM NUMBER 19)

Wastewater wood preservatives are generated primarily by the wood preserving industry (SIC 2491) which uses pentachlorophenol and/or creosote for preserving.

A14.1 Quantities Generated

SIC 2491 generates 56,452 kg/month according to the 1984 Abt survey, out of a total of 59,919.7 kg/month reported by Abt for all six generating SICs shown in Exhibit A14-1. TRW (1979) had previously estimated a total of 178 generating facilities, each generating an average of 13.7 kg/day or 411 kg/month, corresponding well with Abt's generation figures. Abt indicates 55.3 percent of the firms generating wood preservative wastewater generate a total of 100 kg/month of waste or more. This 55.3 percent generates 96.3 percent of the total waste in the category, or 57,711.7 kg/month. Abt identified 10 additional SICs in Question 22 of the survey that generate wastewater wood preservative.

A14.2 Waste Characteristics

Exhibit A14-2 shows a typical waste stream for the wood preserving industry, taken from the WET model by combining streams 02.01.01 and 02.04.01, which are wastewater wood preservative streams from SIC 2491.

EXHIBIT A14-1

GENERATORS OF WASTEWATER WOOD PRESERVATIVE

SIC Code	Quantity (kg/month)[1]
2400	66
2430	20
2490	354
2491	56,452
3576	1,019
5238	2,009
Total SICs 6	Total waste 59,919.7[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A14-2

WASTEWATER WOOD PRESERVATIVE

State:	Liquid
Generation:	Continuous
Fraction Nonwater:	.4
Fraction Suspended:	.09
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.0
Heating Value:	13,500 kJ/kg
Fraction Chlorine	0.0
Fraction Ash:	.05
pH:	5.1
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Pentachlorophenol	780	262	$.11 \times 10^{-3}$
Acenaphthene	300	154	$.155 \times 10^{-2}$
Chrysene	100	228	$.63 \times 10^{-8}$

A15. HEAVY METAL SOLUTIONS (WASTE STREAM NUMBER 21)

Abt (1984) indicates that heavy metal solutions are generated by establishments producing printing ink and miscellaneous chemical products. This waste is likely to be very similar to waste number 33, ink sludge with chromium or lead.

A15.1 Quantities Generated

Abt (1984) estimates SIC 2893 generated 4,865 kg/month of heavy metal solutions, and SIC 2800 generated 4 kg/month, as shown in Exhibit A15-1. TRW (1979) estimates that 181 establishments generate a total of 495 kg/month of waste. This total would include waste categories 33 (ink sludge with chromium or lead) and 31 (waste ink with solvents or heavy metals). Abt data indicates 66.3 percent of firms generating this waste produce more than 100 kg/month of waste, and this 66.3 percent generates 88.7 percent (or 4318.2 kg/month) of the total heavy metal solution waste quantity. Question 22 of the Abt survey identified an additional 50 SICs that reported generating heavy metal solutions.

A15.2 Waste characteristics

Exhibit A15-2 shows the waste characterization for heavy metal solutions, which is similar to that for waste 33, ink sludge with chromium or lead. The toluene, a solvent, has been omitted and the metals are assumed to be in water solution. This description is modified from a WET model stream (01.05.03). Other WET heavy metal streams have metal constituent concentrations of between 5 and 40,000 ppm, so there is obviously much variation depending upon the particular process. Also process dependent is the presence or absence of solvents in the waste stream. No solvents are assumed to be present in this typical case. TRW (1979) indicates that solvents and other miscellaneous chemicals such as hardeners, adhesives, and resins may also be present.

EXHIBIT A15-1

GENERATORS OF HEAVY METAL SOLUTIONS

	SIC Code		Quantity (kg/month)[1]
	2800		4
	2893		4,865
Total SICs	2	Total waste	4,869.3[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A15-2

HEAVY METAL SOLUTIONS

State:	Liquid
Generation:	Continuous
Fraction Nonwater:	.06
Fraction Suspended:	.06
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.0
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	0.0
pH:	N/A
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Chromium VI	150	52	0
Lead	760	207	0

A16. ARSENIC WASTES (WASTE STREAM NUMBER 22)

The Abt survey identified SIC 724, Cotton Ginning, as the sole producer of arsenic wastes. This waste is a result of dessication of the cotton with arsenic acid, 98 percent of which is done in Texas and the remainder in Oklahoma.

A16.1 Quantities Generated

The Abt survey estimated that 9,269 kg/month of this waste is generated. Abt data show that 47.7 percent of cotton ginners produce over 100 kg/month total waste. These firms account for 93.3 percent (8,645/month) of the arsenic waste generated.

A16.2 Waste Characteristics

Exhibit A16-1 shows a typical arsenic waste stream. The waste is cotton trash (leaves, bolls, side-branches) from plants which have been sprayed with arsenic acid.

EXHIBIT A16-1

State:	Solid
Generation:	Intermittent
Fraction Non-water:	1.0
Fraction Suspended:	N/A
Solids Specific Gravity:	0.8
Average Specific Gravity:	0.8
Heating Value:	N/A
Fraction Chlorine:	0.0
Fraction Ash:	1.0
pH:	N/A
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Arsenic	250	75	0.0

Estimates of the arsenic content of this waste are taken from a Preliminary Study of Sources of Inorganic Arsenic, Radian Corp. (1982). This study quotes two determinations of the amounts of arsenic in cotton trash. The average arsenic content in one study was 2,000 ppm and in the other was 225 ppm. The second study was deemed to have used more precise analytical detection methods so 225 ppm was considered to be the more accurate estimate of the arsenic content of dessicated stripper cotton.

A17. MERCURY WASTES (WASTE STREAM NUMBER 23)

According to the Abt survey, none of the producers of mercury wastes produce more than 25 kg/month of total waste, therefore they would not be characterized as small quantity generators. Consequently, no attempt has been made to characterize this waste.

A17.1 Quantities Generated

The only SIC generating mercury wastes is 8071, medical laboratories. According to Abt, the total waste generated is 17.14 kg/month, all of which is produced by facilities generating less than 25 kg/month of total waste.

A18. SPENT PLATING WASTES (WASTE STREAM NUMBER 24)

Plating wastes are generated mainly by fabricators of metal products and machinery manufacturers and also by the printing and publishing industry. The Abt survey identified 27 SICs which provided quantity information on the generation of spent plating wastes.

A18.1 *Quantities Generated*

Exhibit A18-1 lists the 27 SICs generating spent plating wastes and the quantity generated by each according to the 1984 Abt survey. Total waste quantity is 480,632 kg/month. TRW reports these wastes under cyanide and heavy metals for metal and machinery manufacturers and does not list printers and publishers as generators of plating wastes.

Abt data show that 26.4 percent of the firms generating spent plating wastes generate 100 kg/month or more of total waste. These firms produce 91.5 percent (or 439,616.8 kg/month) of the total amount of plating waste. Question 22 of the Abt survey identified five additional SICs that generate spent plating waste for which no quantity data were given.

A18.2 Waste Characteristics

Exhibit A18-2 shows a waste stream that is typical of this category. The typical waste was determined by analogy with four WET model waste streams (01.01.16, 01.02.02, 01.02.04, and 01.02.05). These wastes were all generated by SIC 3471, which is the major small quantity generator of this category of waste, generating 30 percent of the total waste quantity.

EXHIBIT A18-1

SPENT PLATING WASTE

SIC Code	Quantity (kg/month)[1]
2700	18
2710	436
2711	11,692
2721	1,110
2750	42,788
2751	28,873
2793	385
2893	322
3400	83,738
3421	26,800
3444	3,500
3460	200
3470	42,592
3471	142,498
3500	54,369
3545	12,558
3573	4,970
3599	422
3662	518
3674	17,411
3679	371
3692	346
3825	49
3861	456
3911	2,879
7332	166
7333	665
Total SICs 27	Total Waste 480,632.2[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A18-2

SPENT PLATING WASTE

State:	Liquid
Generation:	Continuous
Fraction Non-water:	0.005
Fraction Suspended:	0.004
Solids Specific Gravity:	3.00
Average Specific Gravity:	1.00
Heating Value:	0.0
Fraction Chlorine:	0.0
Fraction Ash:	0.0
pH:	5.0
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Copper	490	64	0
Nickel	1200	59	0
Chromium (VI)	220	52	0
Cadmium	110	112	0
Lead	100	207	0
Cyanide	45	27	658.7

A19. USED LEAD ACID BATTERIES (WASTE STREAM NUMBER 26)

This is a specific waste generated by many SICs.

A19.1 Quantities Generated

Exhibit A19-1 shows 38 SICs and the quantity of used lead acid batteries generated by each according to the 1984 Abt survey. Total quantity is 30.7 million kg/month, making used lead acid batteries the largest waste category for small quantity generation. TRW agrees that the majority of these categories will generate used lead acid batteries.

Abt indicates that 39.4 percent of the firms generating lead acid batteries generate more than 100 kg/month of total waste. This 39.4 percent accounts for 82.4 percent (or 25.3 million kg/month) of the total lead acid battery waste. Abt also identified in survey question 22 an additional 80 SICs generating lead acid batteries.

A19.2 Waste Characteristics

Exhibit A19-2 shows a waste stream that is typical of this category.

EXHIBIT A19-1

USED LEAD ACID BATTERIES

SIC Code	Quantity (kg/month)[1]
711	1,018
782	1,018
1600	38,781
1620	8,495
1622	42,474
1623	45,305
1629	8,485
1752	5,860
1790	11,326
1794	28,316
4000	94
4200	527
4210	1,910,009
4212	150,954
4213	56,356
4214	9,861
4231	8,032
4400	2,832
4469	431,109
5251	21,740
5311	117,397
5500	8,582,718
5510	35,039
5511	2,833,962
5520	66,903
5521	208,591
5531	5,174,777
5541	5,659,779
5551	217,531
5571	617,227
5962	52
7510	28,316
7512	2,832
7512	231,787
7530	530,665
7531	630,433
7538	1,202,162
7539	1,834,465
Total 38	Total Waste 30,758,978.2[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A19-2

USED LEAD ACID BATTERIES

State:	Solid
Generation:	Intermittent
Fraction Nonwater:	1.0
Solids Specific Gravity:	6.0
Average Specific Gravity:	6.0
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	0.0
pH:	N/A
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Lead	50,000	207	0
Sulfuric Acid	3,000	98	10

A10. PAINT WASTE WITH HEAVY METALS (WASTE STREAM NUMBER 27)

This waste category is generated by 4 SICs, including outdoor advertising and water transportation services. Trucking terminal facilities and railroad transportation (SICs 4231 and 40) were expected to generate this waste but, when surveyed, indicated they did not.

A20.1 Quantities Generated

Exhibit A20-1 lists the 4 SICs generating paint wastes with heavy metals and the quantity generated by each, according to the 1984 Abt survey. Total quantity is 1579.7 kg/month. Abt data indicates 29.1 percent of the firms generating paint waste generate more than 100 kg/month total waste, and this 29.1 percent generates 39.2 percent (or 619.4 kg/month) of the total paint wastes. Question 22 of the Abt survey identified an additional 48 SICs generating this waste but not reporting quantity data.

A20.2 Waste Characteristics

Exhibit A20-2 shows a waste stream with typical characteristics, taken from the WET model (waste stream 03.03.01).

EXHIBIT A20-1

GENERATORS OF PAINT WASTE WITH HEAVY METALS

SIC Code	Quantity (kg/month)[1]
3993	14
4212	310
4469	1,239
7397	18
Total SICs 4	Total waste 1,579.7[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A20-2

PAINT WASTE WITH HEAVY METALS

State:	Liquid
Generation:	Intermittent
Fraction Nonwater:	.75
Fraction Suspended:	.2
Solids Specific Gravity:	4.5
Average Specific Gravity:	3.6
Heating Value:	25,300 kJ/kg
Fraction Chlorine	0.0
Fraction Ash:	0.2
pH:	N/A
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Toluene	10,000	92	28.7
MEK	10,000	72	71.2
Chromium VI	56	52	0
Lead	40	207	0
Mercury	12	201	$.12 \times 10^{-2}$

A21. SOLUTION OR SLUDGE WITH PHOTO SILVER (WASTE STREAM NUMBER 28)

Abt indicates this waste is generated by the blueprinting, photocopying, photofinishing and commercial photography industries. These same industries generate waste 9, photographic waste, and waste 14, ignitable wastes.

A21.1 Quantities Generated

The Abt survey indicates that this waste is generated by the 22 SICs listed in Exhibit A21-1, which also shows the corresponding monthly generation. Total waste quantity in 743,256.7 kg/month. Abt data show that 37.1 percent of the firms generating this waste have a total waste generation of over 100 kg/month, the cut-off for small quantity generators. These firms generate 89.5 percent of the total waste, or 665,046.1 kg/month. Question 22 of the Abt survey identified an additional 30 SICs that generate this waste, but for which no quantity data are available.

A21.2 Waste Characteristics

This waste stream is most likely generated as a mixture of photo silver and waste 8, cyanide wastes; waste 9, photographic wastes; waste 14, ignitable wastes; and waste 16, spent solvents. One industry source (Forbes 1984) indicates that silver is recovered from the wastes. Cyanide is present as ferrocyanide and silver is complexed as its thiosulfate, sulfate, or sulfanate.

EXHIBIT A21-1

GENERATORS OF SOLUTION OR SLUDGE WITH PHOTO SILVER

SIC Code	Quantity (Kg/month)[1]
2260	421
2261	1,052
2621	259
2700	948
2710	748
2711	87
2741	336
2750	6,901
2751	36
2752	566
2753	259
2791	9,491
3861	380
4830	170
7216	1,484
7300	12,856
7330	3,970
7332	35,367
7333	173,956
7390	1
7395	488,855
8249	433
Total SICs 22	Total waste 743,256.7[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2]Total may not add due to rounding.

EXHIBIT A21-2

SOLUTION OR SLUDGE WITH PHOTO SILVER

State:	Liquid
Generation:	Intermittent
Fraction Non-water:	0.2
Fraction Suspended:	0.1
Solids Specific Gravity:	2.5
Average Specific Gravity:	1.2
Heating Value:	1500 kJ/kg
Fraction Chlorine:	0.0
Fraction Ash:	0.1
BOD:	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Methanol	20,000	32	96.0
Acetone	20,000	58	185.0
Phenol	0.09	94	.341
Iron	15.0	56	0.0
Boron	13.0	11	0.0
Silver	.45	108	0.0
Cyanide	.57	27	658.7

A22. WASTE FORMALDEHYDE (WASTE STREAM NUMBER 29)

Waste formaldehyde is generated by funeral services, where it is used as an embalming fluid.

A22.1 Quantities Generated

Abt (1984) estimates that 737,469.1 kg/month are generated by SIC 7261. TRW (1979) estimates that 14,472 facilities in SIC 7261 generate an average of 1.3 kg/month, which would place the establishments below the quantity necessary to be classified as small quantity generators. Abt data show 14.4 percent of the firms generating this waste generate greater than 100 kg/month of total waste, and this 14.4 percent generates 61 percent (or 449,671.1 kg/month) of the total formaldehyde waste. Question 22 of the Abt survey identified an additional 55 SICs that claimed generation of formaldehyde waste.

A22.2 Waste Characteristics

Exhibit A22-2 shows a typical waste formaldehyde stream, based on the following assumptions. TRW (1979) indicates that embalming fluid contains 23 percent formaldehyde, the remainder being water, surfactants, and humectants. The surfactant and humectant were assumed to be non-hazardous. The pint containers weigh 65 grams each. By assuming the amount left in each container is similar to that for empty pesticide containers (90 ml solution per 5 gallon container) the concentration of formaldehyde in the waste can be calculated. The containers are assumed to be polyethylene in order to calculate specific gravity of the waste.

EXHIBIT A22-1

GENERATORS OF WASTE FORMALDEHYDE

	SIC Code		Quantity (Kg/month)[1]
	7216[3]		91
	7261		737,378
Total SICs	2	Total waste	737,469.1[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

[3] This may be a typographical error, because dry cleaners are unlikely to generate waste formaldehyde. We believe that it should be included under SIC 7261.

EXHIBIT A22-2

WASTE FORMALDEHYDE

State:	Solid
Generation:	Intermittent
Fraction Nonwater:	1.0
Fraction Suspended:	N/A
Solids Specific Gravity:	.95*
Average Specific Gravity:	.95
Heating Value	0.0
Fraction Chlorine	0.0
pH:	7.0
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Formaldehyde	~ 7,500	30	3286

* Assuming polyethylene containers.

A23. WASTE CONTAINING AMMONIA (WASTE STREAM NUMBER 30)

Ammonia containing wastes are generated primarily by SICs 7340 and 7349, industries providing cleaning and maintenance services.

A23.1 Quantities Generated

Exhibit A23-1 lists the 3 SICs which generate ammonia-containing wastes and the quantities generated, as given in the Abt survey. Total generation is 30,547.2 kg/month. According to Abt, 8 percent of the total facilities generating this waste generate greater than 100 kg/month, and this 8 percent accounts for 74 percent (or 22,613.3 kg/month) of the total ammonia wastes generated. Abt identifies 42 additional SICs generating ammonia wastes without giving quantity data.

A23.2 Waste Characteristics

By analogy to WET model streams, the waste is assumed to be a 10 percent ammonia solution with water. Exhibit A23-2 shows a typical waste stream in this category.

EXHIBIT A23-1

GENERATORS OF WASTE CONTAINING AMMONIA

	SIC Code		Quantity (Kg/month)[1]
	7300		223
	7340		12,695
	7349		17,629
Total SICs	3	Total waste	30,547.2[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A23-2

WASTES CONTAINING AMMONIA

State:	Liquid
Generation:	Intermittent
Fraction Nonwater:	.1
Fraction Suspended:	0.0
Average Specific Gravity:	1.0
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	0.0
pH:	11.0
BOD:	N/A

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Ammonia	100,000	18	6460

A24. WASTE INK WITH SOLVENT OR HEAVY METALS (WASTE STREAM NUMBER 31)

Abt (1984) indicates that waste ink with solvent or heavy metal is generated primarily by SICs 264, 265, and 27. The characteristics of the waste are essentially the same as waste 33.

A24.1 Quantities Generated

Exhibit A24-1 lists the 18 SICs generating this waste and the quantities generated. Total quantity is 135,202.8 kg/month. TRW (1979) agrees with the SICs listed but notes that as much as 45 percent of SIC 27 establishments generate less than 100 kg/month of waste, too little for categorization as small quantity generators. TRW indicates that SIC 2893 also generates this type of waste.

According to Abt, 83.8 percent of the waste (133,272.6 kg/month) is generated by firms that generate over 100 kg/month of total waste. These firms represent 16.5 percent of all the firms generating this waste. The Abt survey identified 30 other SICs that indicated generation of this waste without giving quantity data.

A24.2 Waste Characteristics

We believe that waste ink with solvents or heavy metals will be essentially identical to waste 33, ink sludge with chromium or lead. Thus the waste characterization presented in Exhibit A24-2 below is similar to that for waste 33, taken from the WET model (stream 01.05.03), except that the waste ink contains less solid material than the ink sludge.

EXHIBIT A24-1

GENERATORS OF WASTE INK WITH SOLVENTS OR HEAVY METALS

SIC Code	Quantity (Kg/month)[1]
2640	61,757
2642	16,617
2650	223
2700	1,506
2710	125
2711	14,715
2730	48
2750	14,300
2751	16,863
2752	2,578
2791	48
2795	565
2823	896
2899	943
3079	1,405
3555	722
7332	76
7333	1,816
Total SICs 18	Total waste 135,202.8[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A24-2

INK WASTE WITH SOLVENTS OR HEAVY METALS

State:	Liquid
Generation:	Continuous
Fraction Nonwater:	.02
Fraction Suspended:	.02
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.0
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	.01
pH:	12.5
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Chromium VI	50	52	0
Lead	260	207	0
Toluene	100	92	28.7

A25. HEAVY METAL WASTEWATER SLUDGE (WASTE STREAM NUMBER 32)

Heavy metal wastewater sludge is generated by manufacturers of primary metal products and fabricated metal products including machinery, as well as by firms involved in rolling, drawing, and extruding of metals.

A25.1 Quantities Generated

Exhibit A25-1 lists the 11 SICs generating heavy metal wastewater sludge, and the quantities generated according to the 1984 Abt survey. Total waste quantity is 200,311.8 kg/month. TRW estimates that firms involved in rolling, drawing, and extruding of metal generate heavy metal wastewater sludge as about five percent of their total waste. Twenty percent of firms manufacturing fabricated metal products generate wastes containing heavy metals according to TRW, but it is not clear how much of this is wastewater sludge. In electroplating and metal finishing, however, TRW estimates that wastewater sludge makes up about 23 percent of the total waste.

Abt data show that 46.9 percent of the firms generating heavy metal wastewater sludge generate a total waste quantity of 100 kg/month or greater. These firms produce 92.2 percent (184,702.8 kg/month) of the total amount of heavy metal wastewater sludge. Question 22 of the Abt survey identified 34 additional SICs that generate this waste but provided no quantity information.

A25.2 Waste Characteristics

A typical heavy metal wastewater sludge is shown in Exhibit A25-2, adapted from WET model waste streams 01.01.06, 01.01.16, 01.01.19, and 01.04.03 generated by SICs 3351, 3471, 2816 and 2861. WET model waste streams have heavy metal constituent concentrations of between 26 ppm (chromium concentration in wastewater treatment sludges from the production of sulfate turpentine) and 30,000 ppm (copper concentration in wastewater treatment sludges from copper rolling and drawing), so the concentrations are highly variable depending on the particular process.

EXHIBIT A25-1

GENERATORS OF HEAVY METAL WASTEWATER SLUDGE

SIC Code	Quantity (kg/month)[1]
2751	110
3300	45,025
3400	81,948
3462	931
3470	38,382
3471	12,646
3500	12,878
3674	6,633
3692	1,746
3820	8.4
3911	5.1
Total SICs: 11	200,311.8[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A25-2

HEAVY METAL WASTEWATER SLUDGE

State:	Liquid
Generation:	Continuous
Fraction Non-water:	0.1
Fraction Suspended:	0.09
Solids Specific Gravity:	3.0
Average Specific Gravity:	1.2
Heating Value:	0.0
Fraction Chlorine:	0.0
Fraction Ash:	0.0
pH:	8.0
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Chromium VI	1,100	52	0.0
Lead	600	207	0.0
Cadmium	350	112	0.0
Copper	7,000	64	0.0
Nickel	2,500	59	0.0

A26. INK SLUDGE WITH CHROMIUM OR LEAD (WASTE STREAM NUMBER 33)

Ink sludge is generated primarily by the printing and publishing industries, and ink producers. Characteristics of the waste generated by each individual SIC are assumed to be very similar although quantities differ.

A26.1 Quantities Generated

Exhibit A26-1 shows the 9 SICs generating ink sludge and the quantities produced by each, according to the 1984 Abt survey. Total generation is 18,055.8 kg/month. TRW agrees with the SICs generating, but notes that more than 45 percent of the firms in SIC 27 generate less than 100 kg/month of waste, too little to be characterized as small quantity generators. However, Abt data indicates that 58.6 percent of the total waste, or 10,588.2 kg/month, is generated by SQGs that generate greater than 100 kg/month of waste. These generators represent only 7.1 percent of the total. Eighteen additional SICs were identified by the Abt survey as generators of ink sludge with chromium or lead, but no quantites were reported.

A26.2 Waste Characteristics

Exhibit A26-2 shows a typical waste stream in this category, based on the WET model characterization for SIC 2893 (stream 01.05.03).

EXHIBIT A26-1

GENERATORS OF INK SLUDGE WITH CHROMIUM OR LEAD

SIC Code	Quantity (Kg/month)[1]
2700	3,113
2750	493
2751	1,896
2752	232
2754	55
2782	4,633
2791	1,102
2893	6,530
7333	1
Total SICs 9	Total waste 18,055.8[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A26-2

INK SLUDGE WITH CHROMIUM OR LEAD

State:	Liquid
Generation:	Continuous
Fraction Nonwater:	.07
Fraction Suspended:	.06
Solids Specific Gravity:	2.0
Average Specific Gravity:	1.1
Heating Value:	0.0
Fraction Chlorine	0.0
Fraction Ash:	.05
pH:	12.5
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure (mm Hg)
Chromium VI	150	52	0
Lead	760	207	0
Toluene	100	92	28.7

A27. HEAVY METAL WASTE MATERIALS (WASTE STREAM NUMBER 39)

This category of waste encompasses heavy metal dust, solutions, and sludge that have been characterized earlier in this appendix. Apparently, this category was used to obtain information when there was some doubt as to the actual form of the waste. About 75 percent of this waste was produced by SIC 3079, Miscellaneous Plastics Products, and most of the remainder came from SICs 2821 and 2822, Plastics Materials and Synthetics.

A27.1 Quantities Generated

Exhibit A27-1 lists the 12 SICs generating heavy metal waste materials and the quantity generated by each according to the 1984 Abt survey. Total waste quantity is 47,307.7 kg/month. TRW estimates that less than one percent of firms in SIC 30 produce waste with heavy metals, whereas four percent of those in SIC 282 generate metal-containing wastes.

Abt data show that 49.1 percent of the firms generating heavy metal waste materials generate a total waste quantity of 100 kg/month or greater. These firms produce 94.7 percent (44,780.7 kg/month) of the total heavy metal waste materials. Question 22 of the Abt survey identified 60 additional SICs that claimed to generate heavy metal waste materials but provided no information on the quantities produced.

A27.2 Waste Characteristics

Exhibit A27-2 shows a typical waste for this category. It was obtained by combining the typical wastes from heavy metal dust, solutions, and sludge because this was considered to be a composite of these wastes.

EXHIBIT A27-1

GENERATORS OF HEAVY METAL WASTE MATERIALS

SIC Code	Quantity (kg/month)[1]
2800	1,757
2820	5,221
2821	3,351
2822	1.3
2824	35
2899	507
3079	35,233
3293	726
3479	476
3599	0.1
7391	0.2
7397	0.7
Total SICs: 12	47,307.7[2]

Source: Small Quantity Generator data base generated by Development Planning and Resource Associates from the Abt Survey information.

[1] National aggregate total for each SIC. In some cases 3- or 4-digit SICs appear along with the corresponding 2-digit SIC. In these cases the quantities shown for the 2-digit SIC are exclusive of the quantities shown for the 3- or 4-digit SICs.

[2] Total may not add due to rounding.

EXHIBIT A27-2

HEAVY METAL WASTE MATERIALS

State:	Sludge
Generation:	Continuous
Fraction Non-water:	0.3
Fraction Suspended:	0.28
Solids Specific Gravity:	3.0
Average Specific Gravity:	1.6
Heating Value:	0.0
Fraction Chlorine:	0.0
Fraction Ash:	0.0
pH:	9.5
BOD:	0.0

Constituent	Concentration (ppm)	Molecular Weight	Vapor Pressure
Cadmium	400	112	0.0
Chromium VI	450	52	0.0
Lead	5,000	207	0.0
Copper	300	64	0.0
Nickel	100	59	0.0

REFERENCES

1. Small Quantity Hazardous Waste Generator Study, Abt Associates, Inc., December 1984.

2. The RCRA Risk-Cost Analysis Model Waste Stream Data Base, ICF Incorporated, July 1984.

3. Technical Environmental Impacts of Various Approaches for Regulating Small Volume Hazardous Waste Generators, Volume II, TRW Environmental Engineering Division, December 1979.

4. Final Report on Pesticide Containers. Dr. J.K. Leasure. Illinois Institute for Environmental Quality; Energy Resources Co., 1978.

5. Telephone conversation with Mr. Forbes, Environmental Technical Services Group, Kodak Inc., Rochester, New York, December 19, 1984.

6. Preliminary Study of Sources of Inorganic Arsenic, EPA-450/5-82-005. Radian Corporation, August 1982.

APPENDIX B

FEDERAL AND STATE REGULATIONS FOR SMALL QUANTITY GENERATORS

This Appendix summarizes Federal and State SQG regulations as of December 1984. It was compiled on the basis of telephone interviews with representatives of state environmental agencies and departments, and other existing studies of these regulations.

FEDERAL AND STATE SMALL QUANTITY GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
				[Form used for identifying the quantity, composition, origin, routing, and destination of hazardous waste (40 CFR, Part 262, Subpart B)]	[Before transporting waste, a generator must label it according to Department of Transportation regulations (40 CFR, Part 262, Subpart C)]	[Must keep copy of manifest for three years; records of test results must be saved; a report must be submitted to EPA each even numbered year (40 CFR, Part 262, Subpart D)]	[Treatment, storage and disposal facility personnel must complete class-room instruction or on-the-job training that teaches them how to perform their duties, ensuring facilities compliance (40 CFR, Part 264, Subpart B)]	[Treatment, storage and disposal facility owners and operators must have plans for effective action to minimize unanticipated damage from a release (40 CFR, Part 264, Subpart D]
Federal Regulation (Part 261.5 of Title 40, Code of Federal, Regulations (CFR))	Hazardous waste regulations promulgated under RCRA excludes from regulation any generator which produces less than 1000 kg/month of hazardous waste or less than 1 kg/month of acutely hazardous waste. Generators must not accumulate quantities in excess of these amounts at any time.a/ (only the exclusion level will be listed unless there are other State deviations from the Federal regulation)	A "small quantity generator" (SQG) as defined under Part 261.5 of the 40 CFR, Chapter 1, is exempt from regulations under 40 CFR Parts 122 and 124, Parts 262 through 265, and the notification requirements in Section 3010 of RCRA (see note A). To be exempt, SQGs must: 1. Comply with criteria for listing hazardous wastes 2. Treat or dispose of waste as allowed -- see next column.	SQGs must treat or dispose of their waste: 1. On-site; generators disposing waste on-site are required to determine the waste characteristics and may not accumulate more than the exclusion level. 2. At a RCRA permitted hazardous waste (Subtitle C) facility	No	No	No	No	No

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Federal Regulation (Continued)			3. At a solid waste (Subtitle D) facility that has been permitted, licensed, and registered by a State to manage industrial and municipal waste. 4. At a facility which reuses, recycles, or reclaims wastes.					
Alabama	1000 kg/month	Same as Federal regulations, plus State can require information on special handling for disposal of particular waste.	Federal Regulations apply.	No	No	No	No	No
Alaska	1000 kg/month Not Authorized (see note B) An amendment to regulations in Alaska will lower the SQG exclusion level to 220 lbs/month. The regulation must be developed by July 1, 1986 and will become effective July 1, 1987. h/	Federal Regulations Apply h/	Federal Regulations Apply h/	No h/	No h/	No h/	No h/	No h/

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Arizona	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Arkansas	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
California	No quantity exemption; California statutorily defines a SQG the same as EPA, but has no numerical quantity exemption in its regulation. Quantity exemption and other variances are addressed on a case-by-case basis.	Generators may be granted a variance for waste that is insignificant as potential hazard to human health, domestic livestock, or wildlife because of its small quantity, low concentration, or physical or chemical characteristics. Variance may be granted if waste is handled, processed, or disposed, pursuant to regulations of another agency.	No disposal is allowed in Subtitle D landfill	Yes b/ except generators of less than 5 gallons or 50 lbs.	Yes b/	Yes b/ Records and annual reports required	Yes b/	Yes b/
Colorado	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Connecticut	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Delaware	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
District of Columbia	1000 kg/month Presently performing an impact analysis of lowering the exclusion level to 100 kg/month.e/	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Florida	1000 kg/month	Federal Regulations apply	SQG needs State approval for disposal in (Subtitle D) sanitary landfill	No	No	No	No	No
Georgia	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Guam	200 kg/month	Manifest required for off island disposal.d/	Federal Regulations apply	No (if disposed on island)	No	No	No	No
Hawaii	1000 kg/month Not Authorized (see note B)	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Idaho	1000 kg/month Not Authorized (see note B)	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Illinois	100 kg/month of "Special Waste." Special waste includes substances not defined as 'hazardous waste' by RCRA (e.g., pickling liquors, cutting oils, and wastewater treatment plant sludges).b/	SQGs producing between 100-1000 kg/month of special waste must manifest, label and keep records for three years.	No disposal in Subtitle D landfill.	For generators producing between 100-1000 kg/month: Yes	Yes	Yes b/ Records to be kept for three years No b/ Annual reports required	No b/	No b/
Indiana	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Iowa	1000 kg/month	Federal Regulations apply	SQGs need a "special waste" authorization to dispose of waste at a permitted sanitary landfill.	No	No	No	No	No

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Kansas	75 Kg/month New regulations passed July 1, 1984 lowered the exclusion level from 100 kg/month to 75 kg/month. The exclusion level will be lowered to 50 kg/month in July 1985 and then to 25 kg/month in July 1986.h/	SQGs producing between 75 kg/month and 1000 kg/month must manifest, label and meet recordkeeping and reporting requirements.h/	SQGs producing between 75 kg/month must dispose of waste in a Subtitle C facility. Generators below the exemption level must use Subtitle D facilities.h/	Yes h/	Yes h/	Yes h/	No h/	No h/
Kentucky	1000 kg/month	Federal Regulations apply plus SQGs of acutely hazardous waste are subject to state permitting requirements.	Federal Regulations apply	No	No	No	No	No
Louisiana	No exemption. Louisiana may exempt individual home-owners, farmers and others who generate only small quantities of hazardous waste. Generators must petition for exemption.	All generators are regulated in the same manner. (except by specific exemptions)	All generators are regulated in the same manner. (except by specific exemptions)	Yes	Yes	Yes	Yes	Yes
Maine	200 kg/month h/	SQGs may accumulate wastes up to 200 kg/month without a license; other requirements apply to all generators.h/	All generators must used a licensed hazardous waste (Subtitle C) facility.h/	For generators producing less than 1000 kg/month: Yes h/	Yes h/	Yes h/	Yes h/	Yes h/

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
				For generators producing less than 1000 kg/month:				
Maryland	1000 kg/month. "An Act Concerning Controlled Hazardous Substances" (Chapter 743) passed the Maryland Legislature and was signed by the Governor in May 1984. The Act will reduce the exclusion level to 100 kg/month (effective July 1, 1985).b/	Wastes sent to Subtitle C facilities must be properly manifested and hauled by a licensed transporter. b/	SQGs are allowed to dispose of wastes in Subtitle D facilities, yet very few Subtitle D landfills are allowed to accept such wastes under the terms of their permits.b/ (Personnel of the Office of Solid Waste, Facility Permits Section said that the Subtitle D facilities do not want such authority and have not asked for it.)b/	No b/ (but most disposal facilities will not accept waste without a manifest)	No b/ (same as manifest)	Yes b/ Must keep records if they manifest; no annual report required	No b/	No b/
				For generators producing between 20-1000 kg/month:				
Massachusetts	20 kg/month No SQG exemption, but Massachusetts legislation allows "insignificant" waste to be exempt from regulation. b/	SQGs producing between 20 kg/month and 1000 kg/month must manifest their wastes to a RCRA licensed facility, but there are no recordkeeping or annual reporting requirements. All generators must notify the State agency and receive an EPA ID number.b/	All SQG wastes must be disposed in a RRCA (Subtitle C) facility. b/	Yes b/ Required of all generators; transporters specifically authorized to do so may fill out the forms. Generator must sign.b/	Yes b/	No b/	No b/	No b/

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Michigan	100 kg/month g/	SQGs between 100-1000 kg/month must use licensed hauler.g/	SQGs between 100-1000 kg/month must dispose of waste at licensed facility.g/	For generators producing between 100-1000 kg/month: No g/ Proposed amendment would make manifest a requirement for off-site shipments.	No g/	Yes g/	No g/	No g/
Minnesota	1000 kg/month Not Authorized (See note B)	Federal Regulations apply. Proposed regulation will require hazardous waste to be sent to licensed hazardous waste facility. No paper work or manifest required.	Federal Regulation apply	No	No	No	No	No
Mississippi	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Missouri	100 kg/month h/	Generators producing between 100-1000 kg/month must meet RCRA requirements except for the disposal provisions.h/	Generators producing under 1000 kg/month may dispose of wastes in Subtitle D facilities.h/	For generators producing between 100-1000 kg/month: Yes h/	Yes h/	Yes h/	Yes h/	Yes h/
Montana	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Nebraska	1000 kg/month	Federal Regulations apply	SQG may dispose of waste as a solid waste in a state licensed landfill with approval	No	No	No	No	No
Nevada	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No

FEDERAL AND STATE SMALL QUANTITY GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
New Hampshire	100 kg/month h/	SQGs producing less than 100 kg/month may be required to manifest to meet disposal requirements in nearby states.h/	SQGs producing between 100-1000 kg/month must use a State authorized hazardous waste facility.h/	Yes h/	Yes h/	Yes h/	Yes h/	Yes h/
New Jersey	100 kg/month	No manifest required for SQGs producing less than 100 kg/month	SQGs producing below 100 kg/month may dispose of waste in subtitle D landfill. b/ SQGs may store less than 100 kg of waste indefinitely without a permit.	For generators producing between 100-1000 kg/month: Yes b/	Yes b/	Yes b/	Yes b/	Yes b/
New Mexico	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
New York	100 kg/month	All SQGs below 100 kg/month are entirely exempt from regulation SQGs between 100-1000 kg/month must submit annual reports.	SQGs between 100-1000 kg/month must send waste to a State authorized treatment, storage and disposal facility.	For generators producing less than 100 kg/month: No	No	No Annual reports required for those between 100-1000 kg/month.	No	No
North Carolina	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
North Dakota	1000 kg/month Not Authorized (See note B)	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Ohio	1000 kg/month	Federal Regulations apply	Waste must be disposed in permitted facilities.	No	No	No	No	No

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Oklahoma	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Oregon	200 lbs./month SQGs are defined as those producing less than 200 lbs/month. The State also establishes other exemption levels for certain waste categories.h/ (See note C)	SQGs producing between 200 lbs/month must be registered with the State.h/	SQGs producing between 200 lbs - 1000 kg/month must dispose of their waste in a Subtitle C facility. Generators producing less than 200 lbs/month need permission to dispose in a Subtitle D facility.h/	For generators producing between 200 lbs/month and 1000 kg/months: No h/	No h/	No h/	No h/	No h/
Pennsylvania	1000 kg/month h/	SQGs must keep waste records for 5 years. If the waste is delivered by the generator, there is no quarterly reporting requirement.h/	SQGs must dispose of their waste at a permitted Subtitle C facility or at a municipal waste facility (Subtitle D) that has received written approval from the State.h/	No (if waste is delivered by generator) h/	No h/	Yes (must keep waste records for 5 years) h/	No h/	No h /
Puerto Rico	1000 kg/month	SQGs are exempt from manifest and permit requirements if the waste is treated, stored or disposed within the territory.	Federal Regulations apply	No (if treated, stored, or disposed within territory)	No	No	No	No
Rhode Island	No exemption. (some exceptions for infectious waste generators)	All generators regulated in the same manner.	All generators regulated in the same manner.	Yes	Yes	Yes	Yes	Yes

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
				For generators producing between 100-1000 kg/month:				
South Carolina	100 kg/month.	SQGs above 100 kg/month subject to full regulation.	SQGs above 100 kg/month subject to full regulation.	Yes	Yes	Yes	Yes	Yes
South Dakota	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Tennessee	1000 kg/month	Federal Regulations apply plus SQGs over 100 kg/month have separate notification requirements.	SQGs over 100 kg/month must obtain written approval of the State Regulatory authority and the facility operator before disposing of waste.	No	No	No	No	No
Texas	Two agencies share the State's waste management program. Texas Dept. of Health (TDH) manages municipal waste and Texas Dept. of Water Resources (TDWR) manages industrial waste. TDH - 1000 kg/month. [TDH The proposed amendments will lower the exclusion level to 100 kg/month; final approval is expected on Nov. 30, 1984].f/ TDWR - No exemption.	Federal Regulations apply. [The proposed TDH amendments will require SQGs to test wastes, to notify the State before disposal, to manifest, and to keep disposal records.]f/	TDH - SQG must have Department approval and that of the landfill operator before disposal in a solid waste landfill. c/ TWDR - Disposal in (Subtitle D) solid waste landfills allowed on a case-by-case basis.c/	No No	No No	No No	No No	No No

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Utah	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Vermont	100 kg/month There are two exceptions from this exemption level. The State has a 500 kg/month level for some retail wastes (that will expire in 1986) and a 1000 kg/month for certain diluted pesticide rinse water.h/	SQGs producing less than 100 kg/month must notify the State and may be requested to furnish an annual report. Generators producing above 100 kg/month must meet large generators regulations.h/	Generators producing between 100-1000 kg/month must dispose of waste in a Subtitle C facility. Generators producing less than 100 kg/month must use either a certified hazardous waste facility, a State approved sanitary landfill or an environmentally sound alternative (as ruled by the State).h/	Yes h/	Yes h/	Yes h/	Yes h/	Yes h/
Virginia	1000 kg/month	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No
Washington	Based on a degree-of-hazard (DOH) classification system (exclusion level varies from 400 lbs./month to 0.4 lbs./month).	Measurements are made of a waste's qualitative characteristics, its quantity and its concentration. Wastes are then divided into three categories: o Dangerous Waste (DW); o Extremely hazardous waste (EHW); o Undesignated wastes	Because of the DOH approach, limits on disposal are a function of quantity and concentration. No disposal is allowed in a Subtitle D landfill for generators between the exclusion level and 1000 kg/month. Disposal is allowed in a Subtitle D facility	For generators producing between the exclusion level (set by the DOH approach) and 1000 kg/month: Yes b/	Yes b/	Yes b/	Yes b/	Yes b/

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Washington (Continued)		If a dangerous waste is generated in amounts less than 400 lbs. per month at a concentration of .01 percent or less, the waste is excluded from regulations.	for those less than the exclusion level.b/					
W. Virginia	1000 kg/month Divides SQGs into manufacturing and non-manufacturing for purposes of recordkeeping h/	Manufacturing SQGs: Must maintain records of waste types/quantities disposed of, dates of transportation off-site, and the final disposition of waste. Non-manufacturing SQGS: No recordkeeping requirement h/	All SQGs must dispose of waste at a permitted hazardous waste facility or an industrial waste landfill. Disposal at a municipal landfill is prohibitted.h/	No h/	No h/	Yes h/ (for all manufacturing SQGs) No (for all non-manufacturing SQGs)	No h/	No h/
Wisconsin	1000 kg/month h/	Generators between 100-1000 kg/month must submit an annual report h/	For SQGs producing less than 100-1000 kg/month, waste disposed off-site must go to a RCRA permitted treatment, storage, or disposal facility or approved sanitary landfill. Off-site disposers must report the hazardous characteristics of the waste to the receiving facility h/	For generators producing less than 100 kg/month: No h/	No h/	No h/	No h/	No h/
				For generators producing between 100-1000 kg/month: No h/	No h/	Yes h/ Must submit annual resports	No h/	No h/

FEDERAL AND STATE SMALL QUANTITY
GENERATOR (SQG) REGULATIONS

State	SQG Exclusion Level	Variations in State SQG Regulations from the Federal Regulations	SQG Treatment and Disposal Requirements	Applicability of Selected RCRA Provisions for SQGs				
				Manifest	Labeling	Recordkeeping and Reporting	Personnel Training	Contingency Plan
Wyoming	1000 kg/month Not Authorized (see Note B)	Federal Regulations apply	Federal Regulations apply	No	No	No	No	No

Notes

A SQGs are exempt from regulations under 40 CFR Parts 122 and 124, Parts 262 through 265, and the notification requirements in Section 3010 of RCRA.

Part 122 - National Pollution Discharge Elimination System (NPDES) [authority under the Clean Water Act, 33 U.S.G. 1251] -- The Section describes the NPDES program (including permit applications and permit conditions).

Part 124 - Procedure for Decision Making [authority under RCRA 42, U.S.C. 6901; Safe Drinking Water Act, 42 U.S.C. 300(f); and Clean Air Act, 42 U.S.C. 1857] -- The section describes a program for modification and consolidation of the permitting process (including a section on specific procedures applicable to RCRA permits).

Part 262 - Standards Applicable to Generators of Hazardous Waste [authority under RCRA as amended 42 U.S.C. 6905, 6912(a), 6924 and 6925] -- The Section includes generator requirements for:
- the manifest;
- packaging, labeling, and marking; and
- recordkeeping and reporting.

Part 263 - Standards Applicable to Transporters of Hazardous Waste [authority under RCRA] -- The section includes transporter requirements for:
- compliance with the manifest system; and
- immediate action and clean-up in the case of a hazardous waste discharge.

Part 264 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) [authority under RCRA] -- The section includes owner/operator requirements for:
- Prepardness and prevention;
- contingency plans and emergency procedures;
- manifesting, recordkeeping, and reporting;
- groundwater protection;
- closure and post-closure;
- use and management of containers, tanks, and surface impoundments;
- landfills and waste piles; and
- land treatment and incinerators.

Part 265 - Interim Status Standards for Owners and Operators of Hazardous Waste Facilities [authority under RCRA] -- This section has similar provisions to Part 264 but applies to a TSDF's operation during the period of interim status.

Section 3010 of RCRA - Requires any person generating or transporting hazardous waste or owning or operating a facility of treatment, storage, or disposal of such substances shall file with the Administrator a notification stating the location and general description of such activity and the identified or listed hazardous wastes handled by such person.

B Not Authorized/Federal Rules Apply -- Under RCRA (Section 3006), EPA is to manage the hazardous waste control programs until states that desire to administer their own programs can demonstrate that their programs are substantially equivalent (and ultimately will be equivalent) to EPA's program. Interim authorization may be granted by the Administrator allowing a state program to operate temporarily in lieu of the Federal program. States with interim authorization are listed as "Not Authorized."

C Oregon bases some exemptions on particular hazardous waste characteristics. Wastes that meet certain criteria in each category have exemption set at the following levels:

Ignitable waste -	Up to 25 lbs./month
Corrosive waste -	Up to 200 lbs./month
Toxic waste:	
a) Pesticides -	Up to 10 lbs. or one gallon/month
b) Halogenated hydrocarbons/phenols -	Up to 200 lbs/month
c) Inorganics -	10 lbs./month - 200 lbs./month, depending on waste mixtures

Sources:

a/ Unless otherwise cited, Association of State and Territorial Solid Waste Management Officials, "State Small Quantity Hazardous Waste Generator Survey: Draft Final Report," September 1983.

b/ Office of Solid Waste, "A Study of State Programs for the Regulation of Small Quantity Generators of Hazardous Waste: Vol. I and II." Prepared by The Cadmus Group, Inc., July 18, 1984.

c/ General Accounting Office, "Information on Disposal Practices of Generators of Small Quantities of Hazardous Wastes," September 28, 1983.

d/ OTA Staff Memorandum, "The RCRA Exemption for Small Volume Generators," July 1982.

e/ Conversation with Chet Oszman, Permits and State Programs Division, Office of Solid Waste, EPA, September 28, 1984.

f/ Inside Washington Publishers, "Environmental Policy Alert: State Environmental Regulation," October 24, 1984.

g/ Michigan Department of Natural Resources, "Investigations and Recommendations for a Management System for Small Quantities of Hazardous Waste from Michigan Business and Industry, June 1, 1984.

h/ Conversations with state personnel working on small quantity generator regulations.

Alaska	-	Mr. David Ditralgia, Hazardous Waste Program Management, Air and Solid Waste Section, Department of Environmental Conservation
Kansas	-	Mr. Paul Goetz, Chief, Hazardous Waste Management Unit, Department of Health and Environment
Maine	-	Mr. Scott Whittier, Department of Environmental Protection
Missouri	-	Mr. Kenneth Davis, Waste Management Program, Department of Natural Resources
New Hampshire	-	Ms. Dawn Channing, Office of Waste Management, Department of Public Health
Oregon	-	Mr. Gary Kalaba, Hazardous Waste Operations, Department of Environmental Quality
Pennsylvania	-	Mr. Doug Loranzin, Bureau of Solid Waste Management, Department of Environmental Resources
W. Virginia	-	Mr. Mark Casdorph, Division of Water Resources, Department of Natural Resources
Wisconsin	-	Ms. Barbara Zellmer, Department of Natural Resources
Vermont	-	Ms. Anne Whiteley, Solid/Hazardous Waste Programs, Agency of Environmental Conservation

APPENDIX C

GEOGRAPHICAL DISTRIBUTION OF SMALL QUANTITY GENERATORS

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	AK	AL	AR	AZ	CA	CO	CT
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
ARSENIC WASTES	.	4.70	9.86	2.51	11.74	0.83	.
CYANIDE WASTES	2.69	8.46	7.47	20.10	332.95	35.11	80.92
EMPTY PESTICIDE CONTAINER	2.15	48.01	42.55	54.15	296.13	26.32	33.97
FILTRATION RESIDUE FROM DRY CLEANERS	11.16	275.65	138.60	101.67	1213.66	190.34	268.11
HEAVY METAL DUST	0.00	2.01	1.41	0.01	0.27	0.03	4.30
HEAVY METAL SOLUTIONS	0.00	0.15	0.29	0.55	6.91	0.55	0.10
HEAVY METAL WASTE MATERIALS	0.02	1.53	1.11	0.84	13.34	1.12	14.21
HEAVY METAL WASTEWATER SLUDGES	2.34	77.48	31.43	40.79	558.29	48.83	62.43
IGNITABLE PAINT WASTES	8.98	76.01	41.38	68.47	993.47	115.57	84.04
IGNITABLE WASTES	10.16	80.96	52.12	62.73	846.09	87.88	155.44
INK SLUDGE WITH CHROMIUM OR LEAD	0.01	3.09	1.71	0.09	0.92	0.13	1.53
MERCURY WASTES	.	.	.	.	.	.	.
OTHER REACTIVE WASTES	1.65	15.70	9.17	17.44	158.61	14.78	15.85
PAINT WASTE WITH HEAVY METALS	0.01	0.42	0.23	0.02	0.20	0.03	0.69
PESTICIDE WASHING AND RINSING SOLUTIONS	4.91	100.43	84.76	76.71	519.19	33.08	48.57
PHOTOGRAPHIC WASTES	45.33	110.03	83.01	275.72	3537.44	457.56	286.58
SOLUTION OR SLUDGES WITH PHOTO SILVER	18.85	49.72	37.43	100.43	1538.57	199.22	172.58
SOLVENT STILL BOTTOMS	0.01	62.04	37.11	5.61	188.13	19.88	9.95
SPENT PLATING WASTES	3.82	14.07	5.97	62.55	996.93	75.65	345.89
SPENT SOLVENTS	69.65	1436.52	880.09	744.23	10025.46	989.17	2458.18

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	AK	AL	AR	AZ	CA	CO	CT
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM							
STRONG ACID OR ALKALINE WASTES	21.00	451.28	203.24	163.03	2599.19	241.61	1011.87
WASTE FORMALDEHYDE	6.27	103.94	104.48	57.04	398.13	58.75	69.70
WASTE INK WITH SOLVENT OR HEAVY METALS	0.31	8.43	5.09	15.69	174.82	21.23	17.78
WASTE PESTICIDE	0.34	26.47	36.85	22.32	115.46	7.85	3.59
WASTES WITH AMMONIA	0.24	0.94	0.54	0.66	5.13	0.92	25.20
WASTEWATER WOOD PRESERVATIVE	.	46.90	22.14	3.60	56.94	6.68	1.44
TOTAL	209.90	3004.95	1838.07	1896.96	24587.96	2633.13	5172.92

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	DC	DE	FL	GA	HI	IA	ID
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
ARSENIC WASTES	0.07	0.39	13.91	6.99	0.11	.	1.01
CYANIDE WASTES	0.29	0.93	40.42	12.67	12.41	31.46	7.52
EMPTY PESTICIDE CONTAINER	2.95	8.88	238.75	83.34	8.85	119.98	17.66
FILTRATION RESIDUE FROM DRY CLEANERS	65.50	35.17	623.61	440.54	22.25	113.24	39.44
HEAVY METAL DUST	0.00	0.10	3.09	2.40	0.00	0.03	0.02
HEAVY METAL SOLUTIONS	0.07	.	1.02	1.17	0.14	0.50	0.00
HEAVY METAL WASTE MATERIALS	0.05	0.55	6.69	3.33	0.08	8.50	0.18
HEAVY METAL WASTEWATER SLUDGES	0.69	6.44	108.68	52.31	4.67	1.77	9.48
IGNITABLE PAINT WASTES	7.58	11.87	295.47	114.71	16.47	103.73	28.77
IGNITABLE WASTES	18.03	22.11	375.24	143.31	20.69	163.49	20.44
INK SLUDGE WITH CHROMIUM OR LEAD	1.06	0.60	11.60	6.01	0.02	3.55	0.02
MERCURY WASTES	.	.	.	.	.	0.01	.
OTHER REACTIVE WASTES	4.74	2.57	42.60	20.65	4.71	18.42	3.04
PAINT WASTE WITH HEAVY METALS	0.03	0.12	2.04	0.47	0.01	.	0.01
PESTICIDE WASHING AND RINSING SOLUTIONS	4.55	14.19	373.31	151.04	25.95	142.11	9.63
PHOTOGRAPHIC WASTES	68.02	24.85	582.92	284.17	129.59	228.99	71.36
SOLUTION OR SLUDGES WITH PHOTO SILVER	55.22	14.96	408.50	190.32	69.96	42.66	27.83
SOLVENT STILL BOTTOMS	0.64	5.98	166.46	82.35	0.06	3.73	4.83
SPENT PLATING WASTES	2.71	1.43	80.82	22.92	8.67	24.49	14.69
SPENT SOLVENTS	144.98	218.53	4525.54	2166.72	185.16	1363.15	280.36

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	DC	DE	FL	GA	HI	IA	ID
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
STRONG ACID OR ALKALINE WASTES	21.23	48.80	1135.43	459.09	32.83	399.58	73.86
WASTE FORMALDEHYDE	14.36	25.26	296.26	209.00	13.69	320.66	36.50
WASTE INK WITH SOLVENT OR HEAVY METALS	3.94	2.00	40.68	18.61	4.93	32.15	0.71
WASTE PESTICIDE	1.81	3.69	95.76	44.05	2.39	41.09	7.35
WASTES WITH AMMONIA	0.35	0.26	4.25	1.93	0.24	1.31	0.17
WASTEWATER WOOD PRESERVATIVE	0.07	1.84	38.87	39.17	12.59	1.00	16.19
TOTAL	418.94	451.53	9511.92	4557.29	576.45	3165.61	671.07

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	IL	IN	KS	KY	LA	MA	MD
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
ARSENIC WASTES	.	.	.	1.37	8.03	.	1.05
CYANIDE WASTES	115.91	50.69	26.58	7.89	4.29	118.75	13.16
EMPTY PESTICIDE CONTAINER	251.20	113.83	130.06	33.10	63.95	57.88	50.12
FILTRATION RESIDUE FROM DRY CLEANERS	478.29	241.62	98.38	201.96	245.98	451.18	273.86
HEAVY METAL DUST	0.65	0.15	0.06	1.01	2.00	16.08	1.11
HEAVY METAL SOLUTIONS	11.58	1.26	0.76	0.51	0.51	0.55	0.51
HEAVY METAL WASTE MATERIALS	72.66	33.46	11.06	1.46	1.38	29.01	1.55
HEAVY METAL WASTEWATER SLUDGES	1.19	0.10	0.04	37.78	34.06	90.27	39.56
IGNITABLE PAINT WASTES	380.94	181.06	82.30	60.28	67.37	239.63	91.27
IGNITABLE WASTES	574.89	242.65	143.16	60.36	118.12	394.31	82.27
INK SLUDGE WITH CHROMIUM OR LEAD	26.04	5.58	3.12	2.57	1.71	5.59	5.25
MERCURY WASTES	0.05	0.03	0.01	.	.	.	.
OTHER REACTIVE WASTES	64.91	30.92	14.87	18.67	17.17	29.54	12.30
PAINT WASTE WITH HEAVY METALS	.	.	.	0.41	2.12	0.99	0.73
PESTICIDE WASHING AND RINSING SOLUTIONS	478.35	211.65	147.06	54.61	133.05	84.46	57.75
PHOTOGRAPHIC WASTES	1148.97	340.97	211.69	137.64	141.50	451.49	274.35
SOLUTION OR SLUDGES WITH PHOTO SILVER	431.89	98.09	65.91	73.97	90.01	255.51	244.12
SOLVENT STILL BOTTOMS	29.64	10.47	4.76	113.75	64.38	18.28	47.79
SPENT PLATING WASTES	245.70	77.54	21.34	8.54	9.47	412.68	33.78
SPENT SOLVENTS	5835.04	2502.97	1263.33	1356.62	1489.77	3723.32	1416.50

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	IL	IN	KS	KY	LA	MA	MD
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM							
STRONG ACID OR ALKALINE WASTES	1232.39	489.65	327.49	272.81	284.36	1547.34	423.05
WASTE FORMALDEHYDE	703.92	413.72	179.36	198.62	152.14	134.73	105.08
WASTE INK WITH SOLVENT OR HEAVY METALS	219.37	75.18	26.92	8.12	9.59	33.59	14.92
WASTE PESTICIDE	73.08	34.73	30.36	14.78	42.38	5.07	16.14
WASTES WITH AMMONIA	6.58	2.55	1.42	0.76	1.21	40.43	1.79
WASTEWATER WOOD PRESERVATIVE	9.88	13.32	1.01	15.80	30.64	1.44	7.72
TOTAL	12393.19	5172.20	2791.05	2683.39	3015.20	8142.14	3215.74

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	ME	MI	MN	MO	MS	MT	NC
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM							
ARSENIC WASTES	.	.	.	.	5.62	0.33	3.20
CYANIDE WASTES	6.03	86.26	43.47	48.89	5.48	5.90	17.06
EMPTY PESTICIDE CONTAINER	18.35	144.77	134.48	129.47	33.97	11.12	87.04
FILTRATION RESIDUE FROM DRY CLEANERS	38.01	401.80	149.91	234.67	155.29	34.67	443.98
HEAVY METAL DUST	1.08	0.32	0.12	0.17	0.84	0.01	2.22
HEAVY METAL SOLUTIONS	.	3.02	2.27	3.78	0.15	0.00	1.17
HEAVY METAL WASTE MATERIALS	1.11	57.83	24.54	21.17	1.07	0.08	3.91
HEAVY METAL WASTEWATER SLUDGES	2.80	1.04	0.98	1.83	22.79	6.36	69.04
IGNITABLE PAINT WASTES	22.18	233.25	143.42	179.39	47.12	27.92	200.52
IGNITABLE WASTES	70.23	398.34	226.65	255.85	43.19	19.03	148.44
INK SLUDGE WITH CHROMIUM OR LEAD	0.14	10.16	7.30	9.48	1.99	0.01	7.59
MERCURY WASTES	.	0.04	0.01	0.02	.	.	.
OTHER REACTIVE WASTES	6.74	40.36	23.30	31.52	8.77	4.20	24.20
PAINT WASTE WITH HEAVY METALS	0.48	.	.	.	0.19	0.01	0.56
PESTICIDE WASHING AND RINSING SOLUTIONS	11.88	341.36	197.78	204.67	70.05	8.87	161.04
PHOTOGRAPHIC WASTES	55.35	604.22	458.38	480.04	64.32	65.43	249.21
SOLUTION OR SLUDGES WITH PHOTO SILVER	27.63	225.95	161.41	153.45	23.27	21.41	145.34
SOLVENT STILL BOTTOMS	1.82	14.74	10.77	6.20	45.66	4.82	154.22
SPENT PLATING WASTES	25.31	197.27	65.71	76.05	3.86	10.59	18.35
SPENT SOLVENTS	651.93	4590.95	2156.30	2241.45	885.26	254.10	2560.89

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	ME	MI	MN	MO	MS	MT	NC
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
STRONG ACID OR ALKALINE WASTES	193.57	697.18	529.16	479.99	159.27	71.71	496.37
WASTE FORMALDEHYDE	31.20	489.87	263.97	404.42	126.30	34.79	249.75
WASTE INK WITH SOLVENT OR HEAVY METALS	7.20	93.31	55.02	72.59	5.18	0.59	18.77
WASTE PESTICIDE	1.35	40.95	40.49	39.54	24.09	2.62	37.44
WASTES WITH AMMONIA	6.13	3.97	2.31	2.75	0.46	0.20	2.13
WASTEWATER WOOD PRESERVATIVE	1.44	10.81	10.46	17.90	41.60	17.99	37.91
TOTAL	1181.96	8687.78	4708.18	5095.29	1775.80	602.77	5140.33

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	ND	NE	NH	NJ	NM	NV	NY
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM							
ARSENIC WASTES	.	.	.	.	0.52	0.07	.
CYANIDE WASTES	7.31	18.89	6.63	127.01	28.00	8.63	224.97
EMPTY PESTICIDE CONTAINER	59.67	105.43	9.20	95.36	11.94	6.96	161.34
FILTRATION RESIDUE FROM DRY CLEANERS	20.73	67.43	41.87	659.75	55.50	46.80	1637.96
HEAVY METAL DUST	0.01	0.01	1.58	54.80	0.01	0.02	27.31
HEAVY METAL SOLUTIONS	.	1.01	0.03	1.84	0.00	0.00	0.89
HEAVY METAL WASTE MATERIALS	0.70	3.79	2.87	47.75	0.12	0.18	41.23
HEAVY METAL WASTEWATER SLUDGES	0.01	0.03	3.48	95.63	10.26	8.44	166.62
IGNITABLE PAINT WASTES	24.90	67.20	33.33	214.37	24.53	27.25	548.00
IGNITABLE WASTES	53.81	95.21	65.04	434.80	26.37	16.32	618.07
INK SLUDGE WITH CHROMIUM OR LEAD	0.52	2.61	0.45	16.76	0.03	0.03	11.69
MERCURY WASTES	0.00	0.00	.	.	.	.	.
OTHER REACTIVE WASTES	3.06	10.44	7.88	51.01	8.15	2.71	95.31
PAINT WASTE WITH HEAVY METALS	.	.	0.17	1.53	0.01	0.01	2.80
PESTICIDE WASHING AND RINSING SOLUTIONS	50.59	114.15	11.81	138.42	13.19	17.03	225.56
PHOTOGRAPHIC WASTES	55.20	137.63	65.48	651.83	109.10	89.78	2006.62
SOLUTION OR SLUDGES WITH PHOTO SILVER	12.53	34.25	35.33	374.85	45.70	37.29	1250.63
SOLVENT STILL BOTTOMS	0.55	2.35	2.87	36.37	0.53	4.87	95.72
SPENT PLATING WASTES	3.16	12.35	56.92	492.62	19.35	17.21	853.65
SPENT SOLVENTS	267.86	723.43	611.82	5609.40	320.38	216.97	8046.07

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	ND	NE	NH	NJ	NM	NV	NY
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
STRONG ACID OR ALKALINE WASTES	83.35	173.93	219.75	2082.69	79.00	56.36	3731.76
WASTE FORMALDEHYDE	59.22	158.21	22.16	153.69	30.23	13.12	366.87
WASTE INK WITH SOLVENT OR HEAVY METALS	4.14	11.01	6.28	41.23	1.19	0.92	95.42
WASTE PESTICIDE	13.97	28.04	0.55	10.06	4.47	1.72	15.91
WASTES WITH AMMONIA	0.34	0.99	7.52	58.16	0.27	0.24	94.38
WASTEWATER WOOD PRESERVATIVE	0.02	0.95	2.16	5.05	1.80	.	7.22
TOTAL	721.66	1769.36	1215.18	11454.96	790.66	572.92	20325.98

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	OH	OK	OR	PA	RI	SC	SD
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM							
ARSENIC WASTES	.	4.83	1.18	.	.	2.35	.
CYANIDE WASTES	109.51	8.04	27.64	133.98	84.77	6.54	6.23
EMPTY PESTICIDE CONTAINER	197.86	38.09	29.84	106.50	11.56	45.56	33.65
FILTRATION RESIDUE FROM DRY CLEANERS	510.41	183.30	108.54	728.99	58.40	234.18	20.45
HEAVY METAL DUST	0.59	2.16	0.01	30.07	1.79	1.04	0.03
HEAVY METAL SOLUTIONS	7.05	0.15	0.83	0.65	0.03	0.22	.
HEAVY METAL WASTE MATERIALS	73.52	1.61	0.81	31.82	5.58	1.74	1.35
HEAVY METAL WASTEWATER SLUDGES	1.97	63.19	52.07	96.87	71.67	34.25	0.01
IGNITABLE PAINT WASTES	374.63	52.01	90.36	257.21	35.66	57.42	24.61
IGNITABLE WASTES	522.96	55.26	76.26	406.72	58.75	78.76	51.11
INK SLUDGE WITH CHROMIUM OR LEAD	16.79	3.31	0.08	7.06	0.52	1.25	0.64
MERCURY WASTES	0.04	.	.	.	.	.	0.00
OTHER REACTIVE WASTES	58.93	13.16	12.78	56.32	5.39	10.41	6.42
PAINT WASTE WITH HEAVY METALS	.	0.28	0.02	0.36	0.33	0.36	.
PESTICIDE WASHING AND RINSING SOLUTIONS	492.04	71.27	31.22	145.10	13.61	102.96	34.71
PHOTOGRAPHIC WASTES	736.31	172.12	266.97	588.92	81.53	101.66	63.70
SOLUTION OR SLUDGES WITH PHOTO SILVER	246.18	94.96	96.00	312.79	50.91	58.45	11.61
SOLVENT STILL BOTTOMS	19.77	59.03	16.17	31.83	4.90	57.88	0.79
SPENT PLATING WASTES	221.50	19.08	73.36	512.87	206.15	9.45	2.91
SPENT SOLVENTS	5649.17	1379.48	877.23	7298.55	737.96	1117.59	253.84

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	OH	OK	OR	PA	RI	SC	SD
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM							
STRONG ACID OR ALKALINE WASTES	1064.21	400.99	238.17	2577.85	417.43	246.29	107.30
WASTE FORMALDEHYDE	769.91	129.74	73.01	270.05	22.75	120.57	54.15
WASTE INK WITH SOLVENT OR HEAVY METALS	172.72	10.25	11.51	47.76	4.10	7.29	0.90
WASTE PESTICIDE	52.56	26.36	10.01	12.32	0.95	20.45	9.92
WASTES WITH AMMONIA	5.41	0.94	0.73	57.20	7.18	1.15	0.38
WASTEWATER WOOD PRESERVATIVE	7.89	12.44	22.23	10.10	.	20.55	2.77
TOTAL	11311.91	2802.09	2117.03	13721.89	1881.92	2338.39	687.46

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	TN	TX	UT	VA	VT	WA	WI
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
ARSENIC WASTES	2.09	24.17	0.07	1.57	.	2.03	.
CYANIDE WASTES	15.78	55.35	16.78	12.80	5.04	37.86	57.29
EMPTY PESTICIDE CONTAINER	47.72	218.54	6.49	57.17	4.21	49.58	100.08
FILTRATION RESIDUE FROM DRY CLEANERS	277.61	1050.19	62.60	393.85	24.95	199.25	186.85
HEAVY METAL DUST	2.77	7.89	0.00	1.53	1.09	0.06	0.20
HEAVY METAL SOLUTIONS	1.02	1.24	0.55	0.95	.	0.69	3.78
HEAVY METAL WASTE MATERIALS	2.65	10.16	0.46	1.48	1.07	1.17	25.41
HEAVY METAL WASTEWATER SLUDGES	68.09	254.52	24.68	41.56	2.44	64.16	6.07
IGNITABLE PAINT WASTES	95.25	312.39	54.42	125.93	15.32	134.11	189.52
IGNITABLE WASTES	108.82	394.64	39.37	97.58	27.11	104.87	281.47
INK SLUDGE WITH CHROMIUM OR LEAD	7.81	15.16	0.03	5.94	0.09	0.11	8.82
MERCURY WASTES	.	.	.	.	.	.	0.01
OTHER REACTIVE WASTES	25.51	72.02	4.50	22.17	3.08	20.19	21.29
PAINT WASTE WITH HEAVY METALS	0.37	1.99	0.01	0.69	0.08	0.03	.
PESTICIDE WASHING AND RINSING SOLUTIONS	88.29	384.01	18.14	84.99	7.77	53.14	190.04
PHOTOGRAPHIC WASTES	217.77	850.10	141.50	215.66	36.61	444.71	424.09
SOLUTION OR SLUDGES WITH PHOTO SILVER	132.96	579.71	49.88	137.45	14.71	205.33	149.14
SOLVENT STILL BOTTOMS	110.60	301.50	10.09	57.36	1.33	20.28	8.61
SPENT PLATING WASTES	16.16	128.59	33.27	20.45	19.74	96.12	76.42
SPENT SOLVENTS	1865.07	6628.34	422.53	1800.65	308.03	1208.14	2951.68

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE						
	TN	TX	UT	VA	VT	WA	WI
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
STRONG ACID OR ALKALINE WASTES	428.20	2058.08	102.69	409.97	81.78	308.44	659.60
WASTE FORMALDEHYDE	183.14	443.28	33.65	195.79	16.33	82.71	304.58
WASTE INK WITH SOLVENT OR HEAVY METALS	15.94	54.13	5.44	14.92	5.79	16.67	104.95
WASTE PESTICIDE	22.00	131.48	1.66	23.23	0.73	16.79	34.45
WASTES WITH AMMONIA	1.36	5.19	0.33	2.39	3.20	1.14	2.80
WASTEWATER WOOD PRESERVATIVE	12.96	48.59	5.40	25.97	2.89	41.51	7.75
TOTAL	3749.93	14031.26	1034.55	3752.04	583.40	3109.07	5794.94

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE		
	WV	WY	TOTAL
	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
WASTE STREAM			
ARSENIC WASTES	0.46	0.14	111.22
CYANIDE WASTES	2.13	1.08	2146.00
EMPTY PESTICIDE CONTAINER	13.63	5.16	3658.56
FILTRATION RESIDUE FROM DRY CLEANERS	81.37	20.06	13659.57
HEAVY METAL DUST	0.48	0.00	172.96
HEAVY METAL SOLUTIONS	.	0.00	58.43
HEAVY METAL WASTE MATERIALS	0.34	0.04	567.69
HEAVY METAL WASTEWATER SLUDGES	21.38	2.86	2403.74
IGNITABLE PAINT WASTES	19.55	11.81	6712.93
IGNITABLE WASTES	24.48	10.95	8484.94
INK SLUDGE WITH CHROMIUM OR LEAD	0.06	0.01	216.67
MERCURY WASTES	.	.	0.21
OTHER REACTIVE WASTES	8.94	0.91	1178.00
PAINT WASTE WITH HEAVY METALS	0.14	0.01	18.96
PESTICIDE WASHING AND RINSING SOLUTIONS	23.73	6.29	6069.10
PHOTOGRAPHIC WASTES	56.92	47.69	18431.06
SOLUTION OR SLUDGES WITH PHOTO SILVER	30.29	13.93	8919.08
SOLVENT STILL BOTTOMS	19.71	0.05	1977.22
SPENT PLATING WASTES	4.23	5.21	5767.59
SPENT SOLVENTS	510.78	146.98	105368.14

(CONTINUED)

DISTRIBUTION OF SQG WASTE BY STATE
(METRIC TONS PER YEAR)

	STATE		
	WV	WY	TOTAL
WASTE STREAM	QUANTITY OF WASTE	QUANTITY OF WASTE	QUANTITY OF WASTE
STRONG ACID OR ALKALINE WASTES	144.71	51.99	29790.94
WASTE FORMALDEHYDE	126.85	17.68	8849.63
WASTE INK WITH SOLVENT OR HEAVY METALS	2.81	0.37	1622.43
WASTE PESTICIDE	6.23	1.33	1257.22
WASTES WITH AMMONIA	0.35	0.10	366.57
WASTEWATER WOOD PRESERVATIVE	11.83	3.60	719.04
TOTAL	1111.42	348.28	228527.89

APPENDIX D

SQG MODEL PLANT OPERATIONAL AND FINANCIAL PROFILES WITH COMPLIANCE COSTS

Profile Definitions

TYPE OF WASTE = Primary waste stream the facility normally generates.

SIZE CATEGORY = Employment size category.

SMALL = 1-9 employees
MEDIUM = 10-49 employees
LARGE = 50 or more employees

ANNUAL WASTE = Total quantity of waste generated annually, includes primary and secondary waste streams.

MEDIAN SALES = Sales as reported from FINSTAT, approximately 1982 data converted to 1984 dollars.

PROFIT BEFORE TAXES = Based on median percent profit after tax from FINSTAT, converted to dollar value and then to a pre-tax basis using current federal corporate income tax rates.

COMPLIANCE COSTS = From PRA based on primary type of waste and total quantity. Costs are based on single combination of going from sanitary landfill to secured landfill and generally tend to be a "worst case" or "maximum incremental costs" as discussed in Chapter 6.

COSTS AS % OF SALES = Compliance costs as percent of median sales.

COSTS AS % OF PROFITS = Compliance costs as percent of profits before tax.

Table D-1. SQG Model Plant Operational and Financial Characteristics including Dominant Type of Waste, Employment Size Category, Total Annual Waste Quantity Generated, Sales, Profits, Compliance Costs and Compliance Costs as Percent of Sales and Profits; 1984 dollars.

SALES
4/17/85

SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
7217	CARPET AND UPHOLSTERY CLEANING	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	SMALL	9,400	104.0	10.0	4,700.4	4.5	47.0
7349	BUILDING MAINTENANCE SERVICES, N.E.C.	OTHER SERVICES	WASTES WITH AMMONIA	SMALL	3,000	87.8	11.6	3,046.3	3.5	26.3
3471	PLATING AND POLISHING	METAL MANUFACTURING	SPENT PLATING WASTES	SMALL	6,200	191.0	17.0	5,275.2	2.8	31.0
782	LAWN AND GARDEN SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	3,300	151.9	11.0	3,205.5	2.1	29.1
7395	PHOTOFINISHING LABORATORIES	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	SMALL	4,700	194.4	12.7	3,941.5	2.0	31.0
7216	DRY CLEANING PLANTS, EXCEPT RUG	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	SMALL	2,200	114.0	13.0	2,228.8	2.0	17.1
7622	RADIO AND TELEVISION REPAIR	EQUIPMENT REPAIR	IGNITABLE WASTES	SMALL	1,600	105.8	11.7	2,002.4	1.9	17.1
7333	COMMERCIAL PHOTOGRAPHY AND ART	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	SMALL	2,800	162.0	15.0	2,938.5	1.8	19.6
2751	COMMERCIAL PRINTING, LETTERPRESS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	SMALL	2,500	162.4	12.4	2,776.8	1.7	22.4
7992	PUBLIC GOLF COURSES	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	3,000	191.4	13.1	3,045.6	1.6	23.2
7342	DISINFECTING AND EXTERMINATING SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	1,000	133.6	11.5	2,056.0	1.5	17.9
7997	MEMBERSHIP SPORTS AND RECREATION CLUBS	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	1,500	155.2	5.6	2,226.3	1.4	39.8
2752	COMMERCIAL PRINTING, LITHOGRAPHIC	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	SMALL	1,000	170.1	11.8	2,056.0	1.2	17.4
7397	COMMERCIAL TESTING LABORATORIES	ANALYTIC & CLINICAL LABS	STRONG ACID OR ALKALINE WASTES	SMALL	2,700	182.8	11.8	2,137.1	1.2	18.1
4832	RADIO BROADCASTING	EQUIPMENT REPAIR	IGNITABLE WASTES	MEDIUM	9,100	398.0	22.0	4,601.4	1.2	20.9
7332	BLUEPRINTING AND PHOTOCOPYING	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	SMALL	850	183.0	12.0	2,056.0	1.1	17.1
1721	PAINTING, PAPER HANGING, AND DECORATING	CONSTRUCTION	IGNITABLE PAINT WASTES	SMALL	500	185.4	18.3	1,925.6	1.0	10.5
7261	FUNERAL SERVICE AND CREMATORIES	OTHER SERVICES	WASTE FORMALDEHYDE	SMALL	2,300	232.0	20.0	2,387.0	1.0	11.9
2434	WOOD KITCHEN CABINETS	FURNITURE/WOOD MANUF & REF	IGNITABLE WASTES	SMALL	900	183.9	13.2	1,846.0	1.0	14.0
1741	MASONRY AND OTHER STONEWORK	CONSTRUCTION	STRONG ACID OR ALKALINE WASTES	SMALL	1,000	163.7	16.2	1,623.4	1.0	10.0
3471	PLATING AND POLISHING	METAL MANUFACTURING	SPENT PLATING WASTES	MEDIUM	9,600	738.0	36.7	7,323.9	1.0	20.0
2795	LITHOGRAPHIC PLATEMAKING SERVICES	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	12,000	851.6	54.8	7,651.6	0.9	14.0
7997	MEMBERSHIP SPORTS AND RECREATION CLUBS	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	6,000	514.0	14.1	4,614.3	0.9	32.7
2893	PRINTING INK	FORMULATORS	SPENT SOLVENTS	SMALL	2,500	224.0	13.0	1,883.7	0.8	14.5
3599	MACHINERY, EXCEPT ELECTRICAL, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	1,400	193.6	18.2	1,590.3	0.8	8.7
3479	METAL COATING AND ALLIED SERVICES	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	500	202.0	15.7	1,533.4	0.8	9.8
7539	AUTOMOTIVE REPAIR SHOPS, N.E.C.	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	202.2	14.3	1,533.4	0.8	10.7
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	500	181.7	9.1	1,533.4	0.8	16.9
7531	TOP AND BODY REPAIR SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	201.7	11.9	1,533.4	0.8	12.9
3961	COSTUME JEWELRY	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	2,300	229.7	14.6	1,832.2	0.8	12.5
7218	INDUSTRIAL LAUNDERERS	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	MEDIUM	12,000	711.0	22.0	5,551.6	0.8	25.2
7535	PAINT SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	216.0	11.4	1,533.4	0.7	13.5
3911	JEWELRY, PRECIOUS METAL	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	SMALL	1,500	259.9	15.8	1,730.7	0.7	11.0
782	LAWN AND GARDEN SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	4,800	624.3	28.1	3,993.6	0.6	14.2
711	SOIL PREPARATION SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	SMALL	1,800	379.9	21.0	2,393.8	0.6	11.4
7216	DRY CLEANING PLANTS, EXCEPT RUG	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	MEDIUM	2,200	364.0	21.0	2,228.8	0.6	10.6
7395	PHOTOFINISHING LABORATORIES	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	MEDIUM	4,700	648.0	37.2	3,941.5	0.6	10.6
7261	FUNERAL SERVICE AND CREMATORIES	OTHER SERVICES	WASTE FORMALDEHYDE	MEDIUM	6,700	690.0	41.0	4,103.5	0.6	10.0
7342	DISINFECTING AND EXTERMINATING SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	2,500	467.9	20.9	2,776.8	0.6	13.3
7332	BLUEPRINTING AND PHOTOCOPYING	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	MEDIUM	3,400	613.0	46.0	3,258.6	0.5	7.1
2741	MISCELLANEOUS PUBLISHING	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	4,300	711.2	36.3	3,732.7	0.5	10.3
2791	TYPESETTING	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	1,800	474.2	21.7	2,393.8	0.5	11.0
7534	TIRE RETREADING AND REPAIR SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	SMALL	500	310.8	14.4	1,533.4	0.5	10.6
3964	NEEDLES, PINS, AND FASTENERS	METAL MANUFACTURING	SPENT SOLVENTS	SMALL	2,300	375.3	20.8	1,832.2	0.5	8.8
7333	COMMERCIAL PHOTOGRAPHY AND ART	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	MEDIUM	3,400	673.0	35.0	3,258.6	0.5	9.3
8222	JUNIOR COLLEGES	ANALYTIC & CLINICAL LABS	OTHER REACTIVE WASTES	MEDIUM	3,400	602.8	52.2	2,833.6	0.5	5.4
2789	BOOKBINDING AND RELATED WORK	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	2,000	554.0	29.3	2,504.2	0.5	8.5

Table D-1. (Continued)

SALES
4/17/85

SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
7397	COMMERCIAL TESTING LABORATORIES	ANALYTIC & CLINICAL LABS	STRONG ACID OR ALKALINE WASTES	MEDIUM	4,300	605.2	38.5	2,649.1	0.4	6.9
7535	PAINT SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	MEDIUM	2,500	432.0	16.2	1,883.7	0.4	11.6
2434	WOOD KITCHEN CABINETS	FURNITURE/WOOD MANUF & REF	IGNITABLE WASTES	MEDIUM	3,300	635.5	17.8	2,628.0	0.4	14.8
5161	CHEMICALS AND ALLIED PRODUCTS	WHOLESALE AND RETAIL SALES	STRONG ACID OR ALKALINE WASTES	SMALL	1,000	451.0	15.0	1,623.4	0.4	10.8
8211	ELEMENTARY AND SECONDARY SCHOOLS	EDUCATIONAL & VOCATIONAL SHOPS	IGNITABLE WASTES	MEDIUM	2,000	539.3	20.1	2,154.2	0.4	10.7
2751	COMMERCIAL PRINTING, LETTERPRESS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	2,500	708.4	30.0	2,776.8	0.4	9.3
2753	ENGRAVING AND PLATE PRINTING	PRINTING/CERAMICS	STRONG ACID OR ALKALINE WASTES	MEDIUM	4,300	679.5	27.6	2,649.1	0.4	9.6
711	SOIL PREPARATION SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	5,200	1,000.0	229.6	4,201.3	0.4	1.8
2741	MISCELLANEOUS PUBLISHING	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	12,000	1,969.6	110.9	7,651.6	0.4	6.9
2793	PHOTOENGRAVING	PRINTING/CERAMICS	STRONG ACID OR ALKALINE WASTES	MEDIUM	3,500	618.3	36.2	2,396.0	0.4	6.6
2721	PERIODICALS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	3,500	855.4	39.2	3,311.6	0.4	8.4
8249	VOCATION SCHOOLS, N.E.C.	EDUCATIONAL & VOCATIONAL SHOPS	STRONG ACID OR ALKALINE WASTES	MEDIUM	2,500	540.0	42.9	2,071.2	0.4	4.8
2791	TYPESETTING	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	9,500	1,673.7	68.2	6,395.9	0.4	9.4
2711	NEWSPAPERS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	1,500	588.2	30.3	2,226.3	0.4	7.3
7216	DRY CLEANING PLANTS, EXCEPT RUG	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	LARGE	7,300	1,060.0	45.0	4,002.7	0.4	8.9
7332	BLUEPRINTING AND PHOTOCOPYING	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	LARGE	11,900	2,062.0	105.0	7,601.5	0.4	7.2
2435	HARDWOOD VENEER AND PLYWOOD	FURNITURE/WOOD MANUF & REF	SPENT SOLVENTS	MEDIUM	9,000	945.9	51.8	3,397.7	0.4	6.6
7331	DIRECT MAIL AND ADVERTISING SERVICES	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	MEDIUM	3,400	914.4	36.6	3,258.6	0.4	8.9
3471	PLATING AND POLISHING	METAL MANUFACTURING	SPENT PLATING WASTES	LARGE	12,000	2,473.0	119.4	8,754.8	0.4	7.3
2842	POLISHES AND SANITATION GOODS	CLEANING AGENTS & COSMETIC MAN	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	4,600	1,124.0	35.0	3,889.4	0.3	11.1
7997	MEMBERSHIP SPORTS AND RECREATION CLUBS	PESTICIDE END-USERS	PESTICIDE WASHING AND RINSING SOLUTION	LARGE	6,000	1,350.0	37.0	4,614.3	0.3	12.5
3993	SIGNS AND ADVERTISING DISPLAYS	METAL MANUFACTURING	IGNITABLE PAINT WASTES	MEDIUM	2,700	779.5	30.0	2,611.8	0.3	8.7
8062	GENERAL MEDICAL AND SURGICAL HOSPITALS	ANALYTIC & CLINICAL LABS	IGNITABLE WASTES	MEDIUM	2,200	675.4	27.6	2,228.8	0.3	8.1
1721	PAINTING, PAPER HANGING, AND DECORATING	CONSTRUCTION	IGNITABLE PAINT WASTES	MEDIUM	1,900	704.5	32.4	2,252.2	0.3	7.0
2752	COMMERCIAL PRINTING, LITHOGRAPHIC	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	MEDIUM	2,000	783.6	33.1	2,504.2	0.3	7.6
7532	TOP AND BODY REPAIR SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	MEDIUM	2,500	593.8	20.4	1,883.7	0.3	9.2
3581	AUTOMATIC MERCHANDISING MACHINES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	1,302.8	116.2	4,051.0	0.3	3.5
2879	AGRICULTURAL CHEMICALS, N.E.C.	FORMULATORS	PESTICIDE WASHING AND RINSING SOLUTION	MEDIUM	3,500	1,090.0	36.0	3,311.6	0.3	9.2
5191	FARM SUPPLIES	WHOLESALE AND RETAIL SALES	WASTE PESTICIDES	SMALL	2,200	810.0	22.0	2,448.8	0.3	11.1
7342	DISINFECTING AND EXTERMINATING SERVICES	PESTICIDE APPLICATION SERVICES	PESTICIDE WASHING AND RINSING SOLUTION	LARGE	6,000	1,527.6	41.8	4,614.3	0.3	11.0
7331	DIRECT MAIL AND ADVERTISING SERVICES	PHOTOGRAPHY	PHOTOGRAPHIC WASTES	LARGE	11,900	2,710.0	108.4	7,601.5	0.3	7.0
3412	METAL BARRELS, DRUMS, AND PAILS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	10,500	1,352.7	106.9	3,726.4	0.3	3.5
7539	AUTOMOTIVE REPAIR SHOPS, N.E.C.	VEHICLE MAINTENANCE	SPENT SOLVENTS	MEDIUM	2,500	693.1	26.6	1,883.7	0.3	7.1
3079	MISCELLANEOUS PLASTIC PRODUCTS	OTHER MANUFACTURING	SPENT SOLVENTS	MEDIUM	4,800	929.0	39.0	2,445.0	0.3	6.3
3599	MACHINERY, EXCEPT ELECTRICAL, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	2,500	767.4	45.2	1,883.7	0.2	4.2
7391	RESEARCH AND DEVELOPMENT LABORATORIES	ANALYTIC & CLINICAL LABS	SPENT SOLVENTS	MEDIUM	2,000	731.9	46.7	1,753.6	0.2	3.8
8222	JUNIOR COLLEGES	ANALYTIC & CLINICAL LABS	OTHER REACTIVE WASTES	LARGE	9,200	2,160.0	124.8	5,094.4	0.2	4.1
2491	WOOD PRESERVING	WOOD PRESERVING	WASTEWATER WOOD PRESERVATIVES	MEDIUM	5,400	1,673.3	76.8	3,899.8	0.2	5.1
3479	METAL COATING AND ALLIED SERVICES	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	1,400	689.0	33.3	1,590.3	0.2	4.8
2795	LITHOGRAPHIC PLATEMAKING SERVICES	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	12,000	3,355.6	169.0	7,651.6	0.2	4.5
8221	COLLEGES AND UNIVERSITIES, N.E.C.	EDUCATIONAL & VOCATIONAL SHOPS	OTHER REACTIVE WASTES	MEDIUM	1,500	911.7	51.6	2,038.8	0.2	4.0
2843	SURFACE ACTIVE AGENTS	CLEANING AGENTS & COSMETIC MAN	IGNITABLE WASTES	MEDIUM	5,200	1,473.0	50.0	3,291.3	0.2	6.6
3469	METAL STAMPINGS, N.E.C.	METAL MANUFACTURING	HEAVY METAL WASTEWATER SLUDGES	MEDIUM	2,000	1,063.0	40.2	2,354.2	0.2	5.9
7218	INDUSTRIAL LAUNDERERS	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	LARGE	12,000	2,573.0	188.0	5,551.6	0.2	3.0
2789	BOOKBINDING AND RELATED WORK	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	4,000	1,678.3	64.6	3,575.4	0.2	5.5
2732	BOOK PRINTING	PRINTING/CERAMICS	INK SLUDGE WITH CHROMIUM OR LEAD	MEDIUM	1,500	989.8	25.7	2,038.8	0.2	7.9
2869	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.	CHEMICAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	4,500	1,175.0	66.0	2,374.1	0.2	3.6

Table D-1. (Continued)

SALES
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SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
3451	SCREW MACHINE PRODUCTS	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	2,300	915.0	34.9	1,832.2	0.2	5.2
3444	SHEET METAL WORK	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	610	920.8	34.2	1,533.4	0.2	4.5
3293	GASKETS, PACKING, AND SEALING DEVICES	OTHER MANUFACTURING	IGNITABLE WASTES	MEDIUM	500	1,178.8	53.8	1,846.0	0.2	3.4
8331	JOB TRAINING AND RELATED SERVICES	EDUCATIONAL & VOCATIONAL SHOPS	SPENT SOLVENTS	LARGE	1,900	883.4	43.4	1,727.0	0.2	4.0
3499	FABRICATED METAL PRODUCTS, N.E.C.	METAL MANUFACTURING	HEAVY METAL WASTEWATER SLUDGES	MEDIUM	1,600	1,134.2	48.8	2,162.4	0.2	4.4
1741	MASONRY AND OTHER STONEWORK	CONSTRUCTION	STRONG ACID OR ALKALINE WASTES	MEDIUM	2,500	1,115.9	55.8	2,071.2	0.2	3.7
7534	TIRE RETREADING AND REPAIR SHOPS	VEHICLE MAINTENANCE	SPENT SOLVENTS	MEDIUM	2,500	1,027.6	27.9	1,883.7	0.2	6.8
7397	COMMERCIAL TESTING LABORATORIES	ANALYTIC & CLINICAL LABS	STRONG ACID OR ALKALINE WASTES	LARGE	9,100	2,242.1	109.4	4,102.3	0.2	3.7
8211	ELEMENTARY AND SECONDARY SCHOOLS	EDUCATIONAL & VOCATIONAL SHOPS	IGNITABLE WASTES	LARGE	5,000	1,833.1	88.5	3,222.5	0.2	3.6
2782	BLANKBOOKS AND LOOSELEAF BINDERS	PRINTING/CERAMICS	SPENT SOLVENTS	MEDIUM	2,500	1,080.0	73.1	1,883.7	0.2	2.6
2754	COMMERCIAL PRINTING	PRINTING/CERAMICS	SPENT SOLVENTS	MEDIUM	2,500	1,103.7	114.7	1,883.7	0.2	1.6
8062	GENERAL MEDICAL AND SURGICAL HOSPITALS	ANALYTIC & CLINICAL LABS	IGNITABLE WASTES	LARGE	3,000	1,486.9	46.8	2,520.6	0.2	5.4
1721	PAINTING, PAPER HANGING, AND DECORATING	CONSTRUCTION	IGNITABLE PAINT WASTES	LARGE	7,200	2,700.0	103.6	4,528.8	0.2	4.4
7333	COMMERCIAL PHOTOGRAPHY AND ART	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	LARGE	4,600	2,352.0	100.0	3,889.4	0.2	3.9
3569	GENERAL INDUSTRIAL MACHINERY, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	3,200	1,272.0	51.3	2,059.7	0.2	4.0
2647	SANITARY PAPER PRODUCTS	PRINTING/CERAMICS	SPENT SOLVENTS	LARGE	11,300	2,424.2	48.1	3,899.9	0.2	8.1
2721	PERIODICALS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	7,600	3,379.5	98.0	5,433.1	0.2	5.5
2752	COMMERCIAL PRINTING, LITHOGRAPHIC	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	9,600	4,064.7	176.8	6,446.3	0.2	3.6
3851	OPTHALMIC GOODS	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	5,000	1,817.1	31.5	2,866.9	0.2	9.1
3442	METAL DOORS, SASH, AND TRIM	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	2,200	1,169.8	47.7	1,806.2	0.2	3.8
3662	RADIO AND TV COMMUNICATION EQUIPMENT	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	12,000	3,240.0	186.5	4,951.0	0.2	2.7
3411	METAL CANS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	10,500	2,502.4	99.0	3,726.4	0.1	3.8
8069	SPECIALTY HOSPITALS, EXCEPT PSYCHIATRIC	ANALYTIC & CLINICAL LABS	IGNITABLE WASTES	LARGE	3,700	1,932.9	580.5	2,769.9	0.1	0.5
8221	COLLEGES AND UNIVERSITIES, N.E.C.	EDUCATIONAL & VOCATIONAL SHOPS	OTHER REACTIVE WASTES	LARGE	4,100	2,181.0	113.1	3,115.4	0.1	2.8
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	1,400	1,118.0	55.9	1,598.3	0.1	2.8
3651	RADIO AND TV RECEIVING SETS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	1,925.0	91.3	2,723.7	0.1	3.0
2841	SOAP AND OTHER DETERGENTS	CLEANING AGENTS & COSMETIC MAN	STRONG ACID OR ALKALINE WASTES	MEDIUM	3,100	1,620.0	50.0	2,267.4	0.1	4.5
3822	ENVIRONMENTAL CONTROLS	METAL MANUFACTURING	IGNITABLE WASTES	LARGE	8,700	3,233.5	160.0	4,469.0	0.1	2.8
8249	VOCATION SCHOOLS, N.E.C.	EDUCATIONAL & VOCATIONAL SHOPS	STRONG ACID OR ALKALINE WASTES	LARGE	5,000	2,113.8	173.4	2,866.9	0.1	1.7
2491	WOOD PRESERVING	WOOD PRESERVING	WASTEWATER WOOD PRESERVATIVES	LARGE	12,000	5,092.9	148.5	6,751.6	0.1	4.5
3441	FABRICATED STRUCTURAL METAL	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	MEDIUM	2,200	1,517.4	53.4	1,971.2	0.1	3.7
3443	FABRICATED PLATE WORK (BOILER SHOPS)	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	2,200	1,421.7	63.6	1,806.2	0.1	2.8
3552	TEXTILE MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	10,700	2,970.0	51.5	3,769.8	0.1	7.3
2893	PRINTING INK	FORMULATORS	SPENT SOLVENTS	MEDIUM	4,900	1,945.0	157.0	2,468.5	0.1	1.6
2511	WOOD HOUSEHOLD FURNITURE	FURNITURE/WOOD MANUF & REF	IGNITABLE PAINT WASTES	LARGE	3,000	2,186.7	61.5	2,744.2	0.1	4.5
3469	METAL STAMPINGS, N.E.C.	METAL MANUFACTURING	HEAVY METAL WASTEWATER SLUDGES	LARGE	7,600	3,888.0	181.3	4,863.1	0.1	2.7
3423	HAND AND EDGE TOOLS, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	10,800	3,059.0	81.2	3,791.6	0.1	4.7
2711	NEWSPAPERS	PRINTING/CERAMICS	PHOTOGRAPHIC WASTES	LARGE	2,100	2,115.0	106.6	2,559.1	0.1	2.4
3291	ABRASIVE PRODUCTS	OTHER MANUFACTURING	IGNITABLE WASTES	MEDIUM	500	1,296.0	50.6	1,846.0	0.1	3.6
3843	DENTAL EQUIPMENT AND SUPPLIES	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	5,200	2,484.7	325.4	2,928.7	0.1	0.9
3861	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	12,000	4,260.0	233.9	4,951.0	0.1	2.1
3585	REFRIGERATION AND HEATING EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	3,518.6	73.8	4,951.0	0.1	5.5
2761	MANIFOLD BUSINESS FORMS	PRINTING/CERAMICS	SPENT SOLVENTS	MEDIUM	1,000	1,296.0	60.5	1,533.4	0.1	2.5
2821	PLASTICS MATERIALS AND RESINS	CHEMICAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	4,400	2,076.5	135.2	2,350.4	0.1	1.7
3554	PAPER INDUSTRIES MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	10,700	3,350.4	120.1	3,769.8	0.1	3.1
3679	ELECTRONIC COMPONENTS, N.E.C.	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	4,600	2,481.2	159.0	2,742.8	0.1	1.7
2899	CHEMICAL PREPARATIONS, N.E.C.	FORMULATORS	SPENT SOLVENTS	MEDIUM	4,400	2,160.0	103.0	2,350.4	0.1	2.3

Table D-1. (Continued)

SALES
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SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
3499	FABRICATED METAL PRODUCTS, N.E.C.	METAL MANUFACTURING	HEAVY METAL WASTEWATER SLUDGES	LARGE	5,400	3,627.2	192.3	3,899.8	0.1	2.0
2732	BOOK PRINTING	PRINTING/CERAMICS	INK SLUDGE WITH CHROMIUM OR LEAD	LARGE	5,000	3,240.0	206.6	3,472.5	0.1	1.7
3564	BLOWERS AND FANS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	7,300	2,868.0	178.0	3,019.1	0.1	1.7
3699	ELECTRICAL MACHINERY AND SUPPLIES, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	2,688.7	172.0	2,723.7	0.1	1.6
7391	RESEARCH AND DEVELOPMENT LABORATORIES	ANALYTIC & CLINICAL LABS	SPENT SOLVENTS	SMALL	560	158.2	9.0	1,533.4	0.1	17.0
3569	GENERAL INDUSTRIAL MACHINERY, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	9,600	3,566.0	179.3	3,529.7	0.1	2.0
3643	CURRENT-CARRYING WIRING DEVICES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	10,900	3,862.0	302.5	3,813.3	0.1	1.3
2262	FINISHING PLANTS, SYNTHETICS	TEXTILE MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	4,166.6	101.4	4,051.0	0.1	4.0
3462	IRON AND STEEL FORGINGS	METAL MANUFACTURING	HEAVY METAL WASTEWATER SLUDGES	LARGE	5,500	4,114.0	123.4	3,944.0	0.1	3.2
7391	RESEARCH AND DEVELOPMENT LABORATORIES	ANALYTIC & CLINICAL LABS	SPENT SOLVENTS	LARGE	4,100	2,381.4	136.8	2,278.8	0.1	1.7
3551	FOOD PRODUCTS MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	4,236.5	223.4	4,051.0	0.1	1.8
3675	ELECTRONIC CAPACITORS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	3,000	2,181.6	108.0	2,010.0	0.1	1.9
2782	BLANKBOOKS AND LOOSELEAF BINDERS	PRINTING/CERAMICS	SPENT SOLVENTS	LARGE	6,000	2,957.7	75.2	2,723.7	0.1	3.6
3644	NONCURRENT-CARRYING WIRING DEVICES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,700	3,132.0	165.0	2,883.5	0.1	1.7
2642	ENVELOPES	PRINTING/CERAMICS	WASTE INK WITH SOLVENT OR HEAVY METAL	LARGE	4,800	3,564.0	359.7	3,281.2	0.1	0.9
2851	PAINTS AND ALLIED PRODUCTS	FORMULATORS	SPENT SOLVENTS	MEDIUM	2,500	2,052.0	77.0	1,883.7	0.1	2.4
3523	FARM MACHINERY AND EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	2,500	2,073.8	103.7	1,883.7	0.1	1.8
3494	VALVES AND PIPE FITTINGS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	4,463.0	267.7	4,051.0	0.1	1.5
2451	MOBILE HOMES	CONSTRUCTION	IGNITABLE PAINT WASTES	LARGE	7,500	5,208.6	121.2	4,653.3	0.1	3.8
3873	WATCHES, CLOCKS AND WATCHCASES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,095.1	365.4	2,723.7	0.1	0.7
3661	TELEPHONE AND TELEGRAPH APPARATUS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,098.0	477.8	2,723.7	0.1	0.6
3566	SPEED CHANGERS, DRIVES, AND GEARS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	7,300	3,451.0	110.5	3,019.1	0.1	2.7
3829	MEASURING AND CONTROLLING DEVICES, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,126.4	217.3	2,723.7	0.1	1.3
3677	ELECTRONIC COILS AND TRANSFORMERS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	3,000	2,351.1	165.0	2,010.0	0.1	1.2
2452	PREFABRICATED WOOD BUILDINGS	CONSTRUCTION	IGNITABLE PAINT WASTES	LARGE	7,500	5,524.6	14.7	4,653.3	0.1	31.7
3573	ELECTRONIC COMPUTING EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,300	2,766.0	127.4	2,326.6	0.1	1.8
3634	ELECTRIC HOUSEWARES AND FANS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,281.5	103.8	2,723.7	0.1	2.6
2645	DIE-CUT PAPER AND BOARD	PRINTING/CERAMICS	SPENT SOLVENTS	LARGE	6,000	3,293.8	91.7	2,723.7	0.1	3.0
3841	SURGICAL AND MEDICAL INSTRUMENTS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	3,600	2,611.4	402.3	2,157.9	0.1	0.5
3545	MACHINE TOOL ACCESSORIES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	4,936.9	246.8	4,051.0	0.1	1.6
5161	CHEMICALS AND ALLIED PRODUCTS	WHOLESALE AND RETAIL SALES	STRONG ACID OR ALKALINE WASTES	MEDIUM	2,500	2,543.0	59.0	2,071.2	0.1	3.5
3842	SURGICAL APPLIANCES AND SUPPLIES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	3,600	2,664.9	127.2	2,157.9	0.1	1.7
2641	PAPER COATING AND GLAZING	PRINTING/CERAMICS	WASTE INK WITH SOLVENT OR HEAVY METAL	LARGE	7,100	5,106.1	211.3	4,132.2	0.1	2.0
3832	OPTICAL INSTRUMENTS AND LENSES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,372.1	260.3	2,723.7	0.1	1.0
3479	METAL COATING AND ALLIED SERVICES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,200	3,160.0	156.7	2,530.7	0.1	1.6
2261	FINISHING PLANTS, COTTON	TEXTILE MANUFACTURING	SPENT SOLVENTS	LARGE	4,500	2,984.2	117.8	2,374.1	0.1	2.0
3676	ELECTRONIC RESISTORS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	3,000	2,537.7	282.0	2,010.0	0.1	0.7
3442	METAL DOORS, SASH, AND TRIM	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	8,200	4,104.0	148.7	3,220.5	0.1	2.2
3652	PHONOGRAPH RECORDS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,570.0	182.5	2,723.7	0.1	1.5
3079	MISCELLANEOUS PLASTIC PRODUCTS	OTHER MANUFACTURING	SPENT SOLVENTS	LARGE	5,000	3,299.0	153.0	2,491.9	0.1	1.6
3823	PROCESS CONTROL INSTRUMENTS	METAL MANUFACTURING	IGNITABLE WASTES	LARGE	1,900	2,804.3	280.0	2,116.6	0.1	0.8
3495	WIRE SPRINGS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	2,432.7	50.2	1,832.2	0.1	3.6
3555	PRINTING TRADES MACHINERY	METAL MANUFACTURING	HEAVY METAL WASTEWATER MATERIALS	LARGE	4,500	4,688.4	292.9	3,499.7	0.1	1.2
3825	INSTRUMENTS TO MEASURE ELECTRICITY	METAL MANUFACTURING	IGNITABLE PAINT WASTES	LARGE	1,800	2,956.1	88.0	2,206.4	0.1	2.5
3811	ENGINEERING AND SCIENTIFIC INSTRUMENTS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	3,664.9	115.0	2,723.7	0.1	2.4
3553	WOODWORKING MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	9,400	4,692.3	344.0	3,485.8	0.1	1.0
3576	SCALES AND BALANCES, EXCEPT LABORATORY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,300	3,238.0	486.4	2,326.6	0.1	0.5

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SALES
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SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
3592	CARBURETORS, PISTONS, RINGS, VALVES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	5,662.7	183.3	4,051.0	0.1	2.2
3451	SCREW MACHINE PRODUCTS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	3,679.0	140.6	2,608.4	0.1	1.9
3441	FABRICATED STRUCTURAL METAL	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	8,200	5,424.2	140.6	3,835.5	0.1	2.7
3645	RESIDENTIAL LIGHTING FIXTURES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,500	2,700.0	87.6	1,883.7	0.1	2.2
1741	MASONRY AND OTHER STONEWORK	CONSTRUCTION	STRONG ACID OR ALKALINE WASTES	LARGE	5,000	4,200.4	210.0	2,866.9	0.1	1.4
2842	POLISHES AND SANITATION GOODS	CLEANING AGENTS & COSMETIC MAN	PESTICIDE WASHING AND RINSING SOLUTION	LARGE	4,600	5,706.0	203.0	3,889.4	0.1	1.9
3629	ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,500	3,517.7	195.2	2,374.1	0.1	1.2
2844	TOILET PREPARATIONS	CLEANING AGENTS & COSMETIC MAN	IGNITABLE WASTES	LARGE	4,500	4,563.0	412.0	3,049.7	0.1	0.7
3641	ELECTRIC LAMPS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,700	4,339.0	77.3	2,883.5	0.1	3.7
3443	FABRICATED PLATE WORK (BOILER SHOPS)	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	8,200	4,860.0	221.5	3,220.5	0.1	1.5
3519	INTERNAL COMBUSTION ENGINES, NEC	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	12,000	7,614.6	380.7	4,951.0	0.1	1.3
3693	X-RAY APPARATUS AND TUBES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,600	3,757.5	506.0	2,397.8	0.1	0.5
3674	SEMICONDUCTORS AND RELATED DEVICES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	3,000	3,170.0	270.2	2,010.0	0.1	0.7
2643	BAGS, EXCEPT TEXTILE BAGS	PRINTING/CERAMICS	WASTE INK WITH SOLVENT OR HEAVY METAL	LARGE	6,000	5,089.3	189.6	3,727.9	0.1	2.0
3621	MOTORS AND GENERATORS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,500	3,752.2	199.9	2,374.1	0.1	1.2
3567	INDUSTRIAL FURNACES AND OVENS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	7,300	4,787.0	185.5	3,019.1	0.1	1.6
3613	SWITCHGEAR AND SWITCHBOARD APPARATUS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	4,361.9	223.4	2,723.7	0.1	1.2
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,600	4,218.1	210.9	2,631.6	0.1	1.2
2731	BOOK PUBLISHING	PRINTING/CERAMICS	WASTE INK WITH SOLVENT OR HEAVY METAL	LARGE	2,000	3,548.4	273.7	2,197.8	0.1	0.8
3646	COMMERCIAL LIGHTING FIXTURES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,700	4,679.0	367.9	2,883.5	0.1	0.8
3694	ENGINE ELECTRICAL EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	4,427.7	170.0	2,723.7	0.1	1.6
2821	PLASTICS MATERIALS AND RESINS	CHEMICAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,400	4,212.0	246.1	2,585.2	0.1	1.1
3559	SPECIAL INDUSTRY MACHINERY, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	4,495.2	180.1	2,723.7	0.1	1.5
3622	INDUSTRIAL CONTROLS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,500	3,935.0	411.6	2,374.1	0.1	0.6
3534	ELEVATORS AND MOVING STAIRWAYS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	4,341.8	217.1	2,608.4	0.1	1.2
3293	GASKETS, PACKING, AND SEALING DEVICES	OTHER MANUFACTURING	IGNITABLE WASTES	LARGE	1,900	3,660.7	142.2	2,116.6	0.1	1.5
3549	METALWORKING MACHINERY, NEC	METAL MANUFACTURING	SOLVENT STILL BOTTOMS	LARGE	3,500	5,299.6	265.0	3,049.1	0.1	1.2
3612	TRANSFORMERS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	4,735.1	394.6	2,723.7	0.1	0.7
2879	AGRICULTURAL CHEMICALS, N.E.C.	FORMULATORS	PESTICIDE WASHING AND RINSING SOLUTION	LARGE	5,400	7,572.0	251.0	4,304.8	0.1	1.7
729	GENERAL CROP SERVICES	PESTICIDE APPLICATION SERVICES	EMPTY PESTICIDE CONTAINERS	LARGE	1,200	2,592.0	25.9	1,466.1	0.1	5.7
3496	MISCELLANEOUS FABRICATED WIRE PRODUCTS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	3,305.0	189.7	1,832.2	0.1	1.0
3542	MACHINE TOOLS, METAL FORMING TYPES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,200	5,027.1	251.4	2,769.6	0.1	1.1
3444	SHEET METAL WORK	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	3,330.9	196.2	1,832.2	0.1	0.9
3541	MACHINE TOOLS, METAL CUTTING TYPES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,200	5,194.0	259.7	2,769.6	0.1	1.1
3429	HARDWARE, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,500	5,410.4	216.4	2,838.1	0.1	1.3
3599	SERVICE INDUSTRY MACHINES, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	7,838.1	169.1	4,051.0	0.1	2.4
3465	AUTOMOTIVE STAMPINGS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	5,079.0	165.1	2,608.4	0.1	1.6
2899	CHEMICAL PREPARATIONS, N.E.C.	FORMULATORS	SPENT SOLVENTS	LARGE	12,000	7,912.0	287.0	4,051.0	0.1	1.4
3568	POWER TRANSMISSION EQUIPMENT, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	7,300	5,940.0	900.9	3,019.1	0.1	0.3
3531	CONSTRUCTION MACHINERY	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	6,000	6,372.1	318.6	3,173.7	.0	1.0
2499	WOOD PRODUCTS, NEC	FURNITURE/WOOD MANUF & REF	SPENT SOLVENTS	LARGE	2,500	3,887.6	155.5	1,883.7	.0	1.2
3446	ARCHITECTURAL METAL WORK	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	3,793.0	151.5	1,832.2	.0	1.2
3579	OFFICE MACHINES, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,300	4,936.0	263.2	2,326.6	.0	0.9
3546	POWER DRIVEN HAND TOOLS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,200	5,932.3	296.6	2,769.6	.0	0.9
2869	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.	CHEMICAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,200	5,514.0	229.0	2,538.7	.0	1.1
3523	FARM MACHINERY AND EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	5,971.3	298.6	2,723.7	.0	0.9
3561	PUMPS AND PUMPING EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,000	5,514.5	337.2	2,491.9	.0	0.7

Table D-1. (Continued)

SALES
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SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
3432	PLUMBING FITTINGS AND BRASS GOODS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,500	4,266.0	320.7	1,883.7	.0	0.6
3498	FABRICATED PIPE FITTINGS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	4,296.6	166.1	1,832.2	.0	1.1
3535	CONVEYERS AND CONVEYING EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	6,146.3	307.3	2,608.4	.0	0.8
3524	FARM AND GARDEN EQUIPMENT	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	6,186.7	309.3	2,608.4	.0	0.8
2648	STATIONERY PRODUCTS	PRINTING/CERAMICS	SPENT SOLVENTS	LARGE	8,700	7,929.8	226.5	3,331.4	.0	1.5
2621	PAPER MILLS, EXCEPT BUILDING PAPER	PAPER INDUSTRY	SPENT SOLVENTS	LARGE	3,800	5,296.8	(98.6)	2,206.5	.0	-2.2
2649	CONVERTED PAPER PRODUCTS, N.E.C.	PRINTING/CERAMICS	WASTE INK WITH SOLVENT OR HEAVY METAL	LARGE	2,000	5,297.0	241.6	2,197.8	.0	0.9
3623	WELDING APPARATUS, ELECTRIC	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,500	6,048.5	226.0	2,374.1	.0	1.1
3648	LIGHTING EQUIPMENT, N.E.C.	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,700	7,383.0	482.9	2,883.5	.0	0.6
2834	PHARMACEUTICAL PREPARATIONS	FORMULATORS	SPENT SOLVENTS	LARGE	3,700	5,625.0	277.0	2,182.3	.0	0.8
3547	ROLLING MILL MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,200	7,200.0	360.0	2,769.6	.0	0.8
2761	MANIFOLD BUSINESS FORMS	PRINTING/CERAMICS	SPENT SOLVENTS	LARGE	2,500	4,962.9	322.2	1,883.7	.0	0.6
3452	BOLTS, NUTS, RIVETS, AND WASHERS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	6,916.0	231.6	2,608.4	.0	1.1
3291	ABRASIVE PRODUCTS	OTHER MANUFACTURING	IGNITABLE WASTES	LARGE	1,900	4,796.2	218.7	1,727.0	.0	0.8
3563	AIR AND GAS COMPRESSORS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	7,300	8,410.0	641.6	3,019.1	.0	0.5
3574	CALCULATING AND ACCOUNTING MACHINES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,300	6,484.0	1,079.0	2,326.6	.0	0.2
3536	HOISTS, CRANES, AND MONORAILS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,500	7,360.0	368.0	2,608.4	.0	0.7
2851	PAINTS AND ALLIED PRODUCTS	FORMULATORS	SPENT SOLVENTS	LARGE	6,000	7,777.0	280.0	2,723.7	.0	1.0
2841	SOAP AND OTHER DETERGENTS	CLEANING AGENTS & COSMETIC MAN	STRONG ACID OR ALKALINE WASTES	LARGE	3,100	6,591.0	394.0	2,267.4	.0	0.6
3448	PREFABRICATED METAL BUILDINGS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	5,400.0	264.5	1,832.2	.0	0.7
3678	ELECTRONIC CONNECTORS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	12,000	12,224.7	2,014.0	4,051.0	.0	0.2
3433	HEATING EQUIPMENT, EXCEPT ELECTRIC	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,500	6,123.7	377.7	1,883.7	.0	0.5
3449	MISCELLANEOUS METAL WORK	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	5,976.0	405.0	1,832.2	.0	0.5
3532	MINING MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,100	7,589.6	379.5	2,278.8	.0	0.6
3533	OIL FIELD MACHINERY	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	6,944.6	347.7	1,832.2	.0	0.5
2893	PRINTING INK	FORMULATORS	SPENT SOLVENTS	LARGE	8,500	13,328.0	1,258.0	3,287.1	.0	0.3
3537	INDUSTRIAL TRUCKS AND TRACTORS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	1,400	6,642.8	332.1	1,590.3	.0	0.5
3511	TURBINES AND TURBINE GENERATOR SETS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	12,160.0	608.0	2,723.7	.0	0.4
4613	REFINED PETROLEUM PIPE LINES	EQUIPMENT REPAIR	SPENT SOLVENTS	LARGE	4,700	21,968.0	8,771.0	2,421.4	.0	.0
4612	CRUDE PETROLEUM PIPE LINES	EQUIPMENT REPAIR	SPENT SOLVENTS	LARGE	1,400	18,122.0	7,071.0	1,590.3	.0	.0
3999	MANUFACTURING, NEC	METAL MANUFACTURING	SPENT SOLVENTS	MEDIUM	2,500	NA	NA	1,883.7	NA	NA
8081	OUTPATIENT CARE FACILITIES	ANALYTIC & CLINICAL LABS	SPENT SOLVENTS	MEDIUM	2,500	NA	NA	1,883.7	NA	NA
7819	SERVICES ALLIED TO MOTION PICTURE PRODUC	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	SMALL	1,000	NA	NA	2,056.0	NA	NA
3562	BALL AND ROLLER BEARINGS	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	7,300	NA	NA	3,019.1	NA	NA
8081	OUTPATIENT CARE FACILITIES	ANALYTIC & CLINICAL LABS	SPENT SOLVENTS	LARGE	6,000	NA	NA	2,723.7	NA	NA
1742	PLASTERING, DRYWALL AND INSULATION	CONSTRUCTION	IGNITABLE PAINT WASTES	MEDIUM	2,500	NA	NA	2,522.9	NA	NA
2754	COMMERCIAL PRINTING	PRINTING/CERAMICS	SPENT SOLVENTS	LARGE	6,000	NA	NA	2,723.7	NA	NA
3691	STORAGE BATTERIES	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	4,600	NA	NA	2,397.8	NA	NA
8081	OUTPATIENT CARE FACILITIES	ANALYTIC & CLINICAL LABS	SPENT SOLVENTS	SMALL	500	NA	NA	1,533.4	NA	NA
7819	SERVICES ALLIED TO MOTION PICTURE PRODUC	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	MEDIUM	2,000	NA	NA	2,584.2	NA	NA
4619	PIPE LINES, N.E.C.	EQUIPMENT REPAIR	SPENT SOLVENTS	LARGE	7,900	NA	NA	3,153.6	NA	NA
7819	SERVICES ALLIED TO MOTION PICTURE PRODUC	PHOTOGRAPHY	SOLUTION OR SLUDGES WITH PHOTO SILVER	LARGE	5,000	NA	NA	4,097.5	NA	NA
851	FORESTRY SERVICES	PESTICIDE APPLICATION SERVICES	EMPTY PESTICIDE CONTAINERS	LARGE	1,200	NA	NA	1,466.1	NA	NA
3999	MANUFACTURING, NEC	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	6,000	NA	NA	2,723.7	NA	NA
3497	METAL FOIL AND LEAF	METAL MANUFACTURING	SPENT SOLVENTS	LARGE	2,300	NA	NA	1,832.2	NA	NA
3421	CUTLERY	METAL MANUFACTURING	STRONG ACID OR ALKALINE WASTES	LARGE	7,400	NA	NA	3,596.6	NA	NA
9223	CORRECTIONAL INSTITUTIONS	EDUCATIONAL & VOCATIONAL SHOPS	STRONG ACID OR ALKALINE WASTES	MEDIUM	2,500	NA	NA	2,071.2	NA	NA

Table D-1. (Continued)

SALES
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SIC CODE	INDUSTRY SHORT TITLE	INDUSTRY GROUP	TYPE OF WASTE	SIZE CATEGORY	ANNUAL WASTE	MEDIAN SALES	PROFIT BEFORE TAXES	COMPLIANCE COST	COST AS % OF SALES	COST AS % OF PROFITS
					(KG/YR)	($1000)		($)	(PERCENT)	
1742	PLASTERING, DRYWALL AND INSULATION	CONSTRUCTION	IGNITABLE PAINT WASTES	LARGE	5,000	NA	NA	3,606.1	NA	NA
7215	COIN-OPERATED LAUNDRIES AND CLEANING	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	SMALL	1,500	NA	NA	1,963.8	NA	NA
2824	ORGANIC FIBERS, NONCELLULOSIC	CHEMICAL MANUFACTURING	SPENT SOLVENTS	LARGE	5,400	NA	NA	2,585.2	NA	NA
1742	PLASTERING, DRYWALL AND INSULATION	CONSTRUCTION	IGNITABLE PAINT WASTES	SMALL	1,000	NA	NA	1,925.6	NA	NA
7699	REPAIR SERVICES, NEC	EQUIPMENT REPAIR	SPENT SOLVENTS	MEDIUM	3,600	NA	NA	2,157.9	NA	NA
9223	CORRECTIONAL INSTITUTIONS	EDUCATIONAL & VOCATIONAL SHOPS	STRONG ACID OR ALKALINE WASTES	LARGE	5,000	NA	NA	2,866.9	NA	NA
7215	COIN-OPERATED LAUNDRIES AND CLEANING	LAUNDRIES	FILTRATION RESIDUE FROM DRY CLEANING	MEDIUM	2,500	NA	NA	2,339.3	NA	NA

APPENDIX E

DETAILED INDUSTRY PROFILES

Appendix Table E-1: Profile data for industries with SQGs that account for 5% or more of output, and estimated SQG share of industry revenues and employment, by SQG share, (1977 Census revenue and employment data).

Appendix Table E-2: Profile data for industries with SQGs that account for 5% or more of output, and estimated SQG share of industry revenues and employment, by standard industrial code (SIC) (1977 Census revenue and employment data).

Appendix Table E-3: Master list of industries considered for industry analysis and model plant development.

[redacted] Ap[redacted]x Ta[redacted]-1: [redacted]stry[redacted]file[redacted] for [redacted]tri[redacted]th S[redacted]ccou[redacted] for[redacted]r mo[redacted] out[redacted]nd [redacted]

estimated SQG share of industry revenues and employment, listed by share from SQGs,
1977 Census revenue and employment data

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TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES ($1,000,000)	INDUSTRY TOTAL EMPLOYMENT (1,000)	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9	10-49	50+	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED % SQGs BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED SHARE (%) FROM SQG'S REVENUE	EMPLOYMENT
				(PERCENTAGE)										
7641	REUPHOLSTERY AND FURNITURE REPAIR	465.32	19.74	76	21	3	73	24	3	5	8	5	5.6	5.7
2751	COMMERCIAL PRINTING, LETTERPRESS	4,284.40	110.80	23	29	48	23	33	43	2	5	9	6.2	6.0
2435	HARDWOOD VENEER AND PLYWOOD	1,272.50	22.20	1	14	85	0	14	86	4	14	6	7.1	7.1
7992	PUBLIC GOLF COURSES	314.89	13.10	38	50	12	28	54	18	8	8	8	8.0	8.0
2434	WOOD KITCHEN CABINETS	1,590.80	46.20	12	30	58	12	32	56	4	14	6	8.2	8.4
7261	FUNERAL SERVICE AND CREMATORIES	2,558.64	68.91	69	29	1	64	34	2	9	9	9	8.9	9.0
7397	COMMERCIAL TESTING LABORATORIES	662.20	24.47	17	48	35	17	48	34	8	11	10	10.1	10.1
1721	PAINTING, PAPER HANGING, AND DECORATING	3,205.32	133.11	45	38	17	50	35	15	10	14	14	12.2	12.0
3999	MANUFACTURING, NEC	2,662.00	67.30	11	23	66	11	25	64	2	7	17	13.1	12.9
7333	COMMCERCIAL PHOTOGRAPHY AND ART	1,629.64	43.63	47	37	16	43	39	18	8	16	25	13.7	14.2
2843	SURFACE ACTIVE AGENTS	944.80	6.60	4	28	68	5	29	67	0	15	15	14.4	14.3
7391	RESEARCH AND DEVELOPMENT LABORATORIES	1,995.74	47.51	5	13	82	7	15	78	5	10	16	14.7	14.3
2649	CONVERTED PAPER PRODUCTS, N.E.C.	1,697.40	29.40	4	22	73	4	23	73	4	3	19	14.7	14.7
2645	DIE-CUT PAPER AND BOARD	1,057.70	14.30	4	19	77	4	21	75	4	3	19	15.4	15.0
2791	TYPESETTING	730.40	27.10	17	44	39	16	46	38	2	11	27	15.7	15.7
2621	PAPER MILLS, EXCEPT BUILDING PAPER	12,613.30	126.80	0	1	99	0	1	99	0	0	16	15.8	15.9
7218	INDUSTRIAL LAUNDERERS	1,114.21	45.31	2	28	70	2	28	70	5	15	17	16.2	16.2
2648	STATIONERY PRODUCTS	651.70	12.70	3	14	84	2	14	83	4	3	19	16.5	16.4
2499	WOOD PRODUCTS, NEC	2,557.40	64.60	7	23	70	8	25	67	1	5	22	16.6	16.1
2262	FINISHING PLANTS, SYNTHETICS	2,484.20	37.10	0	4	96	1	5	95	2	8	17	16.6	16.5
7342	DISINFECTING AND EXTERMINATING SERVICES	866.01	40.84	34	57	10	32	59	9	5	22	25	16.7	16.8
2899	CHEMICAL PREPARATIONS, N.E.C.	3,950.50	35.30	8	26	66	8	27	66	5	10	21	16.9	16.8
2643	BAGS, EXCEPT TEXTILE BAGS	3,482.40	48.70	1	11	88	1	10	89	4	3	19	17.1	17.2
7216	DRY CLEANING PLANTS, EXCEPT RUG	1,779.70	125.74	56	38	6	51	42	8	11	25	24	17.1	17.0
2641	PAPER COATING AND GLAZING	3,392.00	39.70	2	9	89	2	10	88	4	3	19	17.3	17.1
2642	ENVELOPES	990.60	22.70	1	9	90	1	9	90	4	3	19	17.4	17.5
3699	ELECTRICAL MACHINERY AND SUPPLIES, N.E.C.	749.40	20.90	5	23	73	5	22	73	2	3	23	17.6	17.5
2261	FINISHING PLANTS, COTTON	759.40	20.80	2	7	91	1	7	91	2	4	19	17.6	17.7
3645	RESIDENTIAL LIGHTING FIXTURES	986.50	23.90	4	20	76	5	21	74	2	3	23	18.2	17.8
7531	TOP AND BODY REPAIR SHOPS	2,644.05	79.11	68	27	5	66	29	5	13	32	16	18.3	18.7
2795	LITHOGRAPHIC PLATEMAKING SERVICES	667.10	15.10	9	40	51	9	44	47	2	11	27	18.4	17.7
2793	PHOTOENGRAVING	218.00	5.70	16	29	55	10	35	47	2	11	27	18.4	17.0
7332	BLUEPRINTING AND PHOTOCOPYING	373.60	11.93	42	45	13	40	46	14	7	25	33	18.5	18.9
3843	DENTAL EQUIPMENT AND SUPPLIES	786.80	16.40	5	16	79	5	18	77	0	7	22	18.5	18.1
2452	PREFABRICATED WOOD BUILDINGS	1,948.60	29.00	2	18	80	2	17	81	1	5	22	18.5	18.6
2647	SANITARY PAPER PRODUCTS	4,921.30	34.40	0	1	99	0	2	98	4	3	19	18.8	18.7
2753	ENGRAVING AND PLATE PRINTING	314.80	9.90	10	31	59	10	35	55	2	11	27	19.5	18.8
3648	LIGHTING EQUIPMENT, N.E.C.	670.60	12.90	2	15	83	2	16	82	2	3	23	19.6	19.4
3652	PHONOGRAPH RECORDS	1,181.70	23.10	4	12	84	5	13	82	2	3	23	19.8	19.4
3679	ELECTRONIC COMPONENTS, N.E.C.	5,551.00	126.00	4	12	84	4	15	81	2	3	23	19.8	19.1
3677	ELECTRONIC COILS AND TRANSFORMERS	506.50	20.70	1	13	85	1	14	86	2	3	23	20.0	20.1
3451	SCREW MACHINE PRODUCTS	1,771.90	43.80	6	39	55	6	41	53	4	9	30	20.3	19.7
3446	ARCHITECTURAL METAL WORK	947.10	20.80	12	31	57	12	32	56	4	9	30	20.4	20.2
7535	PAINT SHOPS	411.64	14.94	61	39	0	57	43		13	32	16	20.4	21.2
2789	BOOKBINDING AND RELATED WORK	533.70	24.20	8	28	64	7	29	64	2	11	27	20.5	20.5
3646	COMMERCIAL LIGHTING FIXTURES	922.70	15.60	1	11	88	1	14	85	2	3	23	20.6	19.9
3622	INDUSTRIAL CONTROLS	2,514.50	55.50	2	9	89	2	9	89	2	3	23	20.8	20.7
3629	ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.	692.20	16.40	2	9	89	2	9	89	2	3	23	20.8	20.8

Appendix Table E-1 (cont'd)

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TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES ($1,000,000)	INDUSTRY TOTAL EMPLOYMENT (1,000)	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED % SOGs BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED SHARE (%) FROM SOG'S REVENUE (%)	EMPLOYMENT (%)
2451	MOBILE HOMES	3,199.20	50.40	0	5	94	0	7	93	1	5	22	20.9	20.8
2841	SOAP AND OTHER DETERGENTS	5,671.30	32.20	2	11	87	3	15	82	3	16	22	21.0	20.6
3444	SHEET METAL WORK	4,863.50	77.50	7	33	60	7	37	56	4	9	30	21.3	20.4
2741	MISCELLANEOUS PUBLISHING	1,850.90	42.10	10	20	70	10	23	67	2	11	27	21.3	20.9
3861	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	9,933.90	111.60	1	3	96	1	4	95	0	7	22	21.3	21.1
3643	CURRENT-CARRYING WIRING DEVICES	1,795.20	43.80	1	7	92	1	6	93	2	3	23	21.4	21.5
3623	WELDING APPARATUS, ELECTRIC	1,191.20	17.40	1	6	93	1	7	92	2	3	23	21.6	21.4
3613	SWITCHGEAR AND SWITCHBOARD APPARATUS	3,541.00	71.40	1	6	93	1	6	92	2	3	23	21.6	21.5
3499	FABRICATED METAL PRODUCTS, N.E.C.	3,429.20	70.90	7	30	63	8	34	58	4	9	30	21.9	20.9
3693	X-RAY APPARATUS AND TUBES	1,884.70	30.90	1	4	95	1	4	95	2	3	23	22.0	22.0
3662	RADIO AND TV COMMUNICATION EQUIPMENT	14,900.40	334.40	1	4	95	1	4	95	2	3	23	22.0	22.0
3644	NONCURRENT-CARRYING WIRING DEVICES	1,421.70	25.80	1	4	95	1	4	95	2	3	23	22.0	21.9
3691	STORAGE BATTERIES	1,982.50	26.00	1	3	96	1	4	95	0	0	23	22.1	21.9
3079	MISCELLANEOUS PLASTIC PRODUCTS	23,688.60	453.70	3	18	79	3	18	79	1	13	25	22.1	22.1
3496	MISCELLANEOUS FABRICATED WIRE PRODUCTS	1,435.00	32.40	6	30	64	6	30	65	4	9	30	22.1	22.3
3621	MOTORS AND GENERATORS	4,458.70	96.90	0	3	96	0	3	97	2	3	23	22.2	22.4
3694	ENGINE ELECTRICAL EQUIPMENT	3,647.20	63.90	1	3	96	1	4	95	2	3	23	22.2	22.1
3612	TRANSFORMERS	2,202.00	43.30	1	3	96	1	4	95	2	3	23	22.2	22.1
3449	MISCELLANEOUS METAL WORK	1,330.90	16.30	2	34	64	3	26	71	4	9	30	22.3	23.7
3651	RADIO AND TV RECEIVING SETS	5,732.60	74.60	1	2	97	1	3	95	2	3	23	22.4	22.0
3675	ELECTRONIC CAPACITORS	742.20	20.70	0	3	97	0	3	97	2	3	23	22.4	22.4
3676	ELECTRONIC RESISTORS	575.50	21.10	0	3	97	0	2	98	2	3	23	22.4	22.5
3634	ELECTRIC HOUSEWARES AND FANS	2,531.20	47.30	1	3	97	1	3	96	2	3	23	22.4	22.3
3641	ELECTRIC LAMPS	1,651.30	28.70	1	1	98	1	2	97	2	3	23	22.6	22.4
3674	SEMICONDUCTORS AND RELATED DEVICES	5,322.60	114.00	1	2	98	1	2	97	2	3	23	22.6	22.4
3661	TELEPHONE AND TELEGRAPH APPARATUS	7,858.20	124.30	0	1	99	0	1	98	2	3	23	22.8	22.7
3678	ELECTRONIC CONNECTORS	1,065.80	25.00	0	1	99	0	0	100	2	3	23	22.8	22.9
2721	PERIODICALS	6,056.50	69.80	6	15	78	7	19	74	2	11	27	22.8	22.3
3293	GASKETS, PACKING, AND SEALING DEVICES	1,267.10	33.10	2	14	84	2	12	86	1	13	25	22.8	23.1
2732	BOOK PRINTING	1,691.80	47.00	4	18	78	4	19	77	2	11	27	23.1	23.0
3291	ABRASIVE PRODUCTS	1,955.70	28.30	2	11	87	2	12	86	1	13	25	23.2	23.0
2834	PHARMACEUTICAL PREPARATIONS	11,459.20	126.40	1	3	97	1	3	96	4	4	24	23.4	23.2
3498	FABRICATED PIPE FITTINGS	1,872.90	28.20	3	27	70	2	21	77	4	9	30	23.6	25.0
3441	FABRICATED STRUCTURAL METAL	5,505.30	99.40	4	25	71	4	25	71	4	9	30	23.7	23.7
3469	METAL STAMPINGS, N.E.C.	4,735.60	103.10	4	23	73	4	25	71	4	9	30	24.1	23.8
2761	MANIFOLD BUSINESS FORMS	2,893.70	45.30	1	16	83	2	19	79	2	11	27	24.2	23.6
2731	BOOK PUBLISHING	4,793.80	59.50	4	11	85	5	12	83	2	11	27	24.2	23.9
7534	TIRE RETREADING AND REPAIR SHOPS	669.70	14.76	30	58	12	31	58	11	13	32	16	24.4	24.3
2782	BLANKBOOKS AND LOOSELEAF BINDERS	1,122.50	31.80	2	12	86	2	14	85	2	11	27	24.6	24.4
2754	COMMERCIAL PRINTING	1,057.00	19.00	4	8	88	5	12	83	2	11	27	24.7	23.8
3442	METAL DOORS, SASH, AND TRIM	3,135.60	65.80	4	18	77	4	19	77	4	9	30	24.9	24.9
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES	3,905.30	105.80	13	44	43	14	48	39	2	9	49	25.3	23.5
3495	WIRE SPRINGS	957.70	21.70	1	16	82	1	18	80	4	9	30	26.1	25.8
3433	HEATING EQUIPMENT, EXCEPT ELECTRIC	1,445.60	25.70	4	12	84	4	13	82	4	9	30	26.4	26.1
3448	PREFABRICATED METAL BUILDINGS	1,779.00	22.60	2	14	84	2	15	82	4	9	30	26.5	26.2
3443	FABRICATED PLATE WORK (BOILER SHOPS)	7,432.60	123.50	2	13	85	2	15	83	4	9	30	26.8	26.3
3412	METAL BARRELS, DRUMS, AND PAILS	937.20	12.50	1	13	86	2	12	86	4	9	30	27.0	27.1
7395	PHOTOFINISHING LABORATORIES	1,829.57	62.70	10	23	67	9	21	70	55	79	5	27.0	25.2
3452	BOLTS, NUTS, RIVETS, AND WASHERS	3,319.50	60.90	2	11	87	2	11	87	4	9	30	27.2	27.1

Appendix Table E-1 (cont'd)

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TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES ($1,000,000)	INDUSTRY TOTAL EMPLOYMENT (1,000)	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED % SOGs BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED SHARE (%) FROM SOG'S REVENUE (%)	EMPLOYMENT (%)
2752	COMMERCIAL PRINTING, LITHOGRAPHIC	9,359.70	216.10	9	28	63	10	32	58	2	11	38	27.2	25.8
2851	PAINTS AND ALLIED PRODUCTS	6,629.60	61.30	3	20	77	4	23	73	7	17	31	27.5	26.8
3423	HAND AND EDGE TOOLS, N.E.C.	2,279.30	47.10	2	9	89	2	11	87	4	9	30	27.6	27.2
3432	PLUMBING FITTINGS AND BRASS GOODS	1,166.50	19.30	1	7	91	2	7	91	4	9	30	28.0	28.1
3429	HARDWARE, N.E.C.	5,202.50	93.20	2	8	91	2	8	90	4	9	30	28.1	27.9
3411	METAL CANS	8,142.90	59.80	0	7	92	1	4	95	4	9	30	28.2	29.0
3494	VALVES AND PIPE FITTINGS	5,662.40	108.80	1	7	92	1	6	93	4	9	30	28.3	28.4
3462	IRON AND STEEL FORGINGS	2,795.60	39.10	1	8	92	1	8	92	4	9	30	28.4	28.3
3497	METAL FOIL AND LEAF	877.60	9.20	1	6	94	0	5	95	4	9	30	28.8	28.9
3421	CUTLERY	711.40	14.80	1	4	95	1	5	94	4	9	30	28.9	28.7
3465	AUTOMOTIVE STAMPINGS	9,739.30	132.30	0	4	96	0	5	95	4	9	30	29.2	29.0
2844	TOILET PREPARATIONS	6,557.20	50.80	1	4	95	2	6	92	0	6	31	29.7	28.8
2824	ORGANIC FIBERS, NONCELLULOSIC	6,379.90	74.00	0	0	100	0	0	100	8	14	30	30.0	30.0
2511	WOOD HOUSEHOLD FURNITURE	4,140.30	140.70	4	11	86	4	11	86	0	0	36	31.0	30.9
2821	PLASTICS MATERIALS AND RESINS	10,818.20	57.20	0	9	91	0	7	93	6	12	37	34.8	35.2
2869	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.	24,232.90	112.40	0	2	97	1	3	96	5	22	36	35.4	35.4
2893	PRINTING INK	944.80	10.10	9	48	43	8	48	45	19	36	40	36.2	36.4
2711	NEWSPAPERS	13,055.90	350.00	4	9	87	4	13	82	0	13	41	36.8	35.5
2879	AGRICULTURAL CHEMICALS, N.E.C.	2,780.40	14.80	4	20	77	5	20	76	6	32	40	37.4	36.8
2491	WOOD PRESERVING	962.60	12.50	5	40	56	6	38	56	9	34	42	37.6	37.1
2842	POLISHES AND SANITATION GOODS	3,157.20	22.00	6	21	73	8	28	64	4	20	46	38.0	35.4
3569	GENERAL INDUSTRIAL MACHINERY, N.E.C.	2,779.60	57.50	5	21	74	6	23	71	2	9	49	38.3	36.9
3553	WOODWORKING MACHINERY	585.70	10.30	3	22	74	4	25	71	2	9	49	38.3	37.1
3545	MACHINE TOOL ACCESSORIES	2,382.90	54.20	4	21	75	4	22	73	2	9	49	38.7	38.1
3589	SERVICE INDUSTRY MACHINES, N.E.C.	1,771.80	32.20	5	18	76	6	21	72	2	9	49	39.0	37.5
3552	TEXTILE MACHINERY	950.00	25.30	5	20	76	4	19	76	2	9	49	39.1	39.3
3567	INDUSTRIAL FURNACES AND OVENS	746.30	15.10	3	20	77	3	19	78	2	9	49	39.6	40.1
3559	SPECIAL INDUSTRY MACHINERY, N.E.C.	3,622.00	70.40	4	17	79	4	18	78	2	9	49	40.3	39.8
3549	METALWORKING MACHINERY, NEC	916.90	19.50	4	17	79	5	22	73	2	9	49	40.3	38.0
3551	FOOD PRODUCTS MACHINERY	1,786.70	36.20	3	16	81	3	17	80	2	9	49	41.2	40.7
3555	PRINTING TRADES MACHINERY	1,350.90	25.40	4	16	81	4	18	78	2	9	49	41.2	39.9
3535	CONVEYERS AND CONVEYING EQUIPMENT	1,902.80	33.00	2	18	81	2	18	80	2	9	49	41.4	40.7
3536	HOISTS, CRANES, AND MONORAILS	835.90	15.80	2	15	83	2	15	84	2	9	49	42.1	42.3
3542	MACHINE TOOLS, METAL FORMING TYPES	1,130.70	23.60	3	13	84	3	14	83	2	9	49	42.4	42.2
3564	BLOWERS AND FANS	1,430.70	28.00	2	13	85	2	14	84	2	9	49	42.9	42.6
3479	METAL COATING AND ALLIED SERVICES	1,607.70	32.30	6	31	63	8	44	48	23	50	42	43.3	44.0
3537	INDUSTRIAL TRUCKS AND TRACTORS	1,920.10	28.70	2	10	87	2	14	84	2	9	49	43.6	42.4
3576	SCALES AND BALANCES, EXCEPT LABORATORY	348.10	7.00	2	11	87	1	10	89	2	9	49	43.7	44.3
3471	PLATING AND POLISHING	1,848.60	61.20	10	45	45	10	48	42	23	50	42	43.7	43.9
3534	ELEVATORS AND MOVING STAIRWAYS	489.70	10.10	1	12	87	1	13	86	2	9	49	43.7	43.4
3541	MACHINE TOOLS, METAL CUTTING TYPES	2,812.80	59.30	3	9	88	3	10	87	2	9	49	44.0	43.6
3566	SPEED CHANGERS, DRIVES, AND GEARS	1,222.30	25.20	2	10	88	2	11	87	2	9	49	44.1	43.8
3554	PAPER INDUSTRIES MACHINERY	826.80	16.30	1	11	88	1	12	87	2	9	49	44.1	43.8
3523	FARM MACHINERY AND EQUIPMENT	10,281.60	131.30	2	7	91	2	10	88	2	9	49	45.3	43.9
3561	PUMPS AND PUMPING EQUIPMENT	3,773.70	63.00	1	7	92	1	7	92	2	9	49	45.7	45.6
3532	MINING MACHINERY	1,996.70	31.30	1	7	92	1	7	91	2	9	49	45.7	45.5
3533	OIL FIELD MACHINERY	3,912.50	58.50	1	6	93	1	6	93	2	9	49	46.1	46.0
3568	POWER TRANSMISSION EQUIPMENT, N.E.C.	1,626.10	32.60	1	7	93	0	7	93	2	9	49	46.2	46.2
3581	AUTOMATIC MERCHANDISING MACHINES	410.20	8.80	2	4	94	2	6	92	2	9	49	46.5	45.7

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TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES	INDUSTRY TOTAL EMPLOYMENT	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9	10-49	50+	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED % SOGs BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED SHARE (%) FROM SOG'S REVENUE	EMPLOYMENT
		($1,000,000)	(1,000)	(PERCENTAGE)										
3524	FARM AND GARDEN EQUIPMENT	1,575.30	19.60	1	5	94	1	6	93	2	9	49	46.5	46.1
3547	ROLLING MILL MACHINERY	507.50	7.90	1	4	95	1	5	94	2	9	49	46.9	46.4
3531	CONSTRUCTION MACHINERY	12,628.70	155.20	1	3	96	1	4	95	2	9	49	47.3	47.1
3585	REFRIGERATION AND HEATING EQUIPMENT	9,638.10	138.60	1	3	96	1	4	95	2	9	49	47.3	46.9
3592	CARBURETORS, PISTONS, RINGS, VALVES	1,400.60	32.20	0	4	96	1	4	95	2	9	49	47.4	47.1
3563	AIR AND GAS COMPRESSORS	2,075.60	31.90	1	4	96	1	3	96	2	9	49	47.4	47.3
3546	POWER DRIVEN HAND TOOLS	1,623.40	27.60	0	2	98	0	3	97	2	9	49	48.2	47.8
3573	ELECTRONIC COMPUTING EQUIPMENT	12,921.80	192.70	0	2	98	1	2	97	2	9	49	48.2	47.8
3579	OFFICE MACHINES, N.E.C.	2,719.70	42.40	0	2	98	0	2	97	2	9	49	48.2	47.8
3562	BALL AND ROLLER BEARINGS	2,567.20	50.50	0	1	99	0	1	99	2	9	49	48.6	48.5
3511	TURBINES AND TURBINE GENERATOR SETS	2,729.60	40.80	0	1	99	0	1	99	2	9	49	48.6	48.4
3519	INTERNAL COMBUSTION ENGINES, NEC	7,696.40	88.80	0	1	99	0	1	99	2	9	49	48.6	48.4
3574	CALCULATING AND ACCOUNTING MACHINES	795.80	17.10	0	0	100	1	1	99	2	9	49	49.0	48.5

Appendix Table E-2: Industry profile data for industries with SQGs accounting for 5% or more of output and estimated SQG share of industry revenues and employment, listed by standard industrial code (SIC), 1977 Census revenue and employment data

4/16/85
TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL		SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE			SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE			ESTIMATED % SQGs BY EMPLOYMENT SIZE			ESTIMATED SHARE (%) FROM SQG'S	
		REVENUES	EMPLOYMENT	1-9	10-49	50+	1-9	10-49	50+	1-9	10-49	50+	REVENUE	EMPLOYMENT
		($1,000,000)	(1,000)	(PERCENTAGE)										
1721	PAINTING, PAPER HANGING, AND DECORATING	3,205.32	133.11	45	38	17	50	35	15	10	14	14	12.2	12.0
2261	FINISHING PLANTS, COTTON	759.40	20.80	2	7	91	1	7	91	2	4	19	17.6	17.7
2262	FINISHING PLANTS, SYNTHETICS	2,404.20	37.10	0	4	96	1	5	95	2	8	17	16.6	16.5
2434	WOOD KITCHEN CABINETS	1,590.80	46.20	12	30	58	12	32	56	4	14	6	8.2	8.4
2435	HARDWOOD VENEER AND PLYWOOD	1,272.50	22.20	1	14	85	0	14	86	4	14	6	7.1	7.1
2451	MOBILE HOMES	3,199.20	50.40	0	5	94	0	7	93	1	5	22	20.9	20.8
2452	PREFABRICATED WOOD BUILDINGS	1,948.60	29.00	2	18	80	2	17	81	1	5	22	18.5	18.6
2491	WOOD PRESERVING	962.60	12.50	5	40	56	6	38	56	9	34	42	37.6	37.1
2499	WOOD PRODUCTS, NEC	2,557.40	64.60	7	23	70	8	25	67	1	5	22	16.6	16.1
2511	WOOD HOUSEHOLD FURNITURE	4,140.30	140.70	4	11	86	4	11	86	0	0	36	31.0	30.9
2621	PAPER MILLS, EXCEPT BUILDING PAPER	12,613.30	126.80	0	1	99	0	1	99	0	0	16	15.8	15.9
2641	PAPER COATING AND GLAZING	3,392.00	39.70	2	9	89	2	10	88	4	3	19	17.3	17.1
2642	ENVELOPES	990.60	22.70	1	9	90	1	9	90	4	3	19	17.4	17.5
2643	BAGS, EXCEPT TEXTILE BAGS	3,482.40	48.70	1	11	88	1	10	89	4	3	19	17.1	17.2
2645	DIE-CUT PAPER AND BOARD	1,057.70	14.30	4	19	77	4	21	75	4	3	19	15.4	15.0
2647	SANITARY PAPER PRODUCTS	4,921.30	34.40	0	1	99	0	2	98	4	3	19	18.8	18.7
2648	STATIONERY PRODUCTS	651.70	12.70	3	14	84	2	14	83	4	3	19	16.5	16.4
2649	CONVERTED PAPER PRODUCTS, N.E.C.	1,697.40	29.40	4	22	73	4	23	73	4	3	19	14.7	14.7
2711	NEWSPAPERS	13,055.90	350.00	4	9	87	4	13	82	0	13	41	36.8	35.5
2721	PERIODICALS	6,056.50	69.80	6	15	78	7	19	74	2	11	27	22.8	22.3
2731	BOOK PUBLISHING	4,793.80	59.50	4	11	85	5	12	83	2	11	27	24.2	23.9
2732	BOOK PRINTING	1,691.80	47.00	4	18	78	4	19	77	2	11	27	23.1	23.0
2741	MISCELLANEOUS PUBLISHING	1,850.90	42.10	10	20	70	10	23	67	2	11	27	21.3	20.9
2751	COMMERCIAL PRINTING, LETTERPRESS	4,284.40	110.80	23	29	48	23	33	43	2	5	9	6.2	6.0
2752	COMMERCIAL PRINTING, LITHOGRAPHIC	9,359.70	216.10	9	28	63	10	32	58	2	11	38	27.2	25.8
2753	ENGRAVING AND PLATE PRINTING	314.80	9.90	10	31	59	10	35	55	2	11	27	19.5	18.8
2754	COMMERCIAL PRINTING	1,057.00	19.00	4	8	88	5	12	83	2	11	27	24.7	23.8
2761	MANIFOLD BUSINESS FORMS	2,893.70	45.30	1	16	83	2	19	79	2	11	27	24.2	23.6
2782	BLANKBOOKS AND LOOSELEAF BINDERS	1,122.50	31.80	2	12	86	2	14	85	2	11	27	24.6	24.4
2789	BOOKBINDING AND RELATED WORK	533.70	24.20	8	28	64	7	29	64	2	11	27	20.5	20.5
2791	TYPESETTING	730.40	27.10	17	44	39	16	46	38	2	11	27	15.7	15.7
2793	PHOTOENGRAVING	218.00	5.70	16	29	55	10	35	47	2	11	27	18.4	17.0
2795	LITHOGRAPHIC PLATEMAKING SERVICES	667.10	15.10	9	40	51	9	44	47	2	11	27	18.4	17.7
2821	PLASTICS MATERIALS AND RESINS	10,818.20	57.20	0	9	91	0	7	93	6	12	37	34.8	35.2
2824	ORGANIC FIBERS, NONCELLULOSIC	6,379.90	74.00	0	0	100	0	0	100	8	14	30	30.0	30.0
2834	PHARMACEUTICAL PREPARATIONS	11,459.20	126.40	1	3	97	1	3	96	4	4	24	23.4	23.2
2841	SOAP AND OTHER DETERGENTS	5,671.30	32.20	2	11	87	3	15	82	3	16	22	21.0	20.6
2842	POLISHES AND SANITATION GOODS	3,157.20	22.00	6	21	73	8	28	64	4	20	46	38.0	35.4
2843	SURFACE ACTIVE AGENTS	944.80	6.60	4	28	68	5	29	67	0	15	15	14.4	14.3
2844	TOILET PREPARATIONS	6,557.20	50.80	1	4	95	2	6	92	0	6	31	29.7	28.8
2851	PAINTS AND ALLIED PRODUCTS	6,629.60	61.30	3	20	77	4	23	73	7	17	31	27.5	26.8
2869	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.	24,232.90	112.40	0	2	97	1	3	96	5	22	36	35.4	35.4
2879	AGRICULTURAL CHEMICALS, N.E.C.	2,780.40	14.80	4	20	77	5	20	76	6	32	40	37.4	36.8
2893	PRINTING INK	944.80	10.10	9	48	43	8	48	45	19	36	40	36.2	36.4
2899	CHEMICAL PREPARATIONS, N.E.C.	3,950.50	35.30	8	26	66	8	27	66	5	10	21	16.9	16.8
3079	MISCELLANEOUS PLASTIC PRODUCTS	23,688.60	453.70	3	18	79	3	18	79	1	13	25	22.1	22.1
3291	ABRASIVE PRODUCTS	1,955.70	28.30	2	11	87	2	12	86	1	13	25	23.2	23.0
3293	GASKETS, PACKING, AND SEALING DEVICES	1,267.10	33.10	2	14	84	2	12	86	1	13	25	22.0	23.1

Appendix Table E-2 (cont'd)

4/16/85
TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES ($1,000,000)	INDUSTRY TOTAL EMPLOYMENT (1,000)	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED % SOGs BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED SHARE (%) FROM SOG'S REVENUE	EMPLOYMENT
3411	METAL CANS	8,142.90	59.80	0	7	92	1	4	95	4	9	30	28.2	29.0
3412	METAL BARRELS, DRUMS, AND PAILS	937.20	12.50	1	13	86	2	12	86	4	9	30	27.0	27.1
3421	CUTLERY	711.40	14.80	1	4	95	1	5	94	4	9	30	28.9	28.7
3423	HAND AND EDGE TOOLS, N.E.C.	2,279.30	47.10	2	9	89	2	11	87	4	9	30	27.6	27.2
3429	HARDWARE, N.E.C.	5,202.50	99.20	2	8	91	2	8	90	4	9	30	28.1	27.9
3432	PLUMBING FITTINGS AND BRASS GOODS	1,166.50	13.30	1	7	91	2	7	91	4	9	30	28.0	28.1
3433	HEATING EQUIPMENT, EXCEPT ELECTRIC	1,445.60	25.70	4	12	84	4	13	82	4	9	30	26.4	26.1
3441	FABRICATED STRUCTURAL METAL	5,505.30	99.40	4	25	71	4	25	71	4	9	30	23.7	23.7
3442	METAL DOORS, SASH, AND TRIM	3,135.60	65.80	4	18	77	4	19	77	4	9	30	24.9	24.9
3443	FABRICATED PLATE WORK (BOILER SHOPS)	7,432.60	123.50	2	13	85	2	15	83	4	9	30	26.8	26.3
3444	SHEET METAL WORK	4,863.50	77.50	7	33	60	7	37	56	4	9	30	21.3	20.4
3446	ARCHITECTURAL METAL WORK	947.10	20.80	12	31	57	12	32	56	4	9	30	20.4	20.2
3448	PREFABRICATED METAL BUILDINGS	1,779.00	22.60	2	14	84	2	15	82	4	9	30	26.5	26.2
3449	MISCELLANEOUS METAL WORK	1,330.90	16.30	2	34	64	3	26	71	4	9	30	22.3	23.7
3451	SCREW MACHINE PRODUCTS	1,771.90	43.80	6	39	55	6	41	53	4	9	30	20.3	19.7
3452	BOLTS, NUTS, RIVETS, AND WASHERS	3,319.50	60.90	2	11	87	2	11	87	4	9	30	27.2	27.1
3462	IRON AND STEEL FORGINGS	2,795.60	39.10	1	8	92	1	8	92	4	9	30	28.4	28.3
3465	AUTOMOTIVE STAMPINGS	9,739.30	132.30	0	4	96	0	5	95	4	9	30	29.2	29.0
3469	METAL STAMPINGS, N.E.C.	4,735.60	103.10	4	23	73	4	25	71	4	9	30	24.1	23.8
3471	PLATING AND POLISHING	1,848.60	61.20	10	45	45	10	48	42	23	50	42	43.7	43.9
3479	METAL COATING AND ALLIED SERVICES	1,607.70	32.30	6	31	63	8	44	48	23	50	42	43.3	44.0
3494	VALVES AND PIPE FITTINGS	5,662.40	108.80	1	7	92	1	6	93	4	9	30	28.3	28.4
3495	WIRE SPRINGS	957.70	21.70	1	16	82	1	18	80	4	9	30	26.1	25.8
3496	MISCELLANEOUS FABRICATED WIRE PRODUCTS	1,435.00	32.40	6	30	64	6	30	65	4	9	30	22.1	22.3
3497	METAL FOIL AND LEAF	877.60	9.20	1	6	94	0	5	95	4	9	30	28.8	28.9
3498	FABRICATED PIPE FITTINGS	1,872.90	28.20	3	27	70	2	21	77	4	9	30	23.6	25.0
3499	FABRICATED METAL PRODUCTS, N.E.C.	3,429.20	70.90	7	30	63	8	34	58	4	9	30	21.9	20.9
3511	TURBINES AND TURBINE GENERATOR SETS	2,729.60	40.80	0	1	99	0	1	99	2	9	49	48.6	48.4
3519	INTERNAL COMBUSTION ENGINES, NEC	7,696.40	88.80	0	1	99	0	1	99	2	9	49	48.6	48.4
3523	FARM MACHINERY AND EQUIPMENT	10,281.60	131.30	2	7	91	2	10	88	2	9	49	45.3	43.9
3524	FARM AND GARDEN EQUIPMENT	1,575.30	19.60	1	5	94	1	6	93	2	9	49	46.5	46.1
3531	CONSTRUCTION MACHINERY	12,628.70	155.20	1	3	96	1	4	95	2	9	49	47.3	47.1
3532	MINING MACHINERY	1,996.70	31.30	1	7	92	1	7	91	2	9	49	45.7	45.5
3533	OIL FIELD MACHINERY	3,912.50	58.50	1	6	93	1	6	93	2	9	49	46.1	46.0
3534	ELEVATORS AND MOVING STAIRWAYS	489.70	10.10	1	12	87	1	13	86	2	9	49	43.7	43.4
3535	CONVEYERS AND CONVEYING EQUIPMENT	1,902.80	33.00	2	18	81	2	18	80	2	9	49	41.4	40.7
3536	HOISTS, CRANES, AND MONORAILS	835.90	15.80	2	15	83	2	15	84	2	9	49	42.1	42.3
3537	INDUSTRIAL TRUCKS AND TRACTORS	1,920.10	28.70	2	10	87	2	14	84	2	9	49	43.6	42.4
3541	MACHINE TOOLS, METAL CUTTING TYPES	2,812.80	59.30	3	9	88	3	10	87	2	9	49	44.0	43.6
3542	MACHINE TOOLS, METAL FORMING TYPES	1,130.70	23.60	3	13	84	3	14	83	2	9	49	42.4	42.2
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES	3,905.30	105.80	13	44	43	14	48	39	2	9	49	25.3	23.5
3545	MACHINE TOOL ACCESSORIES	2,382.90	54.20	4	21	75	4	22	73	2	9	49	38.7	38.1
3546	POWER DRIVEN HAND TOOLS	1,623.40	27.60	0	2	98	0	3	97	2	9	49	48.2	47.8
3547	ROLLING MILL MACHINERY	507.50	7.90	1	4	95	1	5	94	2	9	49	46.9	46.4
3549	METALWORKING MACHINERY, NEC	916.90	19.50	4	17	79	5	22	73	2	9	49	40.3	38.0
3551	FOOD PRODUCTS MACHINERY	1,786.70	36.20	3	16	81	3	17	80	2	9	49	41.2	40.7
3552	TEXTILE MACHINERY	950.00	25.90	5	20	76	4	19	76	2	9	49	39.1	39.3
3553	WOODWORKING MACHINERY	585.70	10.30	3	22	74	4	25	71	2	9	49	38.3	37.1
3554	PAPER INDUSTRIES MACHINERY	826.80	16.30	1	11	88	1	12	87	2	9	49	44.1	43.8

Appendix Table E-2 (cont'd)

4/16/85
TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES ($1,000,000)	INDUSTRY TOTAL EMPLOYMENT (1,000)	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9 (%)	10-49 (%)	50+ (%)	ESTIMATED % SQGs BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED SHARE (%) FROM SQG'S REVENUE	EMPLOYMENT
3555	PRINTING TRADES MACHINERY	1,350.90	25.40	4	16	81	4	18	78	2	9	49	41.2	39.9
3559	SPECIAL INDUSTRY MACHINERY, N.E.C.	3,622.80	70.40	4	17	79	4	18	78	2	9	49	40.3	39.8
3561	PUMPS AND PUMPING EQUIPMENT	3,773.70	63.00	1	7	92	1	7	92	2	9	49	45.7	45.6
3562	BALL AND ROLLER BEARINGS	2,567.20	50.50	0	1	99	0	1	99	2	9	49	48.6	48.5
3563	AIR AND GAS COMPRESSORS	2,075.60	31.90	1	4	96	1	3	96	2	9	49	47.4	47.3
3564	BLOWERS AND FANS	1,430.70	28.00	2	13	85	2	14	84	2	9	49	42.9	42.6
3566	SPEED CHANGERS, DRIVES, AND GEARS	1,222.30	25.20	2	10	88	2	11	87	2	9	49	44.1	43.8
3567	INDUSTRIAL FURNACES AND OVENS	746.30	15.10	3	20	77	3	19	78	2	9	49	39.6	40.1
3568	POWER TRANSMISSION EQUIPMENT, N.E.C.	1,626.10	32.60	1	7	93	0	7	93	2	9	49	46.2	46.2
3569	GENERAL INDUSTRIAL MACHINERY, N.E.C.	2,779.60	57.50	5	21	74	6	23	71	2	9	49	38.3	36.9
3573	ELECTRONIC COMPUTING EQUIPMENT	12,921.80	192.70	0	2	98	1	2	97	2	9	49	48.2	47.8
3574	CALCULATING AND ACCOUNTING MACHINES	795.80	17.10	0	0	100	1	1	99	2	9	49	49.0	48.5
3576	SCALES AND BALANCES, EXCEPT LABORATORY	348.10	7.00	2	11	87	1	10	89	2	9	49	43.7	44.3
3579	OFFICE MACHINES, N.E.C.	2,719.70	42.40	0	2	98	0	2	97	2	9	49	48.2	47.8
3581	AUTOMATIC MERCHANDISING MACHINES	410.20	8.80	2	4	94	2	6	92	2	9	49	46.5	45.7
3585	REFRIGERATION AND HEATING EQUIPMENT	9,638.10	138.60	1	3	96	1	4	95	2	9	49	47.3	46.9
3589	SERVICE INDUSTRY MACHINES, N.E.C.	1,771.80	32.20	5	18	76	6	21	72	2	9	49	39.0	37.5
3592	CARBURETORS, PISTONS, RINGS, VALVES	1,400.60	32.20	0	4	96	1	4	95	2	9	49	47.4	47.1
3612	TRANSFORMERS	2,202.00	43.30	1	3	96	1	4	95	2	3	23	22.2	22.1
3613	SWITCHGEAR AND SWITCHBOARD APPARATUS	3,541.00	71.40	1	6	93	1	6	92	2	3	23	21.6	21.5
3621	MOTORS AND GENERATORS	4,458.70	96.90	0	3	96	0	3	97	2	3	23	22.2	22.4
3622	INDUSTRIAL CONTROLS	2,514.50	55.50	2	9	89	2	9	89	2	3	23	20.8	20.7
3623	WELDING APPARATUS, ELECTRIC	1,191.20	17.40	1	6	93	1	7	92	2	3	23	21.6	21.4
3629	ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.	692.20	16.40	2	9	89	2	9	89	2	3	23	20.8	20.8
3634	ELECTRIC HOUSEWARES AND FANS	2,531.20	47.30	1	3	97	1	3	96	2	3	23	22.4	22.3
3641	ELECTRIC LAMPS	1,651.30	28.70	1	1	98	1	2	97	2	3	23	22.6	22.4
3643	CURRENT-CARRYING WIRING DEVICES	1,795.20	43.80	1	7	92	1	6	93	2	3	23	21.4	21.5
3644	NONCURRENT-CARRYING WIRING DEVICES	1,421.70	25.80	1	4	95	1	4	95	2	3	23	22.0	21.9
3645	RESIDENTIAL LIGHTING FIXTURES	986.50	23.90	4	20	76	5	21	74	2	3	23	18.2	17.8
3646	COMMERCIAL LIGHTING FIXTURES	922.70	15.60	1	11	88	1	14	85	2	3	23	20.6	19.9
3648	LIGHTING EQUIPMENT, N.E.C.	670.60	12.30	2	15	83	2	16	82	2	3	23	19.6	19.4
3651	RADIO AND TV RECEIVING SETS	5,732.60	74.60	1	2	97	1	3	95	2	3	23	22.4	22.0
3652	PHONOGRAPH RECORDS	1,181.70	23.10	4	12	84	5	13	82	2	3	23	19.8	19.4
3661	TELEPHONE AND TELEGRAPH APPARATUS	7,858.20	124.30	0	1	99	0	1	98	2	3	23	22.8	22.7
3662	RADIO AND TV COMMUNICATION EQUIPMENT	14,900.40	334.40	1	4	95	1	4	95	2	3	23	22.8	22.8
3674	SEMICONDUCTORS AND RELATED DEVICES	5,322.60	114.00	1	2	98	1	2	97	2	3	23	22.6	22.4
3675	ELECTRONIC CAPACITORS	742.20	28.70	0	3	97	0	3	97	2	3	23	22.4	22.4
3676	ELECTRONIC RESISTORS	575.50	21.10	0	3	97	0	2	98	2	3	23	22.4	22.5
3677	ELECTRONIC COILS AND TRANSFORMERS	586.50	20.70	1	13	85	1	14	86	2	3	23	20.0	20.1
3678	ELECTRONIC CONNECTORS	1,865.80	25.00	0	1	99	0	0	100	2	3	23	22.8	22.9
3679	ELECTRONIC COMPONENTS, N.E.C.	5,551.00	126.00	4	12	84	4	15	81	2	3	23	19.8	19.1
3691	STORAGE BATTERIES	1,982.50	26.00	1	3	96	1	4	95	0	0	23	22.1	21.9
3693	X-RAY APPARATUS AND TUBES	1,884.70	30.90	1	4	95	1	4	95	2	3	23	22.0	22.0
3694	ENGINE ELECTRICAL EQUIPMENT	3,647.20	63.90	1	3	96	1	4	95	2	3	23	22.2	22.1
3699	ELECTRICAL MACHINERY AND SUPPLIES, N.E.C.	749.40	20.90	5	23	73	5	22	73	2	3	23	17.6	17.5
3843	DENTAL EQUIPMENT AND SUPPLIES	786.80	16.40	5	16	79	5	18	77	0	7	22	18.5	18.1
3861	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES	9,933.90	111.60	1	3	96	1	4	95	0	7	22	21.3	21.1
3999	MANUFACTURING, NEC	2,662.00	67.30	11	23	66	11	25	64	2	7	17	13.1	12.9
7216	DRY CLEANING PLANTS, EXCEPT RUG	1,779.70	125.74	56	38	6	51	42	8	11	25	24	17.1	17.8

Appendix Table E-2 (cont'd)

4/16/85
TABLEF1

SIC CODE	INDUSTRY TITLE	INDUSTRY TOTAL REVENUES	INDUSTRY TOTAL EMPLOYMENT	SHARE (%) OF TOTAL REVENUES BY EMPLOYMENT SIZE 1-9	10-49	50+	SHARE (%) OF TOTAL EMPLOYMENT BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED % SOBs BY EMPLOYMENT SIZE 1-9	10-49	50+	ESTIMATED SHARE (%) FROM SOB'S REVENUE	EMPLOYMENT
		($1,000,000)	(1,000)	(PERCENTAGE)										
7218	INDUSTRIAL LAUNDERERS	1,114.21	45.31	2	28	70	2	28	70	5	15	17	16.2	16.2
7261	FUNERAL SERVICE AND CREMATORIES	2,558.64	68.91	69	29	1	64	34	2	9	9	9	8.9	9.0
7332	BLUEPRINTING AND PHOTOCOPYING	373.60	11.93	42	45	13	40	46	14	7	25	33	18.5	18.9
7333	COMMERCIAL PHOTOGRAPHY AND ART	1,629.64	43.63	47	37	16	43	39	18	8	16	25	13.7	14.2
7342	DISINFECTING AND EXTERMINATING SERVICES	866.01	40.84	34	57	10	32	59	9	5	22	25	16.7	16.8
7391	RESEARCH AND DEVELOPMENT LABORATORIES	1,995.74	47.51	5	13	82	7	15	78	5	10	16	14.7	14.3
7395	PHOTOFINISHING LABORATORIES	1,829.57	62.70	10	23	67	9	21	70	55	79	5	27.0	25.2
7397	COMMERCIAL TESTING LABORATORIES	662.20	24.47	17	48	35	17	48	34	8	11	10	10.1	10.1
7531	TOP AND BODY REPAIR SHOPS	2,644.85	79.11	68	27	5	66	29	5	13	32	16	18.3	18.7
7534	TIRE RETREADING AND REPAIR SHOPS	669.70	14.76	30	58	12	31	58	11	13	32	16	24.4	24.3
7535	PAINT SHOPS	411.64	14.94	61	39	0	57	43		13	32	16	20.4	21.2
7641	REUPHOLSTERY AND FURNITURE REPAIR	465.32	19.74	76	21	3	73	24	3	5	0	5	5.6	5.7
7992	PUBLIC GOLF COURSES	314.89	13.10	38	50	12	28	54	18	0	0	0	0.0	0.0

Appendix Table E-3. Master list of industries considered for industry analysis and model plant development

SIC CODE	INDUSTRY TITLE
711	SOIL PREPARATION SERVICES
721	CROP PLANTING AND PROTECTION
722	CROP HARVESTING
724	COTTON GINNING
729	GENERAL CROP SERVICES
782	LAWN AND GARDEN SERVICES
783	ORNAMENTAL SHRUB AND TREE SERVICES
851	FORESTRY SERVICES
912	FINFISH
913	SHELLFISH
919	MISCELLANEOUS MARINE PRODUCTS
1521	SINGLE-FAMILY HOUSING CONSTRUCTION
1522	RESIDENTIAL CONSTRUCTION, NEC
1531	OPERATIVE BUILDERS
1541	INDUSTRIAL BUILDINGS AND WAREHOUSES
1542	NONRESIDENTIAL CONSTRUCTION, NEC
1611	HIGHWAY AND STREET CONSTRUCTION
1622	BRIDGE, TUNNEL, AND ELEVATED HIGHWAY
1623	WATER, SEWER, AND UTILITY LINES
1629	HEAVY CONSTRUCTION, N.E.C.
1711	PLUMBING, HEATING AND AIR CONDITIONING
1721	PAINTING, PAPER HANGING, AND DECORATING
1742	PLASTERING, DRYWALL AND INSULATION
1743	TERRAZZO, TILE, MARBLE AND MOSAIC WORK
1752	FLOOR LAYING AND OTHER FLOOR WORK, N.E.C.
1761	ROOFING AND SHEET METAL WORK
1793	GLASS AND GLAZING WORK
1794	EXCAVATING AND FOUNDATION WORK
2231	WEAVING AND FINISHING MILLS, WOOL
2251	WOMEN'S HOSIERY, EXCEPT SOCKS
2252	HOSIERY, N.E.C.
2253	KNIT OUTERWEAR MILLS
2254	KNIT UNDERWEAR MILLS
2257	CIRCULAR KNIT FABRIC MILLS
2258	WARP KNIT FABRIC MILLS
2259	KNITTING MILLS, N.E.C.
2261	FINISHING PLANTS, COTTON
2262	FINISHING PLANTS, SYNTHETICS
2269	FINISHING PLANTS, N.E.C.
2271	WOVEN CARPETS AND RUGS
2272	TUFTED CARPETS AND RUGS
2279	CARPETS AND RUGS, N.E.C.
2434	WOOD KITCHEN CABINETS
2435	HARDWOOD VENEER AND PLYWOOD
2436	SOFTWOOD VENEER AND PLYWOOD
2451	MOBILE HOMES
2452	PREFABRICATED WOOD BUILDINGS
2491	WOOD PRESERVING
2492	PARTICLE BOARD
2499	WOOD PRODUCTS, NEC

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
2511	WOOD HOUSEHOLD FURNITURE
2514	METAL HOUSEHOLD FURNITURE
2517	WOOD TV AND RADIO CABINETS
2519	HOUSEHOLD FURNITURE, N.E.C.
2521	WOOD OFFICE FURNITURE
2522	METAL OFFICE FURNITURE
2531	PUBLIC BUILDING AND RELATED FURNITURE
2541	WOOD PARTITIONS AND FIXTURES
2542	METAL PARTITIONS AND FIXTURES
2591	DRAPERY, HARDWARE AND BLINDS AND SHADES
2599	FURNITURE AND FIXTURES, NEC
2611	PULP MILLS
2621	PAPER MILLS, EXCEPT BUILDING PAPER
2631	PAPERBOARD MILLS
2641	PAPER COATING AND GLAZING
2642	ENVELOPES
2643	BAGS, EXCEPT TEXTILE BAGS
2645	DIE-CUT PAPER AND BOARD
2646	PRESSED AND MOLDED PULP GOODS
2647	SANITARY PAPER PRODUCTS
2648	STATIONERY PRODUCTS
2649	CONVERTED PAPER PRODUCTS, N.E.C.
2651	FOLDING PAPERBOARD BOXES
2652	SET-UP PAPERBOARD BOXES
2653	CORRUGATED AND SOLID FIBER BOXES
2654	SANITARY FOOD CONTAINERS
2655	FIBER CANS, DRUMS AND SIMILAR PRODUCTS
2661	BUILDING PAPER AND BOARD MILLS
2711	NEWSPAPERS
2721	PERIODICALS
2731	BOOK PUBLISHING
2732	BOOK PRINTING
2741	MISCELLANEOUS PUBLISHING
2751	COMMERCIAL PRINTING, LETTERPRESS
2752	COMMERCIAL PRINTING, LITHOGRAPHIC
2753	ENGRAVING AND PLATE PRINTING
2754	COMMERCIAL PRINTING
2761	MANIFOLD BUSINESS FORMS
2771	GREETING CARD PUBLISHING
2782	BLANKBOOKS AND LOOSELEAF BINDERS
2789	BOOKBINDING AND RELATED WORK
2791	TYPESETTING
2793	PHOTOENGRAVING
2794	ELECTROTYPING AND STEREOTYPING
2795	LITHOGRAPHIC PLATEMAKING SERVICES
2819	INDUSTRIAL INORGANIC CHEMICALS, N.E.C.
2821	PLASTICS MATERIALS AND RESINS
2822	SYNTHETIC RUBBER
2823	CELLULOSIC MAN-MADE FIBERS
2824	ORGANIC FIBERS, NONCELLULOSIC

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
2834	PHARMACEUTICAL PREPARATIONS
2841	SOAP AND OTHER DETERGENTS
2842	POLISHES AND SANITATION GOODS
2843	SURFACE ACTIVE AGENTS
2844	TOILET PREPARATIONS
2851	PAINTS AND ALLIED PRODUCTS
2861	GUM AND WOOD CHEMICALS
2869	INDUSTRIAL ORGANIC CHEMICALS, N.E.C.
2879	AGRICULTURAL CHEMICALS, N.E.C.
2893	PRINTING INK
2899	CHEMICAL PREPARATIONS, N.E.C.
3079	MISCELLANEOUS PLASTIC PRODUCTS
3111	LEATHER TANNING AND FINISHING
3131	BOOT AND SHOE CUT STOCK AND FINDINGS
3142	HOUSE SLIPPERS
3143	MEN'S FOOTWEAR, EXCEPT ATHLETIC
3144	WOMEN'S FOOTWEAR, EXCEPT ATHLETIC
3149	FOOTWEAR, EXCEPT RUBBER, N.E.C.
3151	LEATHER GLOVES AND MITTENS
3161	LUGGAGE
3171	WOMEN'S HANDBAGS AND PURSES
3172	PERSONAL LEATHER GOODS, N.E.C.
3199	LEATHER GOODS, N.E.C.
3211	FLAT GLASS
3251	BRICK AND STRUCTURAL CLAY TILE
3253	CERAMIC WALL AND FLOOR TILE
3261	VITREOUS PLUMBING FIXTURES
3262	VITREOUS CHINA FOOD UTENSILS
3263	FINE EARTHENWARE FOOD UTENSILS
3264	PORCELAIN ELECTRICAL SUPPLIES
3269	POTTERY PRODUCTS, N.E.C.
3291	ABRASIVE PRODUCTS
3293	GASKETS, PACKING, AND SEALING DEVICES
3351	COPPER ROLLING AND DRAWING
3353	ALUMINUM SHEET, PLATE, AND FOIL
3354	ALUMINUM EXTRUDED PRODUCTS
3355	ALUMINUM ROLLING AND DRAWING, N.E.C.
3356	NONFERROUS ROLLING AND DRAWING, N.E.C.
3357	NONFERROUS WIRE DRAWING AND INSULATING
3398	METAL HEAT TREATING
3399	PRIMARY METAL PRODUCTS, N.E.C.
3411	METAL CANS
3412	METAL BARRELS, DRUMS, AND PAILS
3421	CUTLERY
3423	HAND AND EDGE TOOLS, N.E.C.
3425	HAND SAWS AND SAW BLADES
3429	HARDWARE, N.E.C.
3431	METAL SANITARY WARE
3432	PLUMBING FITTINGS AND BRASS GOODS
3433	HEATING EQUIPMENT, EXCEPT ELECTRIC

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
3441	FABRICATED STRUCTURAL METAL
3442	METAL DOORS, SASH, AND TRIM
3443	FABRICATED PLATE WORK (BOILER SHOPS)
3444	SHEET METAL WORK
3446	ARCHITECTURAL METAL WORK
3448	PREFABRICATED METAL BUILDINGS
3449	MISCELLANEOUS METAL WORK
3451	SCREW MACHINE PRODUCTS
3452	BOLTS, NUTS, RIVETS, AND WASHERS
3462	IRON AND STEEL FORGINGS
3465	AUTOMOTIVE STAMPINGS
3466	CROWNS AND CLOSURES
3469	METAL STAMPINGS, N.E.C.
3471	PLATING AND POLISHING
3479	METAL COATING AND ALLIED SERVICES
3484	SMALL ARMS
3493	STEEL SPRINGS, EXCEPT WIRE
3494	VALVES AND PIPE FITTINGS
3495	WIRE SPRINGS
3496	MISCELLANEOUS FABRICATED WIRE PRODUCTS
3497	METAL FOIL AND LEAF
3498	FABRICATED PIPE FITTINGS
3499	FABRICATED METAL PRODUCTS, N.E.C.
3511	TURBINES AND TURBINE GENERATOR SETS
3519	INTERNAL COMBUSTION ENGINES, NEC
3523	FARM MACHINERY AND EQUIPMENT
3524	FARM AND GARDEN EQUIPMENT
3531	CONSTRUCTION MACHINERY
3532	MINING MACHINERY
3533	OIL FIELD MACHINERY
3534	ELEVATORS AND MOVING STAIRWAYS
3535	CONVEYERS AND CONVEYING EQUIPMENT
3536	HOISTS, CRANES, AND MONORAILS
3537	INDUSTRIAL TRUCKS AND TRACTORS
3541	MACHINE TOOLS, METAL CUTTING TYPES
3542	MACHINE TOOLS, METAL FORMING TYPES
3544	SPECIAL DIES, TOOLS, JIGS AND FIXTURES
3545	MACHINE TOOL ACCESSORIES
3546	POWER DRIVEN HAND TOOLS
3547	ROLLING MILL MACHINERY
3549	METALWORKING MACHINERY, NEC
3551	FOOD PRODUCTS MACHINERY
3552	TEXTILE MACHINERY
3553	WOODWORKING MACHINERY
3554	PAPER INDUSTRIES MACHINERY
3555	PRINTING TRADES MACHINERY
3559	SPECIAL INDUSTRY MACHINERY, N.E.C.
3561	PUMPS AND PUMPING EQUIPMENT
3562	BALL AND ROLLER BEARINGS
3563	AIR AND GAS COMPRESSORS

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
3564	BLOWERS AND FANS
3565	INDUSTRIAL PATTERNS
3566	SPEED CHANGERS, DRIVES, AND GEARS
3567	INDUSTRIAL FURNACES AND OVENS
3568	POWER TRANSMISSION EQUIPMENT, N.E.C.
3569	GENERAL INDUSTRIAL MACHINERY, N.E.C.
3572	TYPEWRITERS
3573	ELECTRONIC COMPUTING EQUIPMENT
3574	CALCULATING AND ACCOUNTING MACHINES
3576	SCALES AND BALANCES, EXCEPT LABORATORY
3579	OFFICE MACHINES, N.E.C.
3581	AUTOMATIC MERCHANDISING MACHINES
3582	COMMERCIAL LAUNDRY EQUIPMENT
3585	REFRIGERATION AND HEATING EQUIPMENT
3586	MEASURING AND DISPENSING PUMPS
3589	SERVICE INDUSTRY MACHINES, N.E.C.
3592	CARBURETORS, PISTONS, RINGS, VALVES
3599	MACHINERY, EXCEPT ELECTRICAL, N.E.C.
3612	TRANSFORMERS
3613	SWITCHGEAR AND SWITCHBOARD APPARATUS
3621	MOTORS AND GENERATORS
3622	INDUSTRIAL CONTROLS
3623	WELDING APPARATUS, ELECTRIC
3624	CARBON AND GRAPHITE PRODUCTS
3629	ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.
3631	HOUSEHOLD COOKING EQUIPMENT
3632	HOUSEHOLD REFRIGERATORS AND FREEZERS
3633	HOUSEHOLD LAUNDRY EQUIPMENT
3634	ELECTRIC HOUSEWARES AND FANS
3635	HOUSEHOLD VACUUM CLEANERS
3636	SEWING MACHINES
3639	HOUSEHOLD APPLIANCES, N.E.C.
3641	ELECTRIC LAMPS
3643	CURRENT-CARRYING WIRING DEVICES
3644	NONCURRENT-CARRYING WIRING DEVICES
3645	RESIDENTIAL LIGHTING FIXTURES
3646	COMMERCIAL LIGHTING FIXTURES
3647	VEHICULAR LIGHTING EQUIPMENT
3648	LIGHTING EQUIPMENT, N.E.C.
3651	RADIO AND TV RECEIVING SETS
3652	PHONOGRAPH RECORDS
3661	TELEPHONE AND TELEGRAPH APPARATUS
3662	RADIO AND TV COMMUNICATION EQUIPMENT
3671	ELECTRON TUBES RECEIVING TYPE
3672	CATHODE RAY TELEVISION PICTURE TUBES
3673	ELECTRON TUBES, TRANSMITTING
3674	SEMICONDUCTORS AND RELATED DEVICES
3675	ELECTRONIC CAPACITORS
3676	ELECTRONIC RESISTORS
3677	ELECTRONIC COILS AND TRANSFORMERS

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
3678	ELECTRONIC CONNECTORS
3679	ELECTRONIC COMPONENTS, N.E.C.
3691	STORAGE BATTERIES
3692	PRIMARY BATTERIES, DRY AND WET
3693	X-RAY APPARATUS AND TUBES
3694	ENGINE ELECTRICAL EQUIPMENT
3699	ELECTRICAL MACHINERY AND SUPPLIES, N.E.C.
3714	MOTOR VEHICLE PARTS AND ACCESSORIES
3811	ENGINEERING AND SCIENTIFIC INSTRUMENTS
3822	ENVIRONMENTAL CONTROLS
3823	PROCESS CONTROL INSTRUMENTS
3824	FLUID METERS AND COUNTING DEVICES
3825	INSTRUMENTS TO MEASURE ELECTRICITY
3829	MEASURING AND CONTROLLING DEVICES, N.E.C.
3832	OPTICAL INSTRUMENTS AND LENSES
3841	SURGICAL AND MEDICAL INSTRUMENTS
3842	SURGICAL APPLIANCES AND SUPPLIES
3843	DENTAL EQUIPMENT AND SUPPLIES
3851	OPTHALMIC GOODS
3861	PHOTOGRAPHIC EQUIPMENT AND SUPPLIES
3873	WATCHES, CLOCKS AND WATCHCASES
3911	JEWELRY, PRECIOUS METAL
3914	SILVERWARE AND PLATED WARE
3915	JEWELERS' MATERIALS AND LAPIDARY WORK
3961	COSTUME JEWELRY
3964	NEEDLES, PINS, AND FASTENERS
3993	SIGNS AND ADVERTISING DISPLAYS
3995	BURIAL CASKETS
3999	MANUFACTURING, NEC
4011	RAILROADS, LINE-HAUL OPERATING
4013	SWITCHING AND TERMINAL SERVICES
4041	RAILWAY EXPRESS SERVICE
4111	LOCAL AND SUBURBAN TRANSIT
4119	LOCAL PASSENGER TRANSPORTATION, NEC
4121	TAXICABS
4131	INTERCITY HIGHWAY TRANSPORTATION
4141	LOCAL PASSENGER CHARTER SERVICE
4142	CHARTER, EXCEPT LOCAL
4151	SCHOOL BUSES
4171	BUS TERMINAL FACILITIES
4172	BUS SERVICE FACILITIES
4212	LOCAL TRUCKING, WITHOUT STORAGE
4213	TRUCKING, EXCEPT LOCAL
4214	LOCAL TRUCKING WITH STORAGE
4231	TRUCKING TERMINAL FACILITIES
4311	U.S. POSTAL SERVICE
4459	LOCAL WATER TRANSPORTATION, NEC
4463	MARINE CARGO HANDLING
4469	WATER TRANSPORTATION SERVICES, N.E.C.
4612	CRUDE PETROLEUM PIPE LINES

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
4613	REFINED PETROLEUM PIPE LINES
4619	PIPE LINES, N.E.C.
4811	TELEPHONE COMMUNICATION
4821	TELEGRAPH COMMUNICATION
4832	RADIO BROADCASTING
4833	TELEVISION BROADCASTING
4899	COMMUNICATION SERVICES, N.E.C.
4953	REFUSE SYSTEMS
4959	SANITARY SERVICES, N.E.C.
5161	CHEMICALS AND ALLIED PRODUCTS
5191	FARM SUPPLIES
5198	PAINTS, VARNISHES, AND SUPPLIES
5231	PAINT, GLASS, AND WALLPAPER STORES
5251	HARDWARE STORES
5271	MOBILE HOME DEALERS
5311	DEPARTMENT STORES
5399	MISCELLANEOUS GENERAL MERCHANDISE STORES
5511	NEW AND USED CAR DEALERS
5521	USED CAR DEALERS
5531	AUTO AND HOME SUPPLY STORES
5541	GASOLINE SERVICE STATIONS
5551	BOAT DEALERS
5561	RECREATIONAL AND UTILITY TRAILER DEALERS
5571	MOTORCYCLE DEALERS
5599	AUTOMOTIVE DEALERS, N.E.C.
5962	MERCHANDISING MACHINE OPERATORS
5982	FUEL AND ICE DEALERS, NEC
7215	COIN-OPERATED LAUNDRIES AND CLEANING
7216	DRY CLEANING PLANTS, EXCEPT RUG
7217	CARPET AND UPHOLSTERY CLEANING
7218	INDUSTRIAL LAUNDERERS
7261	FUNERAL SERVICE AND CREMATORIES
7312	OUTDOOR ADVERTISING SERVICES
7331	DIRECT MAIL AND ADVERTISING SERVICES
7332	BLUEPRINTING AND PHOTOCOPYING
7333	COMMCERCIAL PHOTOGRAPHY AND ART
7342	DISINFECTING AND EXTERMINATING SERVICES
7349	BUILDING MAINTENANCE SERVICES, N.E.C.
7391	RESEARCH AND DEVELOPMENT LABORATORIES
7395	PHOTOFINISHING LABORATORIES
7397	COMMERCIAL TESTING LABORATORIES
7512	PASSENGER CAR RENTAL AND LEASING
7513	TRUCK RENTAL AND LEASING
7519	UTILITY TRAILER RENTAL
7531	TOP AND BODY REPAIR SHOPS
7534	TIRE RETREADING AND REPAIR SHOPS
7535	PAINT SHOPS
7538	GENERAL AUTOMOTIVE REPAIR SHOPS
7539	AUTOMOTIVE REPAIR SHOPS, N.E.C.
7622	RADIO AND TELEVISION REPAIR

Appendix Table E-3 (cont'd)

SIC CODE	INDUSTRY TITLE
7623	REFRIGERATION SERVICE AND REPAIR
7629	ELECTRICAL REPAIR SHOPS, N.E.C.
7631	WATCH, CLOCK, AND JEWELRY REPAIR
7641	REUPHOLSTERY AND FURNITURE REPAIR
7694	ARMATURE REWINDING SHOPS
7699	REPAIR SERVICES, NEC
7992	PUBLIC GOLF COURSES
7996	AMUSEMENT PARKS
7997	MEMBERSHIP SPORTS AND RECREATION CLUBS
7699	REPAIR SERVICES, NEC
7819	SERVICES ALLIED TO MOTION PICTURE PRODUCTION
8062	GENERAL MEDICAL AND SURGICAL HOSPITALS
8069	SPECIALTY HOSPITALS, EXCEPT PSYCHIATRIC
8071	MEDICAL LABORATORIES
8072	DENTAL LABORATORIES
8081	OUTPATIENT CARE FACILITIES
8211	ELEMENTARY AND SECONDARY SCHOOLS
8221	COLLEGES AND UNIVERSITIES, N.E.C.
8222	JUNIOR COLLEGES
8249	VOCATION SCHOOLS, N.E.C.
8331	JOB TRAINING AND RELATED SERVICES
8411	MUSEUMS AND ART GALLERIES
8421	BOTANICAL AND ZOOLOGICAL GARDENS
8922	NONCOMMERCIAL RESEARCH ORGANIZATIONS
9221	POLICE PROTECTION
9223	CORRECTIONAL INSTITUTIONS
9224	FIRE PROTECTION
9641	REGULATION OF AGRICULTURAL MARKETING AND COMMODITIES

APPENDIX F

DETAILED SQG WASTE MANAGEMENT PROFILES

Table F-1 Storage Profile
F-2 Average Storage Time Profile
F-1 Maximum Storage Time Profile
F-4 Disposal Profile, Number of Generators
F-5 Disposal Profile, Percent of Generators
F-6 Recycling Profile, Number of Generators
F-7 Recycling Profile, Percent of Generators
F-8 Treatment Profile, Number of Generators
F-9 Treatment Profile, Percent of Generators
F-10 Transportation Profile
F-11 Transportation Notification Profile
F-12 TSDF Notification Profile

Table F-1: Storage Profile, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Generators Storing		Above Ground Tanks		Below Ground Tanks		Open Metal Drums		Closed Metal Drums		Open Fiberboard Drums		Closed Fiberboard Drums	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%
Waste pesticides	990	473	47.8%	106	22.4%	51	10.8%	61	12.9%	163	34.5%	7	1.5%	27	5.7%
Pesticide wash/rinse solutions	1747	566	32.4%	66	11.7%	75	13.3%	83	14.7%	236	41.7%	8	1.4%	6	1.1%
Empty pesticide containers	1962	1646	83.9%	29	1.8%			139	8.4%	307	18.7%	4	0.2%		
Heavy metal dusts	39	19	48.7%					1	5.3%	18	94.7%			4	21.1%
Cyanide wastes	1384	927	67.0%	52	5.6%			46	5.0%	651	70.2%			178	19.2%
Photographic wastes	4949	947	19.1%	218	23.0%	62	6.5%			285	30.1%	25	2.6%	56	5.9%
Other reactive wastes	497	365	73.4%	28	7.7%	43	11.8%	22	6.0%	140	38.4%			11	3.0%
Strong acids/alkalies	10480	8837	84.3%	698	7.9%	188	2.1%	172	1.9%	1256	14.2%	3	.0%	207	2.3%
Ignitable wastes	2873	2239	77.9%	23	1.0%	112	5.0%	126	5.6%	662	29.6%	15	0.7%	15	0.7%
Ignitable paint wastes	3121	2784	89.2%	382	13.7%	197	7.1%	58	2.1%	1179	42.3%			21	0.8%
Spent solvents	33475	26811	80.1%	3583	13.4%	4759	17.8%	783	2.9%	11636	43.4%	5	.0%	24	0.1%
Filtration residues from dry cleaning	2540	1483	58.4%	60	4.0%	29	2.0%	148	10.0%	417	28.1%	29	2.0%		
Solvent still bottoms	739	728	98.6%					30	4.1%	680	93.4%				
Wood preserving wastewater trtmt. sludges	108	104	96.3%	16	15.4%	4	3.8%	2	1.9%	53	51.0%				
Solutions containing heavy metals	30	15	50.0%	3	20.0%					8	53.3%				
Arsenic-containing wastes	19	8	42.1%												
Plating wastes	1422	257	18.1%	52	20.2%					104	40.5%	55	21.4%		
Paint wastes containing heavy metals	156	156	100.0%												
Solutions/sludges with photographic silver	2648	1616	61.0%	281	17.4%			17	1.1%	166	10.3%	18	1.1%	114	7.1%
Formaldehyde-containing wastes	2014	58	2.9%												
Waste inks with solvents/heavy metals	718	614	85.5%			62	10.1%			325	52.9%				
Wastewater trtmt. sludges with heavy metals	790	493	62.4%	52	10.5%			148	30.0%	46	9.3%				
Ink formulation sludges with chromium/lead	83	83	100.0%	3	3.6%	7	8.4%			69	83.1%				
Heavy metal waste materials	117	96	82.1%							59	61.5%			18	18.8%
Ammonia-containing wastes	100	0													
Mercury-containing wastes	0	0													

Table F-1: (Continued) Storage Profile, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Generators Storing #	Generators Storing %	Pails or Garbage Cans #	Pails or Garbage Cans %	Surface Impoundments/ Lagoons #	Surface Impoundments/ Lagoons %	Piles #	Piles %	Bulk Waste Containers #	Bulk Waste Containers %	Lab Packs #	Lab Packs %	Other #	Other %
Waste pesticides	990	473	47.8%	130	27.5%	20	4.2%	4	0.8%	120	25.4%	6	1.3%	241	51.0%
Pesticide wash/rinse solutions	1747	566	32.4%	73	12.9%	39	6.9%			34	6.0%	6	1.1%	159	28.1%
Empty pesticide containers	1962	1646	83.9%	275	16.7%			461	28.0%	489	29.7%	4	0.2%	392	23.8%
Heavy metal dusts	39	19	48.7%												
Cyanide wastes	1384	927	67.0%												
Photographic wastes	4949	947	19.1%	23	2.4%			23	2.4%	41	4.3%	41	4.3%	522	55.1%
Other reactive wastes	497	365	73.4%	56	15.3%	4	1.1%			2	0.5%	21	5.8%	267	73.2%
Strong acids/alkalies	10480	8837	84.3%	657	7.4%	6	0.1%	580	6.6%	3	.0%	162	1.8%	6013	68.0%
Ignitable wastes	2873	2239	77.9%	243	10.9%	27	1.2%	580	25.9%	367	16.4%	119	5.3%	340	15.2%
Ignitable paint wastes	3121	2784	89.2%	234	8.4%					894	32.1%	17	0.6%	1259	45.2%
Spent solvents	33475	26811	80.1%	631	2.4%	21	0.1%	34	0.1%	120	0.4%	157	0.6%	9342	34.8%
Filtration residues from dry cleaning	2540	1483	58.4%	388	26.2%			62	4.2%	380	25.6%			351	23.7%
Solvent still bottoms	738	728	98.6%							30	4.1%			5	0.7%
Wood preserving wastewater trtmt. sludges	108	104	96.3%			39	37.5%			2	1.9%			4	3.8%
Solutions containing heavy metals	30	15	50.0%									3	20.0%		
Arsenic-containing wastes	19	8	42.1%	2	25.0%			2	25.0%	4	50.0%				
Plating wastes	1422	257	18.1%											92	35.8%
Paint wastes containing heavy metals	156	156	100.0%							156	100.0%				
Solutions/sludges with photographic silver	2648	1616	61.0%	284	17.6%							114	7.1%	1501	92.9%
Formaldehyde-containing wastes	2014	58	2.9%											174	300.0%
Waste inks with solvents/heavy metals	718	614	85.5%	171	27.9%					112	18.2%				
Wastewater trtmt. sludges with heavy metals	790	493	62.4%	2	0.4%					46	9.3%			397	80.5%
Ink formulation sludges with chromium/lead	83	83	100.0%	3	3.6%										
Heavy metal waste materials	117	96	82.1%	20	20.8%					20	20.8%	17	17.7%		
Ammonia-containing wastes	100	0													
Mercury-containing wastes	0	0													

Table F-2: Average Storage Time Profile, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Generators Storing		0 - 7 days		8 - 90 days		91 - 180 days		181 - 270 days		> 270 days		≤ 180 days		> 180 days	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Waste pesticides	990	473	47.8%	216	45.7%	214	45.2%	8	1.7%	6	1.3%	29	6.1%	438	92.6%	35	7.4%
Pesticide wash/rinse solutions	1747	566	32.4%	201	35.5%	307	54.2%	24	4.2%	6	1.1%	28	4.9%	532	94.0%	34	6.0%
Empty pesticide containers	1962	1646	83.9%	926	56.3%	591	35.9%	57	3.5%	43	2.6%	29	1.8%	1574	95.6%	72	4.4%
Heavy metal dusts	39	19	48.7%			12	63.2%	2	10.5%			5	26.3%	14	73.7%	5	26.3%
Cyanide wastes	1384	927	67.0%	52	5.6%	655	70.7%	55	5.9%	165	17.8%			762	82.2%	165	17.8%
Photographic wastes	4949	947	19.1%	288	30.4%	522	55.1%	70	7.4%			67	7.1%	880	92.9%	67	7.1%
Other reactive wastes	497	365	73.4%	42	11.5%	163	44.7%	60	16.4%	20	5.5%	80	21.9%	265	72.6%	100	27.4%
Strong acids/alkalies	10480	8837	84.3%	3448	39.0%	4554	51.5%	63	0.7%	28	0.3%	744	8.4%	8065	91.3%	772	8.7%
Ignitable wastes	2873	2239	77.9%	474	21.2%	1442	64.4%	194	8.7%	25	1.1%	104	4.6%	2110	94.2%	129	5.8%
Ignitable paint wastes	3121	2784	89.2%	808	29.0%	1463	52.6%	102	3.7%	34	1.2%	377	13.5%	2373	85.2%	411	14.8%
Spent solvents	33475	26811	80.1%	3019	11.3%	18151	67.7%	1630	6.1%	752	2.8%	3259	12.2%	22800	85.0%	4011	15.0%
Filtration residues from dry cleaning	2540	1483	58.4%	1035	69.8%	417	28.1%	31	2.1%					1483	100.0%	0	
Solvent still bottoms	738	728	98.6%	198	27.2%	458	62.9%			2	0.3%	70	9.6%	656	90.1%	72	9.9%
Wood preserving wastewater trtmt. sludges	108	104	96.3%	4	3.8%	48	46.2%	9	8.7%	4	3.8%	39	37.5%	61	58.7%	43	41.3%
Solutions containing heavy metals	30	15	50.0%	4	26.7%	3	20.0%	4	26.7%			4	26.7%	11	73.3%	4	26.7%
Arsenic-containing wastes	19	8	42.1%	6	75.0%	2	25.0%							8	100.0%	0	
Plating wastes	1422	257	18.1%	199	77.4%	58	22.6%							257	100.0%	0	
Paint wastes containing heavy metals	156	156	100.0%	156	100.0%									156	100.0%	0	
Solutions/sludges with photographic silver	2648	1616	61.0%	294	18.2%	965	59.7%	129	8.0%	18	1.1%	210	13.0%	1388	85.9%	228	14.1%
Formaldehyde-containing wastes	2014	58	2.9%									58	100.0%	0		58	100.0%
Waste inks with solvents/heavy metals	718	614	85.5%	282	45.9%	327	53.3%	5	0.8%					614	100.0%	0	
Wastewater trtmt. sludges with heavy metals	790	493	62.4%	194	39.4%	247	50.1%	52	10.5%					493	100.0%	0	
Ink formulation sludges with chromium/lead	83	83	100.0%	3	3.6%	70	84.3%	7	8.4%			3	3.6%	80	96.4%	3	3.6%
Heavy metal waste materials	117	96	82.1%			77	80.2%	17	17.7%			2	2.1%	94	97.9%	2	2.1%
Ammonia-containing wastes	100	0												0		0	
Mercury-containing wastes	0	0												0		0	

Table F-3: Maximum Storage Time Profile, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Generators Storing		0 - 7 days		8 - 90 days		91 - 180 days		181 - 270 days		> 270 days		≤ 180 days		> 180 days	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Waste pesticides	990	473	47.8%	114	24.1%	251	53.1%	45	9.5%			63	13.3%	410	86.7%	63	13.3%
Pesticide wash/rinse solutions	1747	566	32.4%	106	18.7%	394	69.6%	32	5.7%			34	6.0%	532	94.0%	34	6.0%
Empty pesticide containers	1962	1646	83.9%	663	40.3%	790	48.0%	93	5.7%	33	2.0%	67	4.1%	1546	93.9%	100	6.1%
Heavy metal dusts	39	19	48.7%			12	63.2%	2	10.5%			5	26.3%	14	73.7%	5	26.3%
Cyanide wastes	1384	927	67.0%	52	5.6%	509	54.9%	149	16.1%	119	12.8%	98	10.6%	710	76.6%	217	23.4%
Photographic wastes	4949	947	19.1%	128	13.5%	603	63.7%	130	13.7%	19	2.0%	67	7.1%	861	90.9%	86	9.1%
Other reactive wastes	497	365	73.4%	12	3.3%	139	38.1%	94	25.8%	20	5.5%	100	27.4%	245	67.1%	120	32.9%
Strong acids/alkalies	10480	8837	84.3%	1407	15.9%	6507	73.6%	123	1.4%	54	0.6%	746	8.4%	8037	90.9%	800	9.1%
Ignitable wastes	2873	2239	77.9%	315	14.1%	1492	66.6%	191	8.5%	47	2.1%	194	8.7%	1998	89.2%	241	10.8%
Ignitable paint wastes	3121	2784	89.2%	808	29.0%	1281	46.0%	242	8.7%			453	16.3%	2331	83.7%	453	16.3%
Spent solvents	33475	26811	80.1%	2116	7.9%	15777	58.8%	3501	13.1%	506	1.9%	4911	18.3%	21394	79.8%	5417	20.2%
Filtration residues from dry cleaning	2540	1483	58.4%	765	51.6%	626	42.2%	60	4.0%			32	2.2%	1451	97.8%	32	2.2%
Solvent still bottoms	738	728	98.6%	29	4.0%	458	62.9%	22	3.0%	3	0.4%	216	29.7%	509	69.9%	219	30.1%
Wood preserving wastewater trtmt. sludges	108	104	96.3%	2	1.9%	36	34.6%	15	14.4%	6	5.8%	45	43.3%	53	51.0%	51	49.0%
Solutions containing heavy metals	30	15	50.0%	4	26.7%	3	20.0%	4	26.7%			4	26.7%	11	73.3%	4	26.7%
Arsenic-containing wastes	19	8	42.1%	6	75.0%	2	25.0%							8	100.0%	0	
Plating wastes	1422	257	18.1%	98	38.1%	159	61.9%							257	100.0%	0	
Paint wastes containing heavy metals	156	156	100.0%	156	100.0%									156	100.0%	0	
Solutions/sludges with photographic silver	2648	1616	61.0%	156	9.7%	951	58.8%	238	14.7%			271	16.8%	1345	83.2%	271	16.8%
Formaldehyde-containing wastes	2014	58	2.9%									58	100.0%	0		58	100.0%
Waste inks with solvents/heavy metals	718	614	85.5%	282	45.9%	202	32.9%	125	20.4%			5	0.8%	609	99.2%	5	0.8%
Wastewater trtmt. sludges with heavy metals	790	493	62.4%	46	9.3%	395	80.1%	52	10.5%					493	100.0%	0	
Ink formulation sludges with chromium/lead	83	83	100.0%	3	3.6%	14	16.9%	59	71.1%	4	4.8%	3	3.6%	76	91.6%	7	8.4%
Heavy metal waste materials	117	96	82.1%			56	58.3%	23	24.0%	13	13.5%	4	4.2%	79	82.3%	17	17.7%
Ammonia-containing wastes	100	0												0		0	
Mercury-containing wastes	0	0												0		0	

Table F-4: Disposal Profile, Number of Generators, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Hazardous Waste Landfill # On	Hazardous Waste Landfill # Off	Sanitary Landfill # On	Sanitary Landfill # Off	Hazardous Waste Incinerator # On	Hazardous Waste Incinerator # Off	Solid Waste Incinerator # On	Solid Waste Incinerator # Off	POTW # Off	Septic Tank or Leaching Field # On	Septic Tank or Leaching Field # Off	Other # On	Other # Off	Other # Unspec.
Waste pesticides	990		160	77	272	6	49	20	82	78	69	113			
Pesticide wash/rinse solutions	1747		69	17	33					215	89	33	28		
Empty pesticide containers	1962		316	105	1101	6		109	17	4			29		
Heavy metal dusts	39		10				3		3	3					
Cyanide wastes	1384		118				266			507		3			
Photographic wastes	4949		70		139				53	4012	85	145			
Other reactive wastes	497		162		60	16	23	9	29	111		3			
Strong acids/alkalies	10480		400		1003	3	28	721	4	2475	201	219			
Ignitable wastes	2873		312	3	705	34	271	5	88	448	27	2			
Ignitable paint wastes	3121		292		1300	34	92			60					
Spent solvents	33475	60	953	38	935	166	1412	641	223	1349	659	289	582	50	
Filtration residues from dry cleaning	2540		267		1394				87	320		29			
Solvent still bottoms	738	142	18		38	3	10		4	1					
Wood preserving wastewater trtmt. sludges	108		45		2		2		2	10		4			
Solutions containing heavy metals	30						8			15					
Arsenic-containing wastes	19														
Plating wastes	1422		278				46			826		56			
Paint wastes containing heavy metals	156														
Solutions/sludges with photographic silver	2648				18					1148	50		18		
Formaldehyde-containing wastes	2014									1898	232				
Waste inks with solvents/heavy metals	718		51		342						51				
Wastewater trtmt. sludges with heavy metals	790		203		148					146		46			
Ink formulation sludges with chromium/lead	83		11		7		11		3	3	3				
Heavy metal waste materials	117		24		38		16		3						
Ammonia-containing wastes	100									100					
Mercury-containing wastes	0														

Table F-5: Disposal Profile, Percent of Generators, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Hazardous Waste Landfill		Sanitary Landfill		Hazardous Waste Incinerator		Solid Waste Incinerator		POTW	Septic Tank or Leaching Field		other		
		% On	% Off	% On	% Off	% On	% Off	% On	% Off	% Off	% On	% Off	% On	% Off	% unspec.
Waste pesticides	990		16.16%	7.75%	27.47%	0.61%	4.95%	2.02%	9.28%	7.86%	6.97%	11.41%			
Pesticide wash/rinse solutions	1747		3.95%	0.97%	1.89%					12.31%	5.09%	1.89%	1.60%		
Empty pesticide containers	1962		16.11%	5.35%	56.12%	0.31%		5.56%	0.87%	0.20%			1.48%		
Heavy metal dusts	39		25.64%				7.69%		7.69%	7.69%					
Cyanide wastes	1384		8.53%				19.22%			36.63%		0.22%			
Photographic wastes	4949		1.41%		2.81%				1.07%	81.07%	1.72%	1.93%			
Other reactive wastes	497		32.60%		12.07%	3.22%	4.63%	1.81%	5.84%	22.33%		0.60%			
Strong acids/alkalies	10480		3.82%		9.57%	0.03%	0.27%	6.88%	0.04%	23.62%	1.92%	2.09%			
Ignitable wastes	2873		10.86%	0.10%	24.54%	1.18%	9.47%	0.17%	3.06%	15.59%	0.94%	0.07%			
Ignitable paint wastes	3121		9.36%		41.65%	1.09%	2.95%			1.92%					
Spent solvents	33475	0.18%	2.85%	0.11%	2.79%	0.50%	4.22%	1.91%	0.67%	4.03%	1.97%	0.86%	1.74%	0.15%	
Filtration residues from dry cleaning	2540		10.51%		54.88%				3.47%	12.60%		1.14%			
Solvent still bottoms	738	19.24%	2.44%		5.15%	0.41%	1.36%		0.54%	0.14%					
Wood preserving wastewater trtmt. sludges	108		41.67%		1.85%		1.85%		1.85%	9.26%		3.70%			
Solutions containing heavy metals	30						26.67%			50.00%					
Arsenic-containing wastes	19														
Plating wastes	1422		19.55%				3.23%			58.09%		3.94%			
Paint wastes containing heavy metals	156														
Solutions/sludges with photographic silver	2646				0.68%					43.35%	1.89%		0.68%		
Formaldehyde-containing wastes	2014									94.24%	11.52%				
Waste inks with solvents/heavy metals	718		7.10%		47.63%						7.10%				
Wastewater trtmt. sludges with heavy metals	790		25.70%		18.73%					18.48%		5.82%			
Ink formulation sludges with chromium/lead	83		13.25%		8.43%		13.25%		3.61%	3.61%	3.61%				
Heavy metal waste materials	117		20.51%		32.48%		13.68%		2.56%						
Ammonia-containing wastes	100									100.00%					
Mercury-containing wastes	9														

[redacted]able [redacted]: R[redacted]ing [redacted]ile, [redacted]ber [redacted]ner[redacted], 10[redacted] 100[redacted]/MONT[redacted]

Waste Stream	Number of Generators	Recyclers # On	Recyclers # Off	Used/Reused Unprocessed # On	Used/Reused Unprocessed # Off	Reclaimed Reprocessed # On	Reclaimed Reprocessed # Off	Blended For Fuel # On	Blended For Fuel # Off	Burned As Fuel # On	Burned As Fuel # Off	Applied To Land # On	Applied To Land # Off	Other # On	Other # Off
Waste pesticides	990	503	135	400	131	79	63		49		49	53	68		
Pesticide wash/rinse solutions	1747	900	284	709	253	85					3	124	62	28	
Empty pesticide containers	1962	123	282	77	65	48	160					14	35		
Heavy metal dusts	39	13		9		8									
Cyanide wastes	1384	53	46	2		51	46								
Photographic wastes	4949	503	151	145	53	401	43								
Other reactive wastes	497	52	11	24	18	25			2			18			
Strong acids/alkalies	10480	2038	2211	1135	890	554	1630		2	719		6			
Ignitable wastes	2873	95	947	36	5	23	807	2	53	40	93				
Ignitable paint wastes	3121	566	339	560		6	295		22		22				
Spent solvents	33475	3563	17210	1959	2952	587	10932	9	525	1390	478	5	5	3	
Filtration residues from dry cleaning	2540	235	90	91		177	31		29						
Solvent still bottoms	738	174	321	174			321				146				
Wood preserving wastewater trtmt. sludges	108	27	8	14	2	17	4			6					
Solutions containing heavy metals	30	3	3	3					3						
Arsenic-containing wastes	19	2	15		2							2	13		
Plating wastes	1422	52	101	52											
Paint wastes containing heavy metals	156														
Solutions/sludges with photographic silver	2648	848	826	95		789	720								
Formaldehyde-containing wastes	2014														
Waste inks with solvents/heavy metals	718	8	143	8	46				46		46				
Wastewater trtmt. sludges with heavy metals	790	199	2			199	2								
Ink formulation sludges with chromium/lead	83	51	3			51			3						
Heavy metal waste materials	117	3	67		31	3	64		3						
Ammonia-containing wastes	100														
Mercury-containing wastes	0														

Table F-7: Recycling Profile, Percent of Generators, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Recyclers		Used/Reused Unprocessed		Reclaimed Reprocessed		Blended For Fuel		Burned As Fuel		Applied To Land		Other	
		% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off
Waste pesticides	990	50.81%	13.64%	62.70%	20.53%	12.38%	9.87%		7.68%		7.68%	8.31%	10.66%		
Pesticide wash/rinse solutions	1747	51.52%	16.26%	59.88%	21.37%	7.18%					0.25%	10.47%	5.24%	2.36%	
Empty pesticide containers	1962	6.27%	14.37%	19.01%	16.05%	11.85%	39.51%					3.46%	8.64%		
Heavy metal dusts	39	33.33%		69.23%		61.54%									
Cyanide wastes	1384	3.83%	3.32%	2.02%		51.52%	46.46%								
Photographic wastes	4949	10.16%	3.05%	22.17%	8.10%	61.31%	6.57%								
Other reactive wastes	497	10.46%	2.21%	38.10%	28.57%	39.68%			3.17%			28.57%			
Strong acids/alkalies	10480	19.45%	21.10%	26.71%	20.95%	13.04%	38.36%		0.05%	16.92%		0.14%			
Ignitable wastes	2873	3.31%	32.96%	3.45%	0.48%	2.21%	77.45%	0.19%	5.09%	3.84%	8.93%				
Ignitable paint wastes	3121	18.14%	10.86%	61.88%		0.66%	32.60%		2.43%		2.43%				
Spent solvents	33475	10.64%	51.41%	9.43%	14.21%	2.83%	52.63%	0.04%	2.53%	6.69%	2.30%	0.02%	0.02%	0.01%	
Filtration residues from dry cleaning	2540	9.25%	3.54%	28.00%		54.46%	9.54%		8.92%						
Solvent still bottoms	738	23.58%	43.50%	35.15%			64.85%				29.49%				
Wood preserving wastewater trtmt. sludges	108	25.00%	7.41%	40.00%	5.71%	48.57%	11.43%			17.14%					
Solutions containing heavy metals	30	10.00%	10.00%	50.00%					50.00%						
Arsenic-containing wastes	19	10.53%	78.95%		11.76%							11.76%	76.47%		
Plating wastes	1422	3.66%	7.10%	33.99%											
Paint wastes containing heavy metals	156														
Solutions/sludges with photographic silver	2648	32.02%	31.19%	5.68%		47.13%	43.01%								
Formaldehyde-containing wastes	2014														
Waste inks with solvents/heavy metals	718	1.11%	19.92%	5.30%	30.46%				30.46%		30.46%				
Wastewater trtmt. sludges with heavy metals	790	25.19%	0.25%			99.00%	1.00%								
Ink formulation sludges with chromium/lead	83	61.45%	3.61%			94.44%			5.56%						
Heavy metal waste materials	117	2.56%	57.26%		44.29%	4.29%	91.43%		4.29%						
Ammonia-containing wastes	100														
Mercury-containing wastes	0														

Table 1-8: Treatment Profile, Number of Generators, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Thermal Treatment or Incineration		Chemical Treatment, Including Oxidation and Reduction		Ion exchange		Chemical Sedimentation		Neutralization of Acids or Bases		Filtration or Sludge Dewatering		Activated Carbon		Distillation or Fractionation		Electrolysis	
		# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off
Waste pesticides	990	15	14							72	29	28							
Pesticide wash/rinse solutions	1747									52	14	5		6					
Empty pesticide containers	1962									69									
Heavy metal dusts	39										3								
Cyanide wastes	1384				52						52	46							178
Photographic wastes	4949									160		18						18	
Other reactive wastes	497	28	18	18	5					49	17								
Strong acids/alkalies	10480							54		967	28	446						178	
Ignitable wastes	2873			2						83			3						
Ignitable paint wastes	3121											90							
Spent solvents	33475	19		7				3		81	3	182				43	23		
Filtration residues from dry cleaning	2540		29									29				29			
Solvent still bottoms	738											146							
Wood preserving wastewater trtmt. sludges	108											2							
Solutions containing heavy metals	30									3									
Arsenic-containing wastes	19																		
Plating wastes	1422									108	2	46							
Paint wastes containing heavy metals	156																		
Solutions/sludges with photographic silver	2648					18				18								400	129
Formaldehyde-containing wastes	2014									58									
Waste inks with solvents/heavy metals	718																		
Wastewater trtmt. sludges with heavy metals	790																		
Ink formulation sludges with chromium/lead	83										3								
Heavy metal waste materials	117																16		
Ammonia-containing wastes	100																		
Mercury-containing wastes	0																		

Table F-8: (Continued) Treatment Profile, Number of Generators, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Evaporation		Triple Rinse or Other Cleaning		Deep Well Injection		Dilution, Possibly by Sewering		Biological Treatment		Spray Irrigation		Solidification or Other Stabilization		Miscellaneous High-Tech		Don't Know	
		# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off	# On	# Off
Waste pesticides	990	73		6								26							
Pesticide wash/rinse solutions	1747	135		34				37		20		55							
Empty pesticide containers	1962			285	14													9	
Heavy metal dusts	39																		
Cyanide wastes	1384																		
Photographic wastes	4949							125											
Other reactive wastes	497	16						17											
Strong acids/alkalies	10480	9	59					7		3				3		328			3
Ignitable wastes	2873	35					3	26		19									3
Ignitable paint wastes	3121	41																	
Spent solvents	33475	853	29			3		27							3				3
Filtration residues from dry cleaning	2540	149																	
Solvent still bottoms	738																		
Wood preserving wastewater trtmt. sludges	108	8						2		4									
Solutions containing heavy metals	30		3																
Arsenic-containing wastes	19																		
Plating wastes	1422	150																	
Paint wastes containing heavy metals	156																		
Solutions/sludges with photographic silver	2648							50											
Formaldehyde-containing wastes	2014																		
Waste inks with solvents/heavy metals	718	51																	
Wastewater trtmt. sludges with heavy metals	790	150																	
Ink formulation sludges with chromium/lead	83																		
Heavy metal waste materials	117								3										
Ammonia-containing wastes	100																		
Mercury-containing wastes	0																		

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Waste Stream	Number of Generators	Thermal Treatment or Incineration % On	Thermal Treatment or Incineration % Off	Chemical Treatment, Including Oxidation and Reduction % On	Chemical Treatment, Including Oxidation and Reduction % Off	Ion exchange % On	Ion exchange % Off	Chemical Sedimentation % On	Chemical Sedimentation % Off	Neutralization of Acids or Bases % On	Neutralization of Acids or Bases % Off	Filtration or Sludge Dewatering % On	Filtration or Sludge Dewatering % Off	Activated Carbon % On	Activated Carbon % Off	Distillation or Fractionation % On	Distillation or Fractionation % Off	Electrolysis % On	Electrolysis % Off
Waste pesticides	990	1.52%	1.41%							7.27%	2.93%	2.83%							
Pesticide wash/rinse solutions	1747									2.98%	0.80%	0.29%		0.34%					
Empty pesticide containers	1962									3.52%									
Heavy metal dusts	39										7.69%								
Cyanide wastes	1384				3.83%						3.76%	3.32%							12.86%
Photographic wastes	4949									3.23%		0.36%						0.36%	
Other reactive wastes	497	5.63%	3.62%	3.62%	1.01%					9.86%	3.42%								
Strong acids/alkalies	10480							0.52%		9.23%	0.27%	4.26%						1.70%	
Ignitable wastes	2873			0.07%						2.89%			0.10%						
Ignitable paint wastes	3121											2.88%							
Spent solvents	33475	0.06%		0.02%				0.01%		0.24%	0.01%	0.54%				0.13%	0.07%		
Filtration residues from dry cleaning	2540		1.14%									1.14%				1.14%			
Solvent still bottoms	738											19.78%							
Wood preserving wastewater trtmt. sludges	108											1.85%							
Solutions containing heavy metals	30									10.00%									
Arsenic-containing wastes	19																		
Plating wastes	1422									7.59%	0.14%	3.23%							
Paint wastes containing heavy metals	156																		
Solutions/sludges with photographic silver	2648					0.68%				0.68%								15.11%	4.87%
Formaldehyde-containing wastes	2014									2.88%									
Waste inks with solvents/heavy metals	718																		
Wastewater trtmt. sludges with heavy metals	790																		
Ink formulation sludges with chromium/lead	83										3.61%								
Heavy metal waste materials	117																13.68%		
Ammonia-containing wastes	100																		
Mercury-containing wastes	0																		

Table F-9: (Continued) Treatment Profile, Percent of Generators, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Evaporation		Triple Rinse or Other Cleaning		Deep Well Injection		Dilution, Possibly by Sewering		Biological Treatment		Spray Irrigation		Solidification or Other Stabilization		Miscellaneous High-Tech		Don't Know	
		% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off	% On	% Off
Waste pesticides	990	7.37%		0.61%								2.63%							
Pesticide wash/rinse solutions	1747	7.73%		1.95%				2.12%		1.14%		3.15%							
Empty pesticide containers	1962			14.53%	0.71%													0.46%	
Heavy metal dusts	39																		
Cyanide wastes	1384																		
Photographic wastes	4949							2.53%											
Other reactive wastes	497	3.22%						3.42%											
Strong acids/alkalies	10480	0.09%	0.56%					0.07%		0.03%				0.03%		3.13%			0.03%
Ignitable wastes	2873	1.22%					0.10%	0.90%		0.66%									0.10%
Ignitable paint wastes	3121	1.31%																	
Spent solvents	33475	2.55%	0.09%			0.01%		0.08%							0.01%				0.01%
Filtration residues from dry cleaning	2540	5.87%																	
Solvent still bottoms	738																		
Wood preserving wastewater trtmt. sludges	108	7.41%						1.85%		3.70%									
Solutions containing heavy metals	30		10.00%																
Arsenic-containing wastes	19																		
Plating wastes	1422	10.55%																	
Paint wastes containing heavy metals	156																		
Solutions/sludges with photographic silver	2648							1.89%											
Formaldehyde-containing wastes	2014																		
Waste inks with solvents/heavy metals	718	7.10%																	
Wastewater trtmt. sludges with heavy metals	790	18.99%																	
Ink formulation sludges with chromium/lead	83																		
Heavy metal waste materials	117								2.56%										
Ammonia-containing wastes	100																		
Mercury-containing wastes	0																		

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Waste Stream	Number of Generators	Generators Transporting #	Generators Transporting %	Public Transporter #	Public Transporter %	Contracted Transporter #	Contracted Transporter %	Owned Transporter #	Owned Transporter %	Other Transporter #	Other Transporter %	Don't know #	Don't know %
Waste pesticides	990	469	47.4%	68	14.5%	242	51.6%	249	53.1%				
Pesticide wash/rinse solutions	1747	218	12.5%	10	4.6%	52	23.9%	163	74.8%				
Empty pesticide containers	1962	1794	91.4%	510	28.4%	664	37.0%	809	45.1%	33	1.8%		
Heavy metal dusts	39	23	59.0%			20	87.0%			3	13.0%		
Cyanide wastes	1384	843	60.9%	146	17.3%	439	52.1%			212	25.1%	46	5.5%
Photographic wastes	4949	864	17.5%	199	23.0%	397	45.9%	123	14.2%	73	8.4%	106	12.3%
Other reactive wastes	497	376	75.7%	54	14.4%	239	63.6%	42	11.2%	60	16.0%		
Strong acids/alkalies	10480	3984	38.0%	1666	41.8%	5100	128.0%	1037	26.0%	522	13.1%	17	0.4%
Ignitable wastes	2873	2339	81.4%	185	7.9%	1857	79.4%	218	9.3%	153	6.5%		
Ignitable paint wastes	3121	2450	78.5%	1279	52.2%	722	29.5%	600	24.5%	396	16.2%		
Spent solvents	33475	20453	61.1%	2282	11.2%	19509	95.4%	1378	6.7%	3989	19.5%	836	4.1%
Filtration residues from dry cleaning	2540	2311	91.0%	1163	50.3%	942	40.8%	86	3.7%	180	7.8%		
Solvent still bottoms	738	567	76.8%	37	6.5%	534	94.2%	3	0.5%	20	3.5%		
Wood preserving wastewater trtmt. sludges	108	60	55.6%	2	3.3%	45	75.0%	2	3.3%	4	6.7%		
Solutions containing heavy metals	30	10	33.3%			11	110.0%						
Arsenic-containing wastes	19	15	78.9%			7	46.7%	7	46.7%				
Plating wastes	1422	764	53.7%	146	19.1%	435	56.9%			108	14.1%		
Paint wastes containing heavy metals	156	156	100.0%							156	100.0%		
Solutions/sludges with photographic silver	2648	1215	45.9%	95	7.8%	919	75.6%	88	7.2%	131	10.8%	18	1.5%
Formaldehyde-containing wastes	2014	0	0.0%										
Waste inks with solvents/heavy metals	718	709	98.7%	171	24.1%	415	58.5%			68	9.6%	56	7.9%
Wastewater trtmt. sludges with heavy metals	790	592	74.9%	148	25.0%	248	41.9%	150	25.3%	46	7.8%		
Ink formulation sludges with chromium/lead	83	79	95.2%			28	35.4%			51	64.6%		
Heavy metal waste materials	117	115	98.3%	4	3.5%	93	80.9%			20	17.4%		
Ammonia-containing wastes	100	0	0.0%										
Mercury-containing wastes	0	0											

Table F-11: Transportation Notification Profile, 100 to 1000 KG/MONTH

Waste Stream	Number of Generators	Generators Transporting #	Generators Transporting %	EPA Hazardous Waste Manifest #	EPA Hazardous Waste Manifest %	DOT Shipping Paper #	DOT Shipping Paper %	Other Manifest #	Other Manifest %	Labelled Containers #	Labelled Containers %	Verbal Notification #	Verbal Notification %	Written Notification #	Written Notification %
Waste pesticides	990	469	47.4%	26	5.5%	4	0.9%	35	7.5%	175	37.3%	230	49.0%	61	13.0%
Pesticide wash/rinse solutions	1747	218	12.5%	19	8.7%					58	26.6%	139	63.8%	27	12.4%
Empty pesticide containers	1962	1794	91.4%	4	0.2%			106	5.9%	824	45.9%	757	42.2%	110	6.1%
Heavy metal dusts	39	23	59.0%	17	73.9%	2	8.7%	1	4.3%	6	26.1%	9	39.1%	4	17.4%
Cyanide wastes	1384	843	60.9%	534	63.3%	52	6.2%	2	0.2%	485	57.5%	334	39.6%	219	26.0%
Photographic wastes	4949	864	17.5%	51	5.9%					184	21.3%	502	58.1%	35	4.1%
Other reactive wastes	497	376	75.7%	178	47.3%	55	14.6%	45	12.0%	177	47.1%	173	46.0%	120	31.9%
Strong acids/alkalies	10480	3984	38.0%	1476	37.0%	367	9.2%	212	5.3%	2266	56.9%	2241	56.3%	508	12.8%
Ignitable wastes	2873	2339	81.4%	512	21.9%	211	9.0%	307	13.1%	569	24.3%	1503	64.3%	410	17.5%
Ignitable paint wastes	3121	2450	78.5%	446	18.2%	43	1.8%	47	1.9%	534	21.8%	711	29.0%	187	7.6%
Spent solvents	33475	20453	61.1%	5872	28.7%	940	4.6%	1471	7.2%	8930	43.7%	10363	50.7%	4297	21.0%
Filtration residues from dry cleaning	2540	2311	91.0%	150	6.5%			57	2.5%	144	6.2%	978	42.3%	118	5.1%
Solvent still bottoms	738	567	76.8%	302	53.3%	164	28.9%	152	26.8%	487	85.9%	516	91.0%	176	31.0%
Wood preserving wastewater trtmt. sludges	108	60	55.6%	47	78.3%	12	20.0%	2	3.3%	37	61.7%	39	65.0%	18	30.0%
Solutions containing heavy metals	30	10	33.3%	8	80.0%										
Arsenic-containing wastes	19	15	78.9%					2	13.3%		0.0%	11	73.3%	2	13.3%
Plating wastes	1422	764	53.7%	386	50.5%			2	0.3%	214	28.0%	309	40.4%	2	0.3%
Paint wastes containing heavy metals	156	156	100.0%												
Solutions/sludges with photographic silver	2648	1215	45.9%			25	2.1%	77	6.3%	605	49.8%	823	67.7%	267	22.0%
Formaldehyde-containing wastes	2014	0	0.0%												
Waste inks with solvents/heavy metals	718	709	98.7%	261	36.8%					273	38.5%	221	31.2%	154	21.7%
Wastewater trtmt. sludges with heavy metals	790	592	74.9%	297	50.2%	52	8.8%			202	34.1%	350	59.1%	52	8.8%
Ink formulation sludges with chromium/lead	83	79	95.2%	14	17.7%	3	3.8%			3	3.8%	7	8.9%	51	64.6%
Heavy metal waste materials	117	115	98.3%	62	53.9%	15	13.0%	1	0.9%	73	63.5%	58	50.4%	57	49.6%
Ammonia-containing wastes	100	0	0.0%												
Mercury-containing wastes	0	0													

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Waste Stream	Number of Generators	Generators Notifying Facility Operators #	%	EPA Hazardous Waste Manifest #	%	DOT Shipping Paper #	%	Other Manifest #	%	Labelled Containers #	%	Verbal Notification #	%	Written Notification #	%	No Response Or Don't Know #	%
Waste pesticides	990	275	27.8%	26	9.5%	4	1.5%	7	2.5%	146	53.1%	196	71.3%	53	19.3%		
Pesticide wash/rinse solutions	1747	160	9.2%	19	11.9%					32	20.0%	143	89.4%	27	16.9%		
Empty pesticide containers	1962	1045	53.3%	61	5.8%	4	0.4%	28	2.7%	706	67.6%	753	72.1%	80	7.7%		
Heavy metal dusts	39	13	33.3%	10	76.9%			1	7.7%	4	30.8%	6	46.2%	4	30.8%		
Cyanide wastes	1384	651	47.0%	534	82.0%	169	26.0%	2	0.3%	605	92.9%	334	51.3%	338	51.9%		
Photographic wastes	4949	516	10.4%			51	9.9%			142	27.5%	424	82.2%	60	11.6%		
Other reactive wastes	497	339	68.2%	198	58.4%	58	17.1%	62	18.3%	195	57.5%	136	40.1%	101	29.8%		
Strong acids/alkalies	10480	2936	28.0%	1348	45.9%	532	18.1%	204	6.9%	1981	67.5%	2208	75.2%	510	17.4%		
Ignitable wastes	2873	1847	64.3%	536	29.0%	181	9.8%	145	7.9%	547	29.6%	1309	70.9%	332	18.0%	78	4.2%
Ignitable paint wastes	3121	908	29.1%	458	50.4%	153	16.9%	40	4.4%	400	44.1%	274	30.2%	78	8.6%		
Spent solvents	33475	16713	49.9%	5769	34.5%	989	5.9%	1041	6.2%	8189	49.0%	7738	46.3%	4444	26.6%	846	5.1%
Filtration residues from dry cleaning	2540	800	31.5%	150	18.8%					231	28.9%	530	66.3%	147	18.4%		
Solvent still bottoms	738	509	69.0%	286	56.2%	150	29.5%	295	58.0%	485	95.3%	348	68.4%	300	58.9%		
Wood preserving wastewater trtmt. sludges	108	51	47.2%	45	88.2%	14	27.5%	4	7.8%	43	84.3%	22	43.1%	25	49.0%		
Solutions containing heavy metals	30	8	26.7%	8	100.0%									4	50.0%		
Arsenic-containing wastes	19	15	78.9%					2	13.3%			13	86.7%				
Plating wastes	1422	544	38.3%	386	71.0%			2	0.4%	214	39.3%	309	56.8%	2	0.4%		
Paint wastes containing heavy metals	156	0	0.0%														
Solutions/sludges with photographic silver	2648	1099	41.5%	18	1.6%			54	4.9%	553	50.3%	723	65.8%	351	31.9%	35	3.2%
Formaldehyde-containing wastes	2014	0	0.0%														
Waste inks with solvents/heavy metals	718	386	53.8%	261	67.6%			62	16.1%	273	70.7%	216	56.0%	159	41.2%		
Wastewater trtmt. sludges with heavy metals	790	297	37.6%	297	100.0%	52	17.5%			202	68.0%	202	68.0%	52	17.5%		
Ink formulation sludges with chromium/lead	83	73	88.0%	18	24.7%	3	4.1%			3	4.1%	3	4.1%	55	75.3%		
Heavy metal waste materials	117	63	53.8%	47	74.6%	15	23.8%	16	25.4%	58	92.1%	40	63.5%	55	87.3%		
Ammonia-containing wastes	100	0	0.0%														
Mercury-containing wastes	0	0															