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Economic Assessment for the Proposed Concentration-Based Listing of Wastewaters and Non-wastewaters from the Production of Paints and Coatings

Final Report

Economics, Methods, and Risk Analysis Division
Office of Solid Waste
U.S. Environmental Protection Agency

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US EPA ARCHIVE DOCUMENT

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY . . . . . 1 - 1

2.0 INTRODUCTION . . . . . 2 - 1
- 2.1 Executive Order 12866 . . . . . 2 - 2
- 2.2 Need For Regulatory Action . . . . . 2 - 3
- 2.3 Limitations of Analysis . . . . . 2 - 3
- 2.4 Organization of Report . . . . . 2 - 5

3.0 PAINT INDUSTRY PROFILE . . . . . 3 - 1
- 3.1 Background . . . . . 3 - 1
- 3.2 Production and Shipment Values . . . . . 3 - 1
- 3.3 Industry Size and Market Share . . . . . 3 - 3
- 3.4 Industry Universe Potentially Subject to Requirements of the Proposed Listing . . . . . 3 - 12

4.0 WASTE GENERATION, MANAGEMENT AND COSTS . . . . . 4 - 1
- 4.1 Waste Generation . . . . . 4 - 2
- 4.2 Baseline Management Practices and Costs . . . . . 4 - 16
- 4.3 Compliance Management Practices and Costs . . . . . 4 - 30
- 4.4 Other Compliance Costs . . . . . 4 - 51
- 4.5 Leachate Management Costs . . . . . 4 - 54

5.0 ECONOMIC IMPACT ANALYSIS . . . . . 5 - 1
- 5.1 Methodology . . . . . 5 - 1
- 5.2 Estimated Economic Costs . . . . . 5 - 6
- 5.3 Aggregate Price and Quantity Impacts . . . . . 5 - 14
- 5.4 Employment Impacts . . . . . 5 - 15
- 5.5 Social Cost Impacts . . . . . 5 - 15
- 5.6 Other Impacts . . . . . 5 - 16

6.0 QUALITATIVE BENEFITS . . . . . 6 - 1
- 6.1 Sources of Benefits . . . . . 6 - 1
- 6.2 Types of Benefits . . . . . 6 - 1

7.0 OTHER ADMINISTRATIVE REQUIREMENTS . . . . . 7 - 1
- 7.1 Environmental Justice . . . . . 7 - 1
- 7.2 Unfunded Mandates Reform Act . . . . . 7 - 1
- 7.3 Protection of Children from Environmental Health Risks and Safety Risks . . . 7 - 2
- 7.4 Regulatory Takings . . . . . 7 - 2
- 7.5 Federalism . . . . . 7 - 2
- 7.6 Tribalism . . . . . 7 - 6

Bibliography

US EPA ARCHIVE DOCUMENT

APPENDIX A - Recent Industry News Article Highlights

APPENDIX B - 1995 and 1997 Biennial Report Data

APPENDIX C - Model Facility Waste Generation Rates/BRS Waste Generation Statistics

APPENDIX D - Representative Facility Computational Tables

US EPA ARCHIVE DOCUMENT

1.0 EXECUTIVE SUMMARY

The Agency is required to make an initial determination if any regulatory action may constitute a significant regulatory action. Based on the findings presented in this report, we believe that this regulatory action, as proposed, does not constitute an economically significant regulatory action as defined under Section 3(f)(1) of Executive Order 12866. However, this rule may be considered significant, as defined under Section 3(f)(4) of this Order due to novel policy or legal issues. For example, the proposed rulemaking involves a unique concentration-based approach. This approach has only been proposed one other time throughout the history of OSW's hazardous waste identification program.

This Economic Assessment (EA) was conducted to determine the potential impacts of the Agency's proposal to list as hazardous two waste streams generated by the paints and coatings industry, as well as to evaluate alternatives to the chosen approach. The analysis was conducted per the requirements of Executive Order 12866 (58 FR 51735, October 4, 1993), which requires that regulatory agencies evaluate whether a new regulation potentially constitutes a significant regulatory action.

The proposed wastes generated by the paint industry are:

K179---- Paint manufacturing waste solids generated by paint manufacturing facilities that, at the point of generation, contain any of the constituents of concern (identified in Chapter 2) at a concentration equal to or greater than the hazardous level set for that constituent. Paint manufacturing waste solids are: (1) waste solids generated from tank and equipment cleaning operations that use solvents, water and/or caustic; (2) emission control dusts or sludges; (3) wastewater treatment sludges; and (4) off-specification product. Waste solids derived from the management of K180 by paint manufacturers would also be subject to this listing. Waste liquids derived from the management of K179 by paint manufacturers are not covered by this listing, but such liquids are subject to the K180 listing.

K180---- Paint manufacturing waste liquids generated by paint manufacturing facilities that, at the point of generation, contain any of the constituents of concern (identified in Chapter 2) at a concentration equal to or greater than the hazardous level set for that constituent, unless the wastes are stored or treated exclusively in tanks or containers prior to discharge to a POTW or under a NPDES permit. Paint manufacturing liquids are generated from tank and equipment cleaning operations that use solvents, water, and/or caustic. Waste liquids derived from the management of K179 by paint manufacturers would also be subject to this listing. Waste solids derived from the management of K180 by paint manufacturers are not covered by this listing, but such solids are subject to the K179 listing.

The listing for K179 is solid (and sludge) forms of waste derived from solvent, water or caustic cleaning wastes, wastewater treatment sludge, emission control dust, and off-specification production wastes. The listing for K180 is for liquid forms of the above listed cleaning wastes. The proposed action is a concentration-based listing.

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In addition to the impacts on the paint industry, the proposed waste listing may also result in impacts on land disposal facilities which have disposed of the wastes considered in this rulemaking. Because of the proposed listing, leachate from these landfills may be hazardous under the Derived-from Rule. Also, when the leachate from these two wastes mixes with leachate from other wastes disposed in these landfills the entire leachate quantity may be considered hazardous under the Mixture Rule.

Paint manufacturers produce varnishes, lacquers, enamels and shellac, putties, wood fillers and sealers, paint and varnish removers, paint and brush cleaners, and allied products. The products are manufactured for four end-use markets: architectural coatings, product finishes for original equipment manufacturers, special purpose coatings, and allied paint products. According to Census data for 1997 there are approximately 1,495 facilities in operation in the U.S., owned by 1,206 different companies. Total production is estimated to range from 1.2 billion and 1.5 billion gallons per year between 1992 and 1998 with a total product value of $17.2 billion in 1998. This industry segmentation includes all facilities identified in Standard Identification Classification (SIC) 2851 and under the North American Industrial Classification (NAICS) code 325510; this includes some manufacturers of miscellaneous allied paint products which will not be affected by the proposed rule.

Approximately 1,146, or 95 percent of the paint manufacturing companies in the U.S. are estimated to be small according to the Small Business Administration (SBA) definition: fewer than 500 employees based on corporate level data[1]. Many of these facilities (and companies) are very small, with fewer than 10 total full-time employees.

While the Census of Manufacturers identified 1,495 facilities, not all of these facilities are actually paint manufacturers which may potentially be affected by the proposed waste listing. The Agency has estimated, on the basis of a RCRA 3007 survey of the industry, that there are 972 facilities which manufacture paints and coatings in the U.S.. Of this total, we estimate that 615 generate the wastestreams of concern for this proposed listing. Extrapolated survey results suggest that these facilities generated nearly 107,000 metric tons of the targeted wastestreams in 1998, of which about 36 percent is currently managed as hazardous waste. This analysis relies primarily on data generated through the Agency's survey of the industry, augmenting this information with Census and other industry specific information as appropriate.

We have estimated the impacts of the concentration-based listing proposal (the Agency's preferred approach), and two key options: a no-list or status quo option and a standard or traditional listing approach option. Under the proposed approach we also evaluated two alternative scenarios. These are: a nonwastewaters option which limits the listing to waste solids, and a sensitivity analysis scenario where wastes currently going to hazardous fuel blending and cement kilns would be diverted to a commercial hazardous waste incinerator.

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[1] *Small Business Size Standards* - Matched to North American Industrial Classification System (NAICS) Codes, Effective October 1, 2000, Small Business Administration (SBA)

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A supplementary analysis of our RCRA 3007 survey data suggests that an estimated 50 percent of the nonwastewaters and 20 percent of the wastewaters are nonhazardous. These estimates were applied under the aggregate findings for the concentration-based listing approach (the Agency's proposed option). Our findings under this approach may overestimate compliance costs for waste streams containing listed constituents that fall below risk-based concentration levels. One-hundred percent of all targeted wastes were designated as hazardous under the aggregate findings for the traditional or standard listing option.

The estimated impacts associated with the Agency proposed approach, alternative scenarios to the proposed approach, and alternative waste listing options are presented in Table 1-1 below. As indicated, the nonwastewaters scenario under the proposed approach is the least costly, at $6.7 million per year for all impacted facilities. The Agency's proposed approach has slightly higher costs, at an estimated $7.3 million per year. The costs associated with the proposed listing approach with the assumption that the wastes currently going to hazardous waste fuel blending will be diverted to commercial incinerators (the sensitivity analysis) indicates an aggregate cost of $18.1 million per year. The traditional or standard listing option is estimated to cost $10.9 million per year. The no-list or status quo option would result in no incremental costs to industry. The impact estimates in Table 1-1 are fully weighted to account for model facility representation. These figures also assume baseline conditions where 50 percent of the nonwastewaters and 20 percent of the wastewaters are nonhazardous, as managed under the proposed waste listing option.

Table 1-1. Summary of Estimated Impacts from All Waste Listing Options and Scenarios

Listing Option/Scenario	Average Weighted Incremental Annual Cost as a Percent of Gross Annual Sales	Aggregate Annual Compliance Cost Impacts (million 1999 dollars)
Proposed Concentration-Based Listing - Agency Preferred Approach (APA)	0.07	$7.3[1]
Agency Preferred Approach - Sensitivity Analysis Scenario (APA 1) (Waste going to all fuel blending is diverted to commercial incineration)	0.19	$18.1[2]
Agency Preferred Approach - Scenario to List Solids Only (APA 2)	0.06	$6.7
Traditional or Standard Listing Option	0.10	$10.9[1]
No List - Status Quo Option	0.0	$0.0

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Table 1-1. Summary of Estimated Impacts from All Waste Listing Options and Scenarios

Listing Option/Scenario	Average Weighted Incremental Annual Cost as a Percent of Gross Annual Sales	Aggregate Annual Compliance Cost Impacts (million 1999 dollars)

[1] While cost estimates under the APA represent only 50 percent of total nonhazardous solids and 80 percent of the nonhazardous liquids, aggregate impacts do not directly reflect this difference. The unweighted and unscaled waste management costs under the APA are estimated at $1.8 million. The unweighted and unscaled waste management costs under the Traditional Listing Option are estimated at $3.5 million. Applying the weighting and scaling factors, plus transportation, administrative, and analytical (APA only) costs results in aggregate annual nationwide compliance costs of $7.3 million for the APA and $10.9 million for the Traditional Option.

[2] The sensitivity analysis under the Agency preferred Approach assumes all liquids currently going to both hazardous *and nonhazardous* waste fuel blending/kilns are diverted to hazardous waste incineration.

In addition to the costs presented above, incremental costs expected to be incurred by the landfill industry are estimated to be approximately $300,000 to $400,000 annually for the Agency's proposed option (which for leachate is the Clean Water Act Exemption with Two-Year Impoundment Replacement Deferral regulatory option). However, the costs may be considerably lower as the result of possible savings gained through contract negotiations for repeat customers who provide consistent revenue streams to shipping companies through their regularly scheduled shipments of leachate. It also is likely that not all landfills that received paint wastes prior to this proposed action have leachate collection systems which will lower the cost estimates[2]. Finally, there is likely some overlap from paint facilities disposing in the same landfill, which will result in lower aggregate nationwide costs, as fewer landfill facilities may be impacted.

Table 1-2 below presents impacts for different size classes of the model facilities, based on employment. The impacts presented in this table represent the impacts on the facilities associated with the proposed waste listing approach. However, these figures assume that 100 percent of all of the waste generated is hazardous, as a high-cost or worst-case impacts scenario. In general cost impacts as a percent of sales are modest, averaging just over 0.1 percent or gross annual revenues. For three of the 151 model facilities impacts exceed 1.0 percent of gross sales; these three model facilities are estimated to represent six total facilities. [The reader should note these findings are at the facility, not the company or parent firm level.]

[2] Note: Leachate must be collected and pumped to be "generated," resulting in creation of the newly listed derived-from waste. Landfills without leachate collection systems are unable to "generate" this new waste.

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Table 1-2. Estimated Cost Impacts on Model Facilities from the Agency Preferred Listing Approach

Model Facility Size Range (number of employees per facility)	Estimated 1999 Average Annual Gross Sales (thousand dollars)	Unweighted Incremental Cost Range Per Facility* (Percent of gross annual sales)	Average Unweighted Incremental Cost as a Percent of Sales *
1-19	$3,661	0.04 - 3.77	0.11%
20-49	$11,484	0.01 - 0.50	0.05%
50-149	$31,839	0.01 - 4.06	0.11%
150 & Above	$85,791	0.01 - 1.33	0.17%

* Estimates derived assuming 100 percent of all waste streams generated by the model facilities are hazardous.

The proposed rule is intended to reduce the potential for environmental releases of hazardous wastes. Depending on current and future exposure patterns, the proposed rule could yield benefits in terms of reductions in health risks due to stricter controls on the management of this waste. The Agency has not monetized or quantitatively estimated the human health or environmental benefits, but anticipates that such benefits would be less than $100 million per year. Furthermore, we feel that additional data are necessary to make a firm determination as to whether there will be quantifiable net benefits (i.e., benefits exceeding costs) from the proposed rule.

We also examined possible impacts associated with relevant legislation other than RCRA, and various Executive Orders. These include: the Unfunded Mandates Reform Act (UMRA), Executive Order 13132, (Federalism), Executive Order 13045 (Protection of Children from Environmental Health Risks and Safety Risks), Executive Order 12898 (Environmental Justice), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and Regulatory Takings. The proposed rule is not expected to result in significant impacts, as defined under UMRA, or any of the executive orders mentioned above.

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2.0 INTRODUCTION

This assessment presents a cost and economic assessment corresponding to the proposed rule to list two paint industry wastes. The wastes are solid (or sludge) solvent, water or caustic cleaning wastes, wastewater treatment sludge, emission control dust, and off-specification production wastes and liquid solvent, water and caustic cleaning wastes. More formally, the proposed waste listings are defined as follows:

K179---- Paint manufacturing waste solids generated by paint manufacturing facilities that, at the point of generation, contain any of the constituents of concern at a concentration equal to or greater than the hazardous level set for that constituent. Paint manufacturing waste solids are: (1) waste solids generated from tank and equipment cleaning operations that use solvents, water and or caustic; (2) emission control dusts or sludges; (3) wastewater treatment sludges; and (4) off-specification product. Waste solids derived from the management of K180 by paint manufacturers would also be subject to this listing. Waste liquids derived from the management of K179 by paint manufacturers are not covered by this listing, but such liquids are subject to the K180 listing.

The proposed constituents of concern for this solid waste stream and their corresponding regulatory levels are presented in the table below. The waste stream would be considered hazardous if, based on a totals analysis, it contains one or more of the constituents presented below at or above the regulatory concentration level.

Constituent	Regulatory Concentration Levels (mg/kg)
Acrylamide	310
Acrylonitrile	43
Antimony	2,300
Methyl Isobutyl Ketone	73,000
Methyl Methacrylate	28,000

K180---- Paint manufacturing waste liquids generated by paint manufacturing facilities that, at the point of generation, contain any of the constituents of concern at a concentration equal to or greater than the hazardous level set for that constituent, unless the wastes are stored or treated exclusively in tanks or containers prior to discharge to a POTW or under a NPDES permit. Paint manufacturing liquids are generated from tank and equipment cleaning operations that use solvents, water, and/or caustic. Waste liquids derived from the management of K179 by paint manufacturers would also be subject to this listing. Waste solids derived from the management of K180 by paint manufacturers are not covered by this listing, but such solids are subject to the K179 listing.

US EPA ARCHIVE DOCUMENT

The proposed constituents of concern for this liquid waste stream and their corresponding regulatory levels are presented in the table below. The waste stream would be considered hazardous if it contains one or more of the constituents presented below at or above the regulatory concentration level.

Constituent	Regulatory Concentration Levels (mg/L)
Acrylamide	12
Acrylonitrile	9.3
Antimony	390
Ethylbenzene	11,000
Formaldehyde	82,000
Methyl Isobutyl Ketone	340
Methyl Methacrylate	2,100
Methylene Chloride	4,500
N–Butyl Alcohol	41,000
Styrene	4,600
Toluene	1,200
Xylene (mixed isomers)	3,900

Several analyses were conducted in order to complete this EA, including developing industry profiles, waste generation and management profiles, baseline waste management costs, compliance costs, incremental cost and economic impacts, benefits analysis, and other administrative requirements. Compliance costs and incremental economic impacts are determined on a per unit basis (metric ton, gallon, etc.), facility, and aggregate (total industry) basis.

2.1 Executive Order 12866

Executive Order No. 12866 (58 FR 51735, October 4, 1993) requires that regulatory agencies evaluate whether a new regulation constitutes a significant regulatory action. A significant regulatory action is defined as an action likely to result in a rule that may:

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;

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- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in Executive Order 12866.

This analysis is primarily designed to address the potential economic significance of the proposed rule, as defined by the first bullet in the list. To accomplish this, we project costs and economic impacts generators of the aforementioned paint production wastes may experience in meeting the requirements of the rule, as proposed.

2.2 Need For Regulatory Action

While some waste produced by paint facilities already is regulated, certain waste streams generated by these facilities still may pose both human health and ecological risks. The private industry costs of production may not fully reflect the human health and environmental costs of management of the two wastes. This situation, referred to as "environmental externality," represents a type of market failure discussed in Office of Management and Budget (OMB) Guidelines. We believe that in the absence of a regulation, facilities are not likely to incur the additional costs for implementing pollution control measures. We further believe that a non-regulatory approach, such as educational outreach programs, would be largely ineffective. Private citizens who are made aware of the potential health risks (e.g., those people living near landfills where the wastes may be disposed) may have limited ability to reduce exposure, or to receive compensation for damages, without incurring significant costs. Educational programs targeted to individual facilities would be overly time-consuming and costly, and would yield only voluntary responses.

It is difficult to establish a causal relationship between the damage incurred and activity at the paint manufacturing facilities. Establishing a direct link between a specific paint facility and human health and other damages incurred may be especially difficult since under current practices many facilities dispose of wastes in landfills where it is co-mingled with many other wastes.

To address these existing market distortions, we believe that Federal government intervention is necessary. Therefore, we are proposing to list the two wastes as hazardous.

2.2 Limitations of Analysis

Below are key limitations of this economic assessment:

– This analysis does not capture all of the variables that may affect a generator's decision to manage the proposed waste streams. It is not clear how facilities will react regarding sampling of wastes or the management of wastes under compliance conditions. Our cost

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estimates do not assume specific behavioral modifications beyond compliance. Moreover, our cost estimation used expenditures as a proxy for direct costs.

-- The analysis is limited by data gaps relating to facility sales (which are estimated based on industry averages).

-- Data collected from responses to the RCRA 3007 survey of paint manufacturers was scaled to reflect the sampling population of 566 facilities assuming a simple percentage (64 percent) rather than a weighted percentage (57.7%). We assume that the universe of paint manufacturers is 876 facilities. Our use of a simple percentage for scaling results in a projected universe of 972 facilities, which is 11 percent higher than our assumption of universe size. Furthermore, our use of a simple percentage yields estimates of the total waste that are 15 percent higher than we would otherwise expect. Therefore, industry impacts assessed in this report may be overstated, depending on the size of the actual population of facilities.

– It is assumed that the generation and management practices reported by the respondents to the RCRA 3007 survey identified as paint manufacturers and generating the wastes of interest to the proposed concentration-based listing are representative of the total universe of paint manufacturers. If the actual universe of facilities differs significantly from the population used for sampling, then the representativeness of our results could be jeopardized.

– The unit costs used in this assessment reflect national averages and may not adequately incorporate local or regional waste management price anomalies.

– Human health benefits could not be monetized or quantified because the risk assessment was not able to estimate population risk impacts. Therefore, we are unable to conclude that the benefits exceed the costs of this proposed rule.

– We have no appropriate data on the actual concentrations of the targeted constituents in paint waste proposed for listing. Aggregate cost impacts are based on an extrapolation based on constituent presence in the targeted wastestreams. These aggregate cost impacts would be overstated if actual concentrations of the targeted constituents fall below the proposed regulatory levels for many of the wastestreams of concern.

Analytical modifications designed to adjust for most of the limitations discussed above are believed to result in an overestimation of aggregate annual compliance cost impacts to industry.

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2.3 Organization of Report

The remainder of this report is divided into five sections. Section 3 presents a profile of the paint manufacturing industry. This includes available economic profile data, such as products manufactured, profiles of facilities, market structure, an assessment of the market value of industry shipments, and product imports and exports.

Section 4 presents the waste management cost analysis; this includes nationwide per-unit costs and prices for the baseline and post-regulatory compliance. Section 5 documents the preliminary economic impacts of the regulation. Section 6 presents a summary of the benefits of the proposed rule. Finally, Section 7 presents findings in relation to other administrative requirements associated with agency rulemaking.

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3.0 PAINT INDUSTRY PROFILE

3.1 Background

The total value of paints and coatings comprises only a small fraction of the U.S. gross domestic product (GDP), 0.22 percent in 1997; however, a large portion of the U.S. economy depends on the paint and surface coatings manufacturing industry.[3] Paint and surface coatings are used by almost all producers of durable and non-durable goods and also are used in the maintenance and repair of existing goods and structures. Paint manufacturers are listed under the Standard Identification Classification (SIC) as industry 2851 and under the North American Industrial Classification (NAICS) code for Paints and Coatings, 325510. These establishments produce varnishes, lacquers, enamels and shellac, putties, wood fillers, and sealers, paint and varnish removers, paint and brush cleaners, and allied paint products.

The U.S. Department of Commerce, Current Industrial Reports identify the following four general end-use markets for paints and surface coatings:[4]

1. Architectural Coatings; NAICS 3255101

2. Product Finishes for Original Equipment Manufacturers; NAICS 3255104

3. Special Purpose Coatings; NAICS 3255107

4. Allied Paint Products; NAICS 325510A

For purposes of this industry profile, all four segments are included. However, the currently proposed listing does not affect the production of allied paint products.

3.2 Production and Shipment Values

Total product shipments for the four end-use markets identified above are estimated to range from 1.2 and 1.5 billion gallons per year between 1992 and 1998, with a total product value estimated at $17.2 billion in 1998.[5] Table 3-1 provides a summary of estimated U.S. total quantity and value of shipments for paints and allied products from 1992 through 1999.

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[3] Environmental Protection Agency, Office of Solid Waste, *Draft Paint Production Wastes Industry Overview*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, July 15, 1999.

[4] U.S. Department of Commerce, Economics and Statistics Administration, *Current Industrial Reports: Paint and Allied Products-Annual Report 1997*. MA28F(97)-1.

[5] Environmental Protection Agency, Office of Solid Waste, *Draft Paint Production Wastes Industry Overview*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, July 15, 1999.

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Table 3-1. Summary of Estimated United States Total Quantity and Value of Shipments of Paint and Allied Products: 1992-1999

YEAR	TOTAL		ARCHITECTURAL COATINGS		PRODUCT COATINGS OEM		SPECIAL PURPOSE COATINGS		MISCELLANEOUS ALLIED PAINT PRODUCTS	
	Quantity[1]	Value[2]	Quantity[1]	Value[2]	Quantity[1]	Value[2]	Quantity[1]	Value[2]	Quantity[1]	Value[2]
1999	N/A	N/A	659.0	6,791.8	486.9	6,325.8	164.6	3,174.7	N/A	N/A
1998	1,491.5	17,249.2	636.3	6,159.8	458.5	6,050.7	188.6	3,365.4	208.1	1,673.3
1997	1,472.8	16,559.5	655.6	6,264.9	425.4	5,750.7	181.8	2,896.0	210.0	1,647.9
1996	1,468.2	16,554.7	640.3	6,246.3	398.7	5,474.1	208.9	3,263.8	220.3	1,570.5
1995	1,408.3	15,951.6	621.1	6,041.3	376.2	5,263.6	195.1	3,103.0	215.9	1,543.7
1994	1,431.1	15,645.2	644.8	5,888.3	372.9	5,069.9	193.8	3,197.3	219.6	1,489.7
1993	1,336.5	14,630.1	608.1	5,615.3	356.6	4,788.3	179.0	2,937.7	192.6	1,288.8
1992	1,236.0	13,595.1	575.6	5,294.3	311.7	4,213.5	172.7	2,933.8	176.0	1,153.5

Source: U.S. Department of Commerce, Bureau of the Census, Current Industrial Reports, *Paint and Allied Products-Annual Report 2000, MQ* 325F(00)-1, June 2000, *and 1998*, MA325F(98)-1, February 2000.

[1] Quantity in millions of gallons.
[2] Value in millions of dollars.

3.3 Industry Size and Market Share

Data used to characterize the paint manufacturing industry are from three sources: the 1997 Census of Manufacturers and the *Modern Paint and Coatings Red Book* (Paint Red Book), a commercial directory of paint and related industry suppliers, and Dun and Bradstreet data which were used to complete a survey of the industry. The remainder of this subsection discusses the industry as depicted by the Census and Paint Red Book. The next subsection focuses on the Dun and Bradstreet data and the survey conducted by EPA of the paints industry. The results of this survey are used to more narrowly focus on the segment of the paint industry that is projected to be subject to the requirements of this proposed rule.

Census data provide information on the total number of paint manufacturing facilities and companies. The Paint Red Book provides background on industry concentration and the percentage of companies in the industry which are considered small according to the Small Business Administration (SBA) standard (less than 500 employees at the firm level). The Paint Red Book is not a comprehensive source of all paint manufacturing facilities. This source only reports information on 954 facilities in the 1999 edition. Comparatively, the 1997 Census of Manufacturers reports a total of 1,495 facilities.

As noted above, 1997 Census data indicate that there are 1,495 paint manufacturing facilities located within the U.S., owned by 1,206 individual companies. The industry is relatively fragmented but is dominated, in terms of aggregate value of shipments, by less than 10 percent of all facilities. Just over 90 percent of all facilities, however, employ fewer than 100 people. A distribution of facilities by number of employees, and their respective share of the total value of shipments is provided in Table 3-2. The geographic distribution of the manufacturing facilities tends to follow general population densities, with the bulk of the facilities located on the East Coast, California, and in the Midwest. This reflects the tendency of paint manufacturers to locate in proximity of their customers, in order to minimize product shipping costs.[6]

[6] ibid.

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Table 3-2. Distribution of *Facilities* by Employment			
Employees Per Facility	**Number of Facilities**	**Percent of Facilities**	**Percent of Total Shipments Value**
1-19	912	61.0%	8.0%
20-49	298	20.0%	13.0%
50-99	154	10.3%	21.0%
100-249	106	7.1%	35.0%
250-499	20	1.3%	23.0%
500 & above	5	0.3%	**
Total	**1,495**	100.0%	100.0%

** *Shipments included in 250-499 category totals*
Source: 1997 Census of Manufacturers, USDC.

The Census of Manufacturers indicates that there are 1,206 individual companies operating in the U.S. paint and coating manufacturing industry. Unfortunately the Census provides no data to identify how many of these companies have more than 500 employees and are classified as large, according to SBA definitions. To estimate the number of large companies, Paint Red Book data are relied upon. While the Paint Red Book is not a comprehensive source of all paint manufacturing enterprises, it is assumed, for purposes of this assessment, to be representative of the entire industry. The distribution of companies identified in the Paint Red Book, by total corporate employment is presented in Table 3-3.

US EPA ARCHIVE DOCUMENT

Table 3-3. Distribution of *Companies* by Employment				
Employees Per Company	**Number of Companies***	**Percent of Companies***		**Number of Facilities****
		Individual	**Cumulative**	
1 to 9	65	10%	10%	65
10 to 49	288	44%	54%	303
50 to 99	95	15%	69%	114
100 to 249	99	15%	84%	132
250 to 499	32	5%	89%	82
Not Specified (assumed small)	38	6%	95%	56
500 & above (Large)	33	5%	100%	151
Total	**650**	100%	100%	903

* Represents only 650 of the total companies, or approximately 54% of the companies as reported in the Census
** Represents only 903 of the total facilities, or approximately 60% of the facilities as reported in the Census

Source: Modern Paint and Coatings Red Book, 1999

Assuming that approximately 5 percent of the paint manufacturing industry companies are large (i.e., with 500 or more employees), then of the 1,206 companies reported in the 1997 Census, approximately 60 would be large companies, and 1,146 would be small according to SBA size definitions.

Prices in the paint and coatings industry generally follow the economy's inflationary trends, rising just above the changes in the economy's general price level as measured by the GNP deflator. We may speculate that this is due to the fragmented structure of the industry and increasing price resistance from customers, particularly original equipment manufacturers. Table 3-4 lists the market share of the ten largest U.S. coatings companies in 1997. In total, these companies were responsible for 78 percent of domestic sales in 1997.[7]

[7] ibid.

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Table 3-4. The Ten Largest U.S. Coatings Companies, 1997		
Company	**Market Segment**	**Domestic Market Share** ***(Percent of Total U.S. Sales)***
Sherwin-Williams	Architectural Product Finishes Special Purposes	20
PPG Industries	Architectural Product Finishes	12
ICI	Architectural Product Finishes	9
Akzo Nobel	Architectural Product Finishes Special Purposes	8
BASF	Product Finishes	6
RPM	Product Finishes Special Purposes	6
Dupont	Product Finishes Special Purposes	5
H.B. Fuller	Product Finishes	4
Valspar	Architectural Product Finishes	4
Courtaulds (purchased by Akzo)	Architectural Product Finishes Special Purposes	4
Market Share of Ten Largest Companies		**78**

Source: Chemical & Engineering News, October 12, 1998, "Paints and Coatings," p.56.

The paint and coatings industry is in constant flux, with numerous mergers, acquisitions, consolidations, and spinoffs occurring every year. Recent activities of a number of these companies are documented in various news articles covering the industry. Some of these activities, especially as reported in *Chemical and Engineering News*, and *Chemical Week* are presented in Appendix A and also in Section 3.3.5 below.

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3.3.1 Typical Products

The majority of U.S. manufacturers rely on the contribution of paints and coatings to add value to their products. Generally, paints and coatings are applied to products to protect them from environmental corrosion and to improve their consumer appeal. In certain instances, paints and coatings provide an essential element, such as the coatings that protect food and beverages in metal cans from contamination and spoilage. The various paint and coating products are classified in one of the following categories: Architectural Coatings, Industrial Coatings (product coatings used by Original Equipment Manufacturers (OEM)), Special Purpose Coatings, or Miscellaneous Allied Paint Products.[8] Table 3-5 provides a brief summary of the different types of paint and coatings products as well as their 1997 and 1998 market share as a percent of annual industry sales.

Architectural Coatings

Architectural coatings accounted for approximately 37.2 percent, or $6.1 billion of the industry's annual sales in 1997 and 35.6 percent, or $6.2 billion of the industry's annual sales in 1998. Typically, this type of paint or coating is applied on-site to new and existing residential, commercial, institutional, and industrial buildings. These paints and coatings reach consumers, painters, contractors, and the government via retail or wholesale distribution channels and outlets.

The use of organic solvent-based (oil) paints has declined in recent years due, in part, to the growing popularity of water-based paints, increased environmental regulations, and other factors

Industrial Coatings

Industrial coatings also known as OEM coatings are coatings that are factory applied as part of the production process. These coatings accounted for 35.4 percent, or about $5.8 billion of the industry's 1997 sales and 35.1 percent, or about $6.1 billion of the industry's 1998 sales. OEM coatings are used to protect or decorate nearly all manufactured products in use today. For instance, while the cost of paint on the average automobile generally represents as little as 1.0 percent of the showroom price, without its protection a car body would be apt to rust out after just one winter in many areas of the country.[9]

The 1997 "Paint & Coatings 2000: Review and Forecast" study identified 14 important manufacturing industries that depend on OEM coating for their production. Some of these industries include: automotive; metal containers, coil sheet and strip; wood furniture and fixtures; machinery and equipment; metal furniture and fixtures; and electrical and electronic among others.[10]

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8 National Paint and Coatings Association, 1999, "Paint & Coatings Industry Facts," http://www.paint.org.

9 National Paint and Coatings Association, 1999, "Economic Value of Paints and Coatings," http://www.paint.org.

10 ibid.

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Special Purpose Coatings

Special purpose coatings accounted for 17.6 percent, or nearly $2.9 billion of 1997 industry sales. In 1998 special purpose coatings accounted for 19.5 percent, or almost $3.4 billion of industry sales. These coatings typically are used where durability is important. They include marine paints, high performance maintenance coatings, automotive refinish paints, traffic and highway markings, and aerosol paints.[11]

Marine coatings generally are used to protect new and existing commercial ships, offshore oil and gas rigs and equipment, and pleasure craft. Annual sales for this market grew by about 31 percent from 10 million gallons in 1990 to 13.1 million gallons in 1997.[12]

High performance maintenance coatings are used to combat the corrosion of exposed steel found in structures, tanks, pipes, industrial equipment, and tank linings. Some of the largest consumers of these coatings include on-shore oil and gas exploration, production and transmission operations; petrochemical plants and refineries; public utilities; and food and beverage processing plants.[13]

Paints and coatings used for highway and traffic markings are designed for high visibility, durability, and adhesion. Sales in this industry increased by approximately 69 percent from 22 million gallons in 1990 to 37.1 million gallons in 1997.[14]

Coatings that are packaged in aerosol cans are mostly used for auto refinishing and touch-up, appliance touch-up, corrosion inhibition, and hobbies and crafts. The typical aerosol can holds about 10 ounces of paint, generally at a low solids level to facilitate spraying. Common propellants for aerosol paints are base on hydrocarbon gases like n-butane, isobutane and propane. Production of aerosol paints increased by approximately 13 percent from 21.9 million gallons per year in 1990 to 24.8 million gallons in 1997.[15]

Miscellaneous Allied Paint Products

The remaining 9.8 percent, or $1.6 billion of the total $16.4 billion 1997 paint and coating industry sales, represents the sale of miscellaneous allied paint products. In 1998, the sale of miscellaneous allied paint products was 9.8 percent, or about $1.7 billion of the total $17.4 billion paint and coating industry sales for that year. This category includes thinners for dopes, lacquers, and oleoresinous thinners, including mixtures and proprietary thinners; aerosol paints made from purchased paint, both exterior and interior; organisols and plastisols, other than coatings; paint and varnish driers; and miscellaneous related paint products, e.g., pigment dispersions, ink vehicles, and bleached shellac (not varnish). It also includes putty and allied products such as wood and textile preservatives (nonpressure type) such as wood fillers and sealers, putty and glazing compounds, paint and varnish removers, and other allied paint products, including brush cleaners.

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11 ibid.

12 ibid.

13 ibid.

14 ibid.

15 ibid.

Table 3-5. Summary of Paint and Coating Products And Their Market Share

Typical Products	1997 Sales (billion dollars)	Percent of Total Industry Sales (1997)	1998 Sales (billion dollars)	Percent of Total Industry Sales (1998)
Architectural Coatings: Exterior waterborne (latex) Interior waterborne (latex) Exterior solvent-borne (oil) Interior solvent-borne (oil) Architectural lacquers "Do-it-yourself" wood and furniture finishes	$6.1	37.2%	$6.2	35.6%
Industrial Coatings (applied by original equipment manufacturers): Automotive finishes Truck and bus finishes Other transportation finishes (aircraft, railroad, etc.) Wood and composition board flat-stock finishes Wood furniture and fixture finishes Sheet, strip, and coil coatings on metals Metal decorating finishes (can, container and closure coatings) Machinery and equipment finishes Paper and paperboard coatings (not ink) Metal furniture and fixtures finishes Electrical insulating varnishes magnet wire coatings	$5.8	35.4%	$6.1	35.1%
Special Purpose Coatings: Industrial maintenance paints (interior, exterior) Marine coatings (off-shore structures, marine refinishing coatings) Traffic paints Metallic paints (aluminum, zinc, bronze, etc.) Automobile refinishing coatings Aerosol paints Roof coatings Multi-color paints	$2.9	17.6%	$3.4	19.5%
Miscellaneous Allied Paint Products	$1.6	9.8%	$1.7	9.8%
TOTAL PAINT AND COATINGS INDUSTRY SALES	**$16.4**	**100%**	**$17.4**	**100%**

Source: **U.S. Department of Commerce, Bureau of the Census, Current Industrial Reports, *Paint and Allied Products-Annual Report 1997*, MA28F(97)-1, August 26, 1998, and 1998, MA325F(98)-1, February 2000.**

Note: Annual sales derived from Commerce reports. The percentages were calculated from data provided.

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3.3.2 Imports and Exports for Selected Paint Products

The U.S. is a net exporter of paints and allied coatings. As Table 3-6 shows, manufacturers' shipments for certain paint products declined slightly from 1996 to 1997. Both exports and imports continued to grow during this time, while U.S. consumption decreased for paint, varnish, lacquer, paint and varnish removers, and thinners. U.S. consumption for miscellaneous allied paint products increased by approximately 13 percent from 1996 to 1997.

Table 3-6. Imports and Exports of Selected Paint Products

Product Description (SIC Code)	Year	Manufacturers' Shipments (million dollars)	Exports (million dollars)	Imports (million dollars)	Apparent U.S. Consumption (million dollars)
Paint, varnish, and lacquer (2851100, 2851200, 2851300)	1997	$14,785.7	$859.0	$297.3	$14,224.0
	1996	$14,984.2	$747.2	$265.3	$14,502.3
Paint and varnish remover including thinners (2851523, 2851531)	1997	$230.7	$60.9	$16.3	$186.1
	1996	$313.1	$49.4	$14.8	$278.5
Other miscellaneous allied products (2851598)	1997	$879.8	$145.0	$66.5	$801.3
	1996	$767.5	$114.9	$56.1	$708.7

Source: U.S. Department of Commerce, Bureau of the Census, Current Industrial Reports, *Paint and Allied Products-Annual Report 1997*, MA28F(97)-1, August 26, 1998.

3.3.3 Capacity Utilization

Full production capacity is broadly defined as the maximum level of production an establishment can obtain under normal operating conditions. The capacity utilization ratio is the ratio of the actual operations to the full production levels. Table 3-7 presents historical trends in capacity utilization in this industry. The capacity utilization ratio for the paints, coatings, and allied products industry was 66 in 1997, indicating that plants were operating below potential.

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Table 3-7. Capacity Utilization Ratios for SIC 2851						
	1992	1993	1994	1995	1996	1997
SIC 2851	75	67	69	68	69	66

Sources: U.S. Department of Commerce, Bureau of the Census. 1996. *Survey of Plant Capacity: 1994.* Washington, DC: Government Printing Office.

U.S. Department of Commerce, Bureau of the Census. 1999i. *Survey of Plant Capacity: 1997.* Washington, DC: Government Printing Office.

3.3.4 Trends in the Paints and Coatings Industry

Mergers and acquisitions, improved technologies within the paints and coatings industry, and government regulations continue to affect advancements within the industry. These factors, combined with raw material pricing patterns have helped stimulate the introduction of innovative and more environmentally friendly products. In 1999, the industry experienced a tremendous year in the U.S. and abroad. The United States was second only to Europe in the paints and coatings market worldwide. The total volume of coatings rose by 3.0 percent to almost 1.5 billion gallons, while total revenues from paint sales increased by 4.1 percent to $18 billion.[16]

Mergers and acquisitions among coating makers and their raw material suppliers continue within the industry. Major acquisitions include Valspar's buyout of Lily Industries in Indianapolis and Eastman's purchase of McWhorter Technologies. Consolidation of companies within the paints and coatings industry has allowed major players within the industry to offer a broader variety of services, and push for the development of new innovative products. Thus, mergers and acquisitions generally increase a company's strength and competitiveness within the market.

New technologies continue to be developed in all areas of the paint industry. The market for powder and waterborne coatings continues to grow. In the architectural paints arena, some new developments and marketing ideas which the industry hopes will increase sales include: the development of low odor paints to serve businesses, hospitals, and schools; development of a coating which is able to dry on substrates as cool as 35 degrees F, in turn extending the painting season; introduction of a high durability exterior paint which includes a lifetime warranty for a single coat of the product on exterior walls; and collaboration with Crayola and other popular consumer brand names to market new paint colors which consumers will recognize. Within the Powder Coatings industry, the major powder coating companies will capture the market through

[16] Tullo, A. "Paint and Coatings." *Chemical and Engineering News*. Volume 78, Number 41, October 9, 2000.

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teaching the customer how to reduce their powder usage and also through new technologies such as Lamineer, a powder coatings system for engineered wood products. In the auto industry, new technologies such as Power Primer system, powder slurry, and powder clear coats have kept the market strong at a time when automakers have become more efficient with their use of paint.[17]

Advances within the paints and coatings industry have often accompanied implementation of government regulatory and non regulatory programs. For example, various EPA and local Volatile Organic Compound (VOC) regulations have encouraged the development of a number of new environmental technologies, including water-based coatings. The market for waterborne coatings has grown to nearly 7.5 billion and is projected to grow 3 percent annually over the next five years. Bayer recently received the Presidential Green Chemistry Challenge Award for developing the two-component waterborne polyurethane system. In December of 1999 Dow presented its Blox thermoplastic resins and Atofina Chemicals, Philadelphia, expects to commercialize a water-based fluoropolymer resin to use in architectural coatings for outdoor exterior applications on projects which would include bridges and water towers.[18] We believe that environmental regulations are largely responsible for stimulating the development of these and other advancements.

While sales growth has been strong, recent rising interest rates and increasing raw materials prices are expected to have a negative impact on certain market sectors, particularly housing and autos. Manufacturers' most pressing concern at this time is rising raw material costs. Coating sales for the past six months were up 3.5 percent from the same period last year, while raw material prices increased 9 to 13 percent in the last three months. This was due primarily to rising oil and intermediates prices. This increase in costs has forced several paint makers to warn on earnings this year, including Valspar, RPM, Sherwin-Williams, and PPG.[19]

3.4 Industry Universe Potentially Subject to Requirements of the Proposed Listing

The Agency conducted a statistically designed survey of paint manufacturers to create a hazardous and nonhazardous paint waste database in support of a listings determination under RCRA. The Agency chose to conduct a statistical survey, rather than a census in order to reduce the burden on the paint industry, meet project deadlines, and to minimize costs.[20]

The first step was to identify and select a group of representative paint manufacturers to include in the survey. We used the Dun and Bradstreet (D&B) database for this purpose. We believe the Dun & Bradstreet database properly represents the paint manufacturing universe (notwithstanding the database inevitably includes some out-of-scope operations also listed under SIC 2851). We also believe that our stratified statistical random-sampling design adequately covered the variety of paint manufacturing types, paint production wastes, and waste management practices of interest to this listing determination.

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17 ibid.

18 ibid.

19 Hume, Caludia. "Paints and Coatings: Who is Making the Numbers." *Chemical Week.* October, 2000. http://206.0.199.2/cw/mag/cwcover.html.

20 Dynamac Corporation. July 12, 2000. Paint Manufacturing Hazardous Waste Listing Determination Support.

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The D&B database sort used to determine the recipients of the questionnaire is a compilation of all entries in the D&B master database that are filed under SIC 2851, Manufacturers of Paint and Allied Products. The database included not only paint manufacturers but also manufacturers of allied products such as putty, sealers, and cleaners, which are not of interest to the listing determination. These manufacturers and others, as explained below, were not included in the survey.

None of the data sources evaluated by the Agency include all paint manufacturers. Given the data and other resource constraints, we were unable to develop a definite and accurate count of paint manufacturers in the U.S. Based on our sample quality review and data analysis, we believe that the data collected from the survey respondents are valid and reliable, and are representative of the paint manufacturing facilities in the sampling population as well as the universe of paint manufacturers of interest. Our review of other data sources such as RCRA Biennial Reporting System (BRS) data for comparison did not suggest otherwise. Therefore, we believe that it is appropriate to weight and extrapolate certain data (such as total number of paint manufacturers, waste quantities, numbers of facilities associated with waste management practices) from survey responses to the sampling population and the paint universe. This report describes the methodology used to sample the paint manufacturers and provides the calculation details for the estimate of paint manufacturers in the U.S.

3.4.1 Sampling Methodology

The Agency decided to perform a statistical survey rather than a census. A detailed description of the sampling methodology is provided in *Paint Manufacturing Hazardous Waste Listing Determination Support*, Dynamac Corporation, July 12, 2000. The following discussion is a summary of the sampling process used for the survey.

The D&B database for SIC 2851, dated July 20, 1999, lists 1,764 paint and allied product manufacturers by an eight digit code. The first four digits of the D&B code are 2851, and the last four are unique to D&B. The database code was used to categorize the manufacturing facilities. Table 3-8, provides a breakdown of the major categories used by D&B, their description, and the number of facilities within each category.

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Table 3-8. Description of D&B Numerical Code		
D&B Code	**Manufacturing Description**	**Number of Facilities**
2851 00 00	Paint, varnish, lacquer, enamel, and allied product manufacturer with *insufficient data* on file to further categorize	705
2851 01 xx	Manufacturer of paint and paint additives	525
2851 02 xx	Manufacturer of lacquers, varnishes, enamels and other coatings	457
2851 03 xx	Manufacturer of putty, wood fillers, and sealers	31
2851 04 xx	Manufacturer of removers and cleaners	46
Total under SIC Code 2851		**1764**

The Agency assumes that the waste characteristics of paint manufacturing processes are influenced by size of facility and type of paint produced (waterborne, solvent based, etc.). Therefore, we decided to categorize, or stratify, the paint manufacturing universe to obtain the data required for the listing determination. The stratification of the paint universe is described in *Paint Manufacturing Hazardous Waste Listing Determination Support*, Dynamac Corporation, July 12, 2000. Twelve (12) stratification categories were identified based on size of facility (sales), type of paint produced (2851 01 xx or 2851 02 xx), and whether the facility is listed in the TRI database. Sales volume information was obtained from a D&B sort under SIC 2851, dated December 6, 1999.

To increase the chances of obtaining meaningful data for the listing determination, we decided to exclude from the sampling population the 705 entries (2851 00 00) that had insufficient information to properly categorize them under 2851 01 xx and 2851 02 xx. Including the 705 manufacturers listed under 2851 00 00 would have prevented the Agency from categorizing the sampling frame due to lack of data. However, we later characterized these facilities using the characteristics of other more certain data.

In addition, the 77 allied Product manufacturers listed under 2851 03 xx and 2851 04 xx were excluded from sampling consideration because they were outside the scope of the listing determination. Those facilities identified under 2851 03 xx and 2851 04 xx did not fit the categories of interest.

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These decisions reduced the paint manufacturing universe for sampling to 982 potential facilities (1764 - 705 - 77 = 982). Based on their characterization, a total of 31 of the 982 manufacturers meeting the requirements to be listed were considered non-paint manufacturers for the purposes of this project. Forty (40) of the 982 entries were judged duplicates and 27 did not have sales volume data to allow categorization. The 884 facilities (982 - 31 - 40 - 27 = 884) identified as paint manufacturers with sales volume information were included in the stratification and random sampling.[21]

3.4.2 Sampling Results

A total of 299 facilities within the 884 paint sample frame were randomly chosen to receive a questionnaire. Sampling was performed in two phases. The first phase included the distribution of 250 questionnaires and the second included the distribution of 49 additional questionnaires. Based on a statistical model, the Agency required a total of 210 responses from paint manufacturers to meet the 90 percent probability of identifying a 1 in 20 event from each of the 12 categories (assuming all recipients of the questionnaires were paint manufacturers of interest). This target level was established to help ensure a high probability of capturing waste management scenarios with more than 5 percent chance of occurrence. In order to assure sufficient returns, an additional 89 questionnaires were sent to paint manufacturers, for a total of 299. This additional number of facilities was included to account for such factors as companies going out of business, not characterized properly, or failure to return a completed distribution form for any unforseen reason.

We received a total of 292 responses out of the 299 questionnaires sent out. Of these, 187 (64 percent) were returned from manufacturers and the data were usable. The other paint manufacturers who returned their paint distribution forms, a total of 105, identified themselves as non paint manufacturers. Approximately 19 percent (36 of 187) of respondents also identified themselves as paint manufacturers that do not generate wastes of interest to the project. Our economic analysis is based on 151 actual facilities (187 less 36), with results weighted and scaled to derive aggregate industry impact estimates.

3.4.3 Paint Manufacturers Population Estimate

As discussed previously, we believe that 1,019 (982 - 40 + 77) facilities in the D&B database can be readily identified as manufacturers of paints or allied products. Based on the available information from D&B, 911 of the 982 facilities, or 92.8 percent, are paint manufacturers, 31 (3.2 percent) are non paint manufacturers and 40 (4.1 percent) are without sales information and were not included since categorization could not be performed.

From the distribution forms received, sixty-four percent (64 percent) of the facilities, or 187 out of 292, have identified themselves as paint manufacturers. When this factor is applied to the survey universe (884), a total of 566 paint manufacturing facilities is the result. We assume that we can apply this factor (64 percent) to the 27 entries removed because of lack of sales information. Seventeen (17) facilities in this group are then paint manufacturers (27 x 0.64 = 17).
We also estimated the total paint manufacturing population, based on the original 1,764 facilities in the D&B database can also be made. We calculated a distribution for the 705 facilities, not

[21] ibid.

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fully defined and not considered in the sampling population based on the survey results and the information provided by D&B. This approach assumes that the characteristics of the facilities included in the sampling population are representative of those facilities that are not fully defined in the D&B database. Table 3-9 provides a summary of the calculation.

Of the facilities listed under 2851 03 xx and 2851 04 xx, we identified a total of 77 facilities or 7.3 percent of those fully defined (982 + 77 = 1,059) in the database, that are not paint manufacturers. We expect that 7.3 percent of the 705 facilities insufficiently defined in the database also belong in this category, for a total of 51 (705 x 0.073 = 51), leaving 654 facilities (705-51 = 654) that are likely to meet the requirements to be listed under 2851 01 xx and 2851 02 xx (paint and paint additives, lacquers, varnishes, enamels and other coatings).

Our evaluation of the D&B database indicates that 92.8 percent of the facilities described as manufacturers under 2851 01 xx and 2851 02 xx are paint manufacturers of interest to this project (911 out of 982). We applied the same percentage to the 654 facilities calculated in the previous paragraph in order to estimate the number of paint manufacturing facilities. Based on this analogy with the D&B data, we estimate there are 607 potential paint manufacturing facilities out of 654 (654 x 0.928 = 607).

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Table 3-9: Estimate of Total Number of Paint Manufacturers, based on D&B Data and Sample Results

Item	From statistical survey		Distribution of 705 Facilities not Fully Defined	
	Number	Result	Number	Result
Total facilities listed by D&B under SIC 2851	1764	**1764**		
Less:				
Facilities not sufficiently defined	705	**1059**	705	**705**
Facilities not of interest (7.3%)	77	**982**	51	**654**
Mischaracterized Facilities (3.2%)	31	**951**	21	**633**
Duplicates (4.1%)	40	**911**	27	**607**
Non paint manufacturers (36%)	328	**583**	218	**388**
Sub-Total - Paint and Coatings Manufacturers	**583**		**388**	
Total Estimated Universe of Paint and Coatings Manufacturers (583 + 388)		**972**		
Note: The total estimated Universe may not add exactly due to rounding				

On the basis of our analysis of the survey questionnaire responses, we determined that only 64 percent of the facilities identified as paint manufacturers in the D&B database and of interest to this project are, in fact, paint manufacturers. We applied the same percentage to the 607 facilities calculated in the previous paragraph, to estimate that 388 facilities are paint manufacturers (0.64 x 607 = 388).

In conclusion, we estimate that the total number of paint manufacturing facilities in the U.S. is 972 (566 + 17 + 388 = 972).[22] Please see Exhibit 3-1 below for a flowchart presentation of the derivation of sample returns and universe of paint manufacturers.

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[22] ibid. (Note: The actual total carried to one decimal place is 971.5, which we have rounded to 972)

Exhibit 3-1. Derivation of Sample and Returns Used For Analysis:

Paint Hazardous Waste Listing Determination -- Proposal

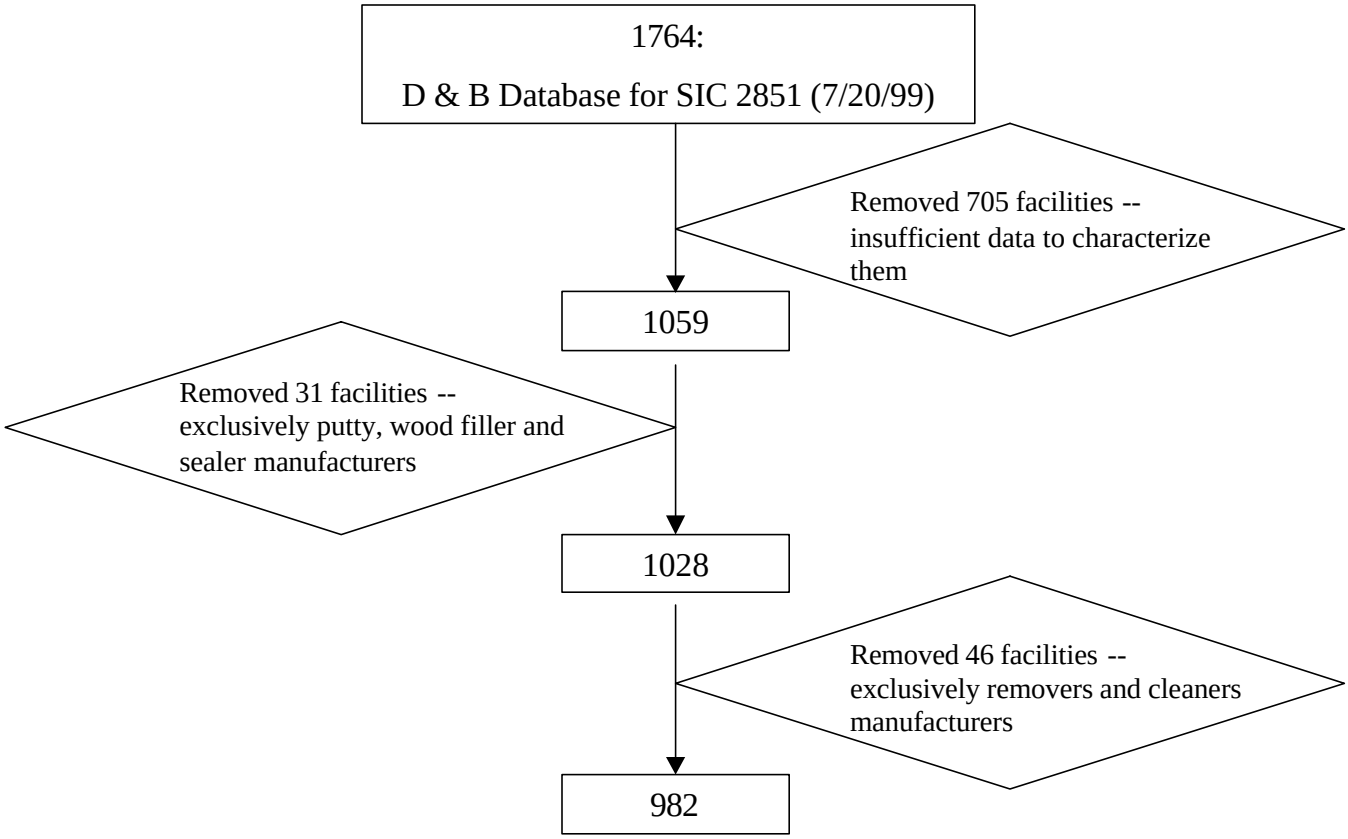

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Exhibit 3-1. Derivation of Sample and Returns Used For Analysis:

Paint Hazardous Waste Listing Determination -- Proposal

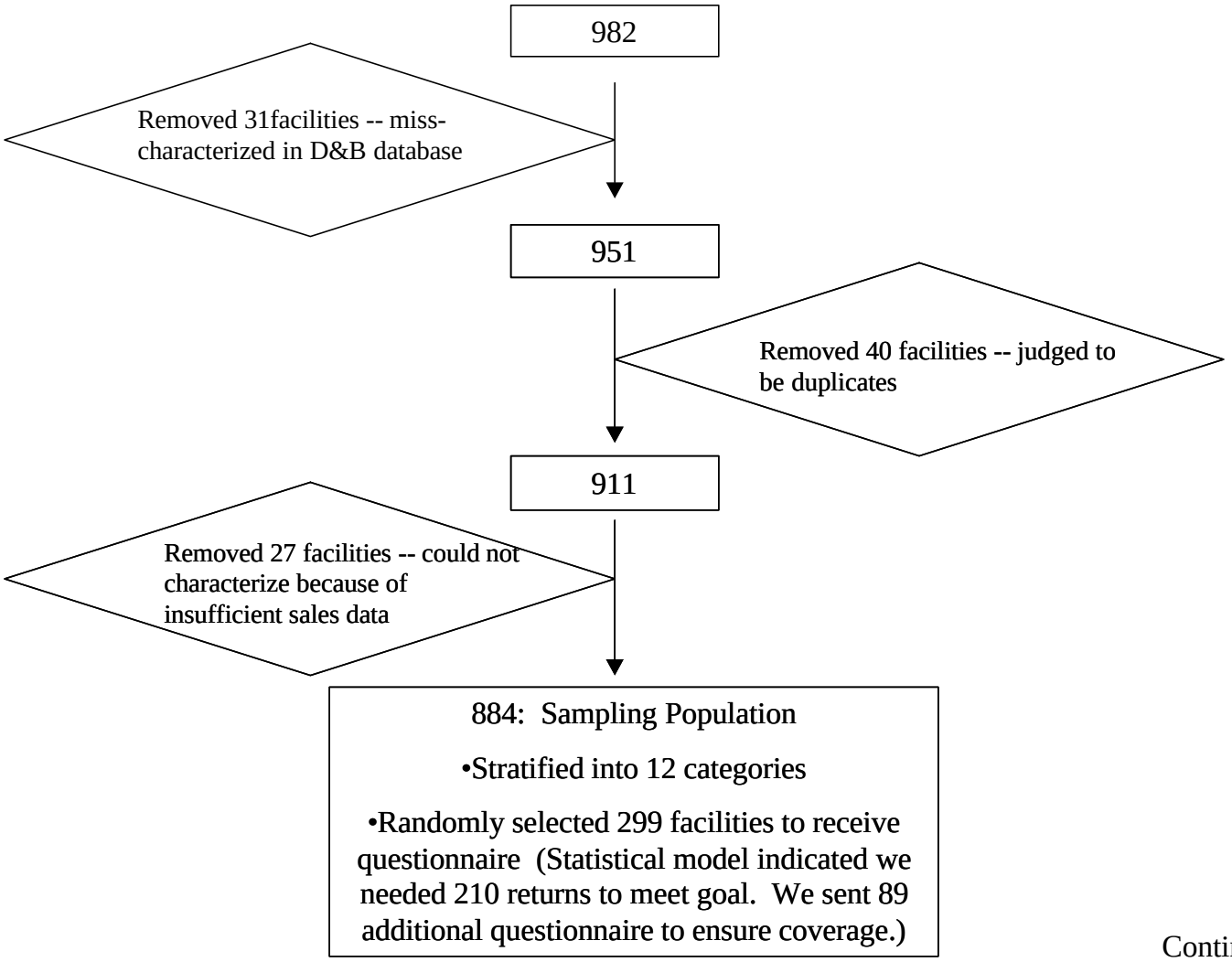

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Exhibit 3-1. Derivation of Sample and Returns Used For Analysis:

Paint Hazardous Waste Listing Determination -- Proposal

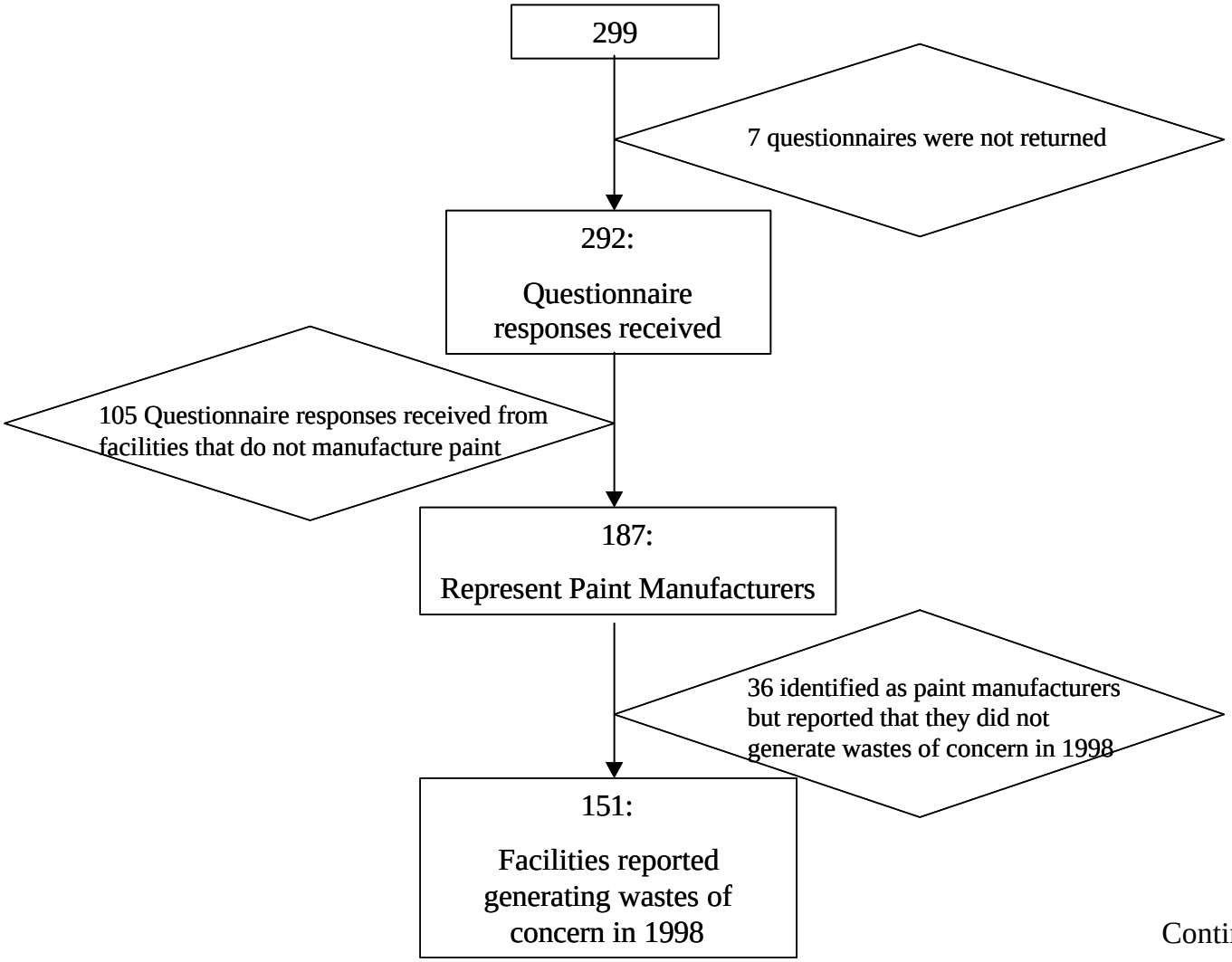

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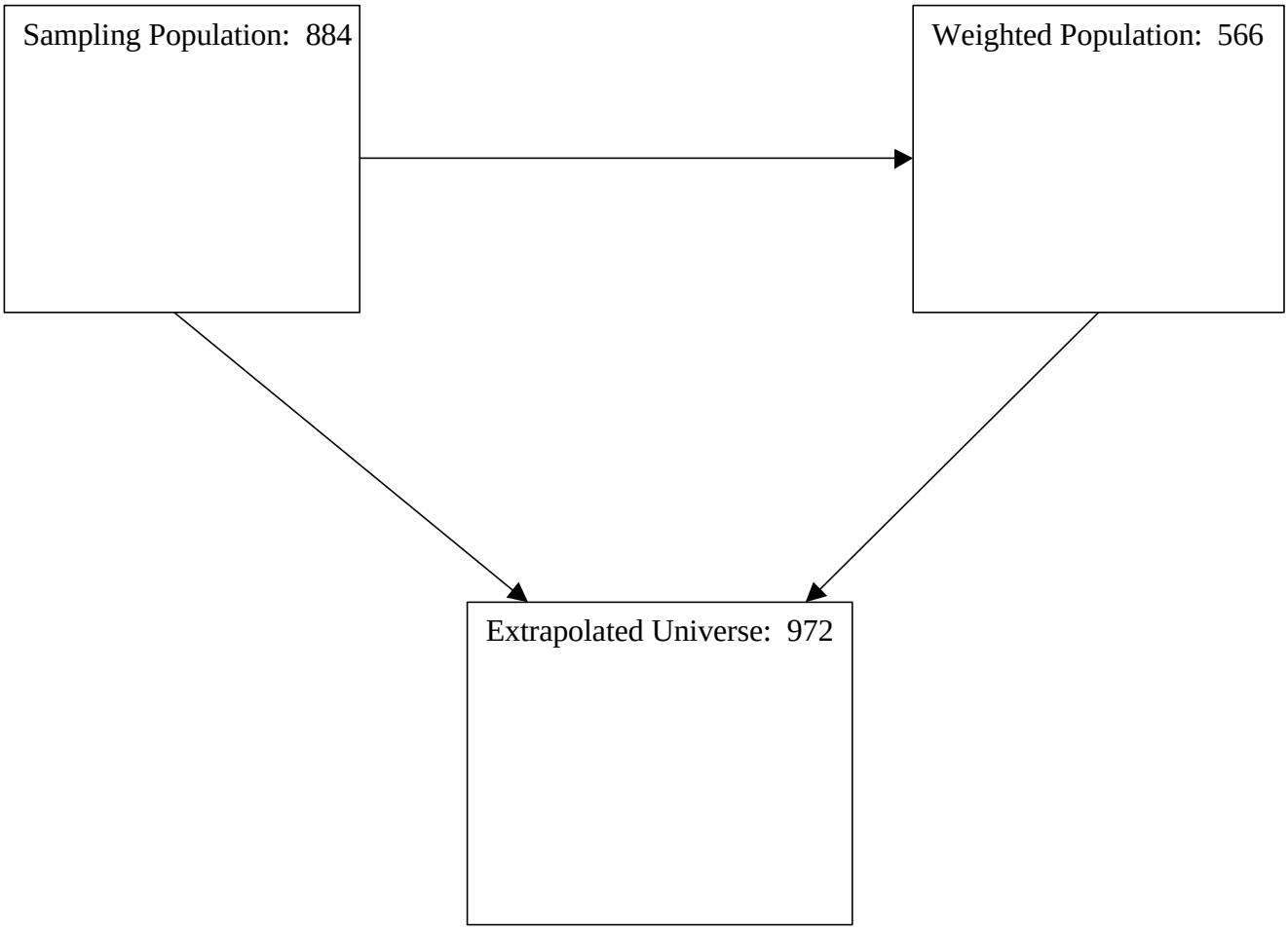
Exhibit 3-1. Derivation of Sample and Returns Used For Analysis:

Paint Hazardous Waste Listing Determination -- Proposal



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4.0 WASTE GENERATION, MANAGEMENT, AND COSTS

Two wastes generated during the production of paints are proposed for listing as hazardous under RCRA. This section describes the two wastes, the estimated quantity of each waste generated, current (baseline) management practices, most likely compliance management practices after listing, and the unit costs and prices of managing these wastes.

As described earlier, the wastes generated by the paint industry proposed for listing are:

K179---- Paint manufacturing waste **solids** generated by paint manufacturing facilities that, at the point of generation, contain any of the constituents of concern (identified in Chapter 2) at a concentration equal to or greater than the hazardous level set for that constituent. Paint manufacturing waste solids are: (1) waste solids generated from tank and equipment cleaning operations that use solvents, water and or caustic; (2) emission control dusts or sludges; (3) wastewater treatment sludges; and (4) off-specification product. Waste solids derived from the management of K180 by paint manufacturers would also be subject to this listing. Waste liquids derived from the management of K179 by paint manufacturers are not covered by this listing, but such liquids are subject to the K180 listing.

The proposed constituents of concern for this solid waste stream and their corresponding regulatory levels are presented in the table below. The waste stream would be considered hazardous if it contains one or more of the constituents presented below at or above the regulatory concentration level.

Constituent	Regulatory Concentration Levels (mg/kg)
Acrylamide	310
Acrylonitrile	43
Antimony	2,300
Methyl Isobutyl Ketone	73,000
Methyl Methacrylate	28,000

K180---- Paint manufacturing waste **liquids** generated by paint manufacturing facilities that, at the point of generation, contain any of the constituents of concern (identified in Chapter 2) at a concentration equal to or greater than the hazardous level set for that constituent, unless the wastes are stored or treated exclusively in tanks or containers prior to discharge to a POTW or under a NPDES permit. Paint manufacturing liquids are generated from tank and equipment cleaning operations that use solvents, water, and/or caustic. Waste liquids derived from the management of K179 by paint manufacturers would also be subject to this listing. Waste solids derived from the management of K180 by paint manufacturers are not covered by this listing, but such solids are subject to the K179 listing.

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The proposed constituents of concern for this liquid waste stream and their corresponding regulatory levels are presented in the table below. The waste stream would will be considered hazardous if it contains one or more of the constituents presented below at or above the regulatory concentration level.

Constituent	Regulatory Concentration Levels (mg/L)
Acrylamide	12
Acrylonitrile	9.3
Antimony	390
Ethylbenzene	11,000
Formaldehyde	82,000
Methyl Isobutyl Ketone	340
Methyl Methacrylate	2,100
Methylene Chloride	4,500
N–Butyl Alcohol	41,000
Styrene	4,600
Toluene	1,200
Xylene (mixed isomers)	3,900

The focus of the proposed listing includes only wastes produced by the Architectural, OEM and Special Purpose Coatings segments of the industry. Wastes generated by Allied Paint Products manufacturing are not included in the scope of this proposed listing.

4.1 Waste Generation

This section presents waste generation estimates based on extrapolation from our 3007 Survey responses and selected alternative sources for comparative purposes. Estimates are presented by waste type and baseline management scenario. A detailed presentation of waste generation on a representative facility bases is presented in Appendix D and incorporated into Chapter 5.

Based on our 3007 Survey responses, we estimate that a total of 106,763 metric tons of paint and coating wastes are generated annually meeting our proposed listing descriptions (not considering constituent concentrations). Of this estimated total, 27,354 metric tons (25.6%) are solids and sludges (proposed as K179) and 79,409 metric tons are liquids (proposed as K180). Hazardous waste represents approximately 38,9851 metric tons, or 36 percent of the total.

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4.1.1 Equipment (Solvent, Water or Caustic) Cleaning Wastes

Process equipment[23] are cleaned regularly to mitigate product contamination and/or restore operational efficiency. In addition, most equipment are cleaned during shut-downs or when a significant change in production lines (e.g., different colors) occurs. They are usually cleaned by flushing with solvent or water creating cleaning wastes, depending on the product formulation (i.e., solvent or latex-based product). The resulting cleaning wastes will consist of paint solids and sludges containing pigments, partially or completely cured binders, and other additives, as well as varying levels of organic solvents depending on the manufacturing process and the type of cleaning solvent used. Agitators, rollers, etc. may be cleaned by hand using rags or brushes. Thick residues from tanks are often removed by scraping.[24]

Our survey data suggest that equipment cleaning wastes contribute 75 to 80 percent of the total waste generated (excluding filter cakes). These wastes are separated into solvent-based washes, water-based washes, and aqueous caustic wastes.[25]

EPA considers cleaning wastes as "spent" when, as a result of contamination, they can no longer serve the purpose for which it was produced without processing (40 CFR 261.1(c)(1)). A cleaning waste is "reclaimed" if it is processed to recover a usable product, or it is regenerated (40 CFR 261.1(c)(4)). A cleaning waste is "used or reused" if it is either (40 CFR 261.1(c)(5):

- Employed as an ingredient in an industrial process to make a product; or
- Employed in a particular function or application as an effective substitute for a commercial product.

EPA does not classify secondary materials (i.e., solvent and water/caustic cleaning wastes) as solid wastes when they are reclaimed and returned to the original process or processes in which they were generated where they are reused in the production process provided (40 CFR 261.4(a)(8)(i-iv)):

- Only tank storage is involved, and the entire process through completion of reclamation is closed by being entirely connected with pipes or other comparable enclosed means of conveyance;
- Reclamation does not involve controlled flame combustion (such as occurs in boilers, industrial furnaces, or incinerators);
- The secondary materials are never accumulated in such tanks for over 12 months without being reclaimed; and
- The reclaimed material is not used to produce a fuel, or used to produce products that are used in a manner constituting disposal.

Thus, solvent and caustic/water cleaning wastes are not considered to be solid wastes until it is the intent of the paint manufacturer to dispose the material as a waste. Table 4-1 presents reported annual waste generation quantities by a few paint manufacturing facilities for cleaning wastes.

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23 Process Equipment Includes: high-speed dispersion mixers, sand mills, colloid mills, rotary batch mixers and blenders, drum mixers and rollers, grinding equipment, mixing vessels, pumps and motors, filters and strainers, filling and capping equipment, and packaging equipment.

24 U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Paint Production Wastes Industry Overview*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, July 15, 1999.

25 ibid.

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Tables 4-2 and 4-3 present reported annual generation quantities by several large quantity generators (LQGs) of hazardous waste in the 1995 and 1997 Biennial Reports. Tables 4-4a and 4-4b present reported generation quantities by paint manufacturers who completed our RCRA 3007 Survey (representing 1998 data).

Solvent Washes

Solvent washes are used to clean solvent-based contaminants. Typically, the same solvent used in the paint product is used as the cleaning agent. In some cases, a solvent with comparable solvency but with a higher boiling point is used to minimize evaporation. Common solvents used in paints and coatings include aliphatic hydrocarbons, toluene, xylene, glycol ethers and ether esters, methyl ethyl ketone, ethanol, acetone, other ketones and esters, butyl acetates, other aromatics, butyl alcohols, and other solvents.[26]

We believe that nearly all of the solvent cleaning waste quantity that is generated already is regulated as a hazardous waste. Biennial Report System (BRS) data for 1997 indicate that these wastes are managed as listed spent solvent hazardous waste under F001 through F005, and/or an ignitable characteristic (D001) or toxicity characteristic (TC) methyl ethyl ketone (D035) waste. Based on 1995 and 1997 Biennial Report data, the average amount of hazardous solvent cleaning waste generated per facility decreased from 205 tons (186 metric tons) in 1995 to 179 tons (163 metric tons) in 1997.

The extrapolated RCRA 3007 Survey data (Table 4-4a) suggest that the paint industry generates approximately 7,429 metric tons of ***solvent cleaning sludges***, of which, 0.8 percent is nonhazardous waste (2.3 metric tons per generator; 26 generators) and 99.2 percent is hazardous waste (41 metric tons per generator; 180 generators). Also, the extrapolated RCRA 3007 Survey data (Table 4-4b) suggest that the paint industry generates approximately 24,419 metric tons of ***solvent cleaning liquids***, of which, 0.02 percent is nonhazardous waste (3.7 metric tons per generator; 2 generators) and 99.98 percent is hazardous waste (73 metric tons per generator; 335 generators).

Water Washes

Water washes are used to clean water-based contaminants. The wash water may contain detergents. Water-based washes are used more liberally because of the low cost resulting in lower solids concentrations than solvent cleaning wastes.[27]

BRS data for 1997 indicate that there are some instances where water cleaning waste is already regulated as an ignitable characteristic (D001) waste, TC characteristic methyl ethyl ketone (D035) waste, TC characteristic metal (D005-D008) waste or solvent listed (F003 or F005) waste. Based on 1995 and 1997 BRS data, the average amount of hazardous aqueous cleaning waste generated per facility decreased from 73 tons (66 metric tons) in 1995 to 56 tons (51 metric tons) in 1997.

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26 SRI International (September 1992) U.S. Paint Industry Data Base. Published by National Paint and Coatings Association, Washington, DC.

27 U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Paint Production Wastes Industry Overview*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, July 15, 1999.

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Our extrapolated Survey data (Table 4-4a) suggest that the paint industry generates approximately 5,187 metric tons of ***water cleaning sludges***, of which, 99.0 percent is nonhazardous waste (42 metric tons per generator; 122 generators) and 1.0% is hazardous waste (10 metric tons per generator; 5 generators). Also, the extrapolated RCRA 3007 Survey data (Table 4-4b) suggest that the paint industry generates approximately 53,974 metric tons of ***water cleaning liquids***, of which, 98.8 percent is nonhazardous waste (202 metric tons per generator; 265 generators) and 1.5 percent is hazardous waste (10 metric tons per generator; 65 generators).

Caustic Washes

Caustic or alkaline washes are used to remove solvent- and water-based contaminants that are not amenable to solvent flushing. An additional waste rinse is usually required after caustic washing to remove residual caustic. This residual, if not removed, could interfere with production of the next paint batch and cause odor problems resulting from the evaporation of caustic solutions.[28]

According to the 1997 BRS data, much of the caustic cleaning waste quantity that is generated may already be regulated as a corrosive characteristic (D002) waste. Based on 1995 and 1997 Biennial Report data, the average amount of hazardous caustic cleaning waste generated per facility decreased from 131 tons (119 metric tons) in 1995 to 90 tons (82 metric tons) in 1997.

The extrapolated 3007 Survey data (Table 4-4a) suggest that the paint industry generates approximately 180 metric tons of ***caustic cleaning sludges***, of which, 5.6 percent is nonhazardous waste (0.6 metric tons per generator; 15 generators) and 94.4 percent is hazardous waste (12 metric tons per generator; 14 generators). Also, the extrapolated 3007 Survey data (Table 4-4b) suggest that the paint industry generates approximately 1,016 metric tons of ***caustic cleaning liquids***, of which, 11.1 percent is nonhazardous waste (22 metric tons per generator; 5 generators) and 88.9 percent is hazardous waste (88 metric tons per generator; 10 generators).

4.1.2 Wastewater Treatment Sludge

Wastewater is generated by paint manufacturers from equipment cleanings, floor washdowns, spill cleanups, laboratory sinks, boiler and cooling water blowdown, scrubber blowdown, resin and pigment production (for some facilities), off-specification product, contaminated stormwater runoff, and distillation condensate. The most common wastewater treatment method is physical-chemical using chemical addition and gravity settling of suspended solids. Chemicals (coagulants) added include lime, alum, or ferric chloride. Settled sludge waste is generated from the wastewater treatment process. Table 4-1 presents reported annual waste generation quantities by a few paint manufacturing facilities for wastewater treatment sludge.

We believe that a portion of the wastewater treatment sludge quantity that is generated is regulated for its characteristic ignitability (D001), solvent content (F002, F003, or F005), and characteristic TC metal hazardous waste under D004-D008 or TC methyl ethyl ketone waste (D035). Tables 4-2 and 4-3 present reported annual hazardous generation quantities by a few LQGs in the 1995 and 1997 Biennial Reports. Based on 1995 and 1997 Biennial Report data, the average amount of hazardous wastewater treatment sludge generated per facility decreased from 50 tons (45 metric tons) in 1995 to 9 tons (8 metric tons) in 1997.

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[28] ibid.

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The extrapolated 3007 Survey data (Table 4-4a) suggest that the paint industry generates approximately 2,559 metric tons of ***wastewater treatment sludges***, of which, 100 percent is non-hazardous waste (53 metric tons per generator; 48 generators).

4.1.3 Emission Control Dust

Paint manufacturers collect airborne particulates in production areas through air hoods and exhaust fans. Particulates enter the air during the loading of dry materials into processing equipment. Particulates are filtered from the collected air using bag houses and other air filters prior to exhaust or return. Pigments represent a large fraction of the particulates collected. Segregation of collected particulate matter into hazardous and nonhazardous constituents is usually not possible. The collected dusts are dry, having less than 5 percent moisture content. Approximately 4.9 pounds of dust is generated for every 1,000 gallons of paint produced.[29]

We believe a small portion of the emission control dust quantity that is generated is regulated as a TC characteristic metal waste under D005-D008. Tables 4-2 and 4-3 present reported annual generation quantities by a few LQGs in the 1995 and 1997 Biennial Reports. Based on Biennial Report data, the average amount of hazardous emission control dust generated per facility decreased from 21 tons (19 metric tons) in 1995 to 11 tons (9.6 metric tons) in 1997.

Our extrapolated Survey data (Table 4-4a) suggest that the paint industry generates approximately 3,452 metric tons of ***emission control dust***, of which, 98.1 percent is nonhazardous waste (26 metric tons per generator; 131 generators) and 1.9 percent is hazardous waste (4.9 metric tons per generator; 14 generators).

4.1.4 Off-Specification Production Wastes

We define off-specification production wastes as finished products which are not saleable or usable. Many of these off-specification wastes are generated by smaller paint manufacturing plants that sell specialty paints. These wastes may be generated when there are changes in customer demand, creation of new product substitutes, expiration of shelf life, operator errors, equipment malfunctions, improper equipment cleaning, quality control failures, and disposal of product samples or quality control samples.[30] Table 4-1 presents reported annual waste generation quantities for a couple of paint manufacturing facilities for off-specification waste.

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29 ibid.

30 ibid.

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We believe that a portion of the off-specification production waste quantity that is generated is regulated as an ignitable characteristic (D001) waste and/or TC hazardous metal waste under D006-D009 or listed solvent waste (F002, F003, or F005). Tables 4-2 and 4-3 present reported annual generation quantities by a few LQGs in the 1995 and 1997 Biennial Reports. Based on Biennial Report data, the average amount of hazardous off-specification production waste generated per facility decreased from 117 tons (107 metric tons) in 1995 to 96 tons (87 metric tons) in 1997.

The extrapolated Survey data (Table 4-4a) suggest that the paint industry generates approximately 8,547 metric tons of ***off-specification production wastes***, of which, 39.1 percent is non-hazardous waste (19 metric tons per generator; 180 generators) and 60.9 percent is hazardous waste (22 metric tons per generator; 241 generators).

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Table 4-1. Reported Paint Production Waste Generation

Waste	Waste Generation (Sample Facilities)	Year of Generation
Solvent Cleaning Waste	Sample Facilities	
	6,839 lb/yr	1992[1]
	17,520 lb/yr	1994[1]
	47,705 lb/yr	1992[1]
	114,675 lb/yr	1992[1]
	447,000 lb/yr	1987[1]
	477,048 lb/yr	1992[1]
	1,301,040 lb/yr	1992[1]
	Estimated Waste Generation Ratios	
	0.0092 lb waste/lb of solvent based coatings	1987[2]
	0.00493 lb waste/lb of water based coatings	1987[2]
Water or Caustic Cleaning Waste	Sample Facilities	
	133,440 lb/yr	1992[1]
	1,626,300 lb/yr	1992[1]
	Estimated Waste Generation Ratios	
	0.00297 lb waste/lb of solvent based coatings	1987[2]
	0.00849 lb waste/lb of water based coatings	1987[2]
Wastewater Treatment Sludge	Sample Facilities	
	26,400 lb/yr	1987[1]
	78,000 lb/yr	1992[1]
	208,330 lb/yr	1994[1]
	Estimated Waste Generation Ratios	
	0.00216 lb waste/lb of solvent based coatings	1987[2]
	0.00497 lb waste/lb of water based coatings	1987[2]
Emission Control Dust	Estimated Waste Generation Ratio	
	4.9 lb dust/1,000 gallons of paint manufactured	1976[1]
Off-specification Production Wastes	Sample Facilities	
	18,848 lb/yr	1994[1]
	27,105 lb/yr	1992[1]

[1] U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Paint Production Wastes Industry Overview*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, July 15, 1999.

[2] U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Strategy Document for the Determination of Potential Constituents of Concern Paint Wastes*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 11, 1999.

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Table 4-2. 1995 Biennial Report Data for SIC 2851 (Paints And Allied Products)						
	Solvent Cleaning Wastes	**Caustic Cleaning Wastes**	**Aqueous Cleaning Wastes**	**Wastewater Treatment Sludge**	**Emission Control Dust**	**Off-Spec. Production Wastes**
Number of LQGs (RCRA definition)	261	24	31	14	22	176
Total Generation (metric tons/yr)	48,661	2,863	2,047	636	397	18,803
Minimum Generation/Facility (metric tons/yr)	0.0	0.2	0.2	0.8	0.1	0.0
10th Percentile Generation/ Facility (metric tons/yr)	4.8	0.8	0.9	0.9	0.2	0.5
25th Percentile Generation/ Facility (metric tons/yr)	17	3.6	1.9	2.0	1.3	3.4
50th Percentile Generation/ Facility (metric tons/yr)	51	35	10	6.7	4.9	16
75th Percentile Generation/ Facility (metric tons/yr)	157	170	50	33	15	54
90th Percentile Generation/ Facility (metric tons/yr)	421	260	155	133	33	111
Maximum Generation/Facility (metric tons/yr)	6,675	766	936	293	138	3,338
Average Generation/Facility (metric tons/yr)	186	119	66	45	19	107
Standard Deviation (metric tons/yr)	507	180	175	80	37	361
Number of LQGs Shipping Off Site	247	24	31	14	22	176
Number of LQGs Shipping <15.18 metric tons*	65 (26.3%)	11 (45.8%)	17 (54.8%)	NA	NA	87 (49.4%)
Number of LQGs Shipping <18.2 metric tons**	NA	NA	NA	8 (57.1%)	18 (81.8%)	NA

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Table 4-2. 1995 Biennial Report Data for SIC 2851 (Paints And Allied Products) [continued ...]

Source: 1995 Biennial Report (see Appendix B for data query algorithm).

* Shipping costs for liquids vary between bulk and drum shipments. For our transportation cost analysis we need to estimate the number of generators who are likely to ship in bulk vs. drum. We have assumed that a tanker truck transporting liquids has 4,000 to 6,000 gallon capacity. We have also assumed drum pickup instead of bulk pickup if a facility's generated 90-day accumulation is < 1,000 gallons (4.17 tons assuming 8.34 lbs/gallon). Under this scenario, annual total generation equals 4,000 gallons or 16.68 tons (15.18 metric) per year. Those generating greater than this quantity of liquids are assumed to ship bulk.

** Shipping costs for solids vary between bulk and drum shipments. For our transportation cost analysis, we need to estimate the number of generators who are likely to ship in bulk vs. drum. We have assumed that a truck dumpster transporting solid waste has 10 to 20 cubic yards (cy)(10 to 20 ton) capacity. We have also assumed drum/jumbo bag pickup instead of bulk (dumpster) pickup if a facility's generated 90-day accumulation is < 5 cy (5 tons assuming 1 ton/cy). Under this scenario, annual total generation equals 20 cy or 20 tons (18.2 metric) per year. Those generating greater than this quantity of solids are assumed to ship bulk..

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Table 4-3. 1997 Biennial Report Data for SIC 2851 (Paints And Allied Products)						
	Solvent Cleaning Wastes	**Caustic Cleaning Wastes**	**Aqueous Cleaning Wastes*** **	**Wastewater Treatment Sludge**	**Emission Control Dust**	**Off-Spec. Production Wastes**
Number of LQGs	254	20	28	8	22	181
Total Generation (metric tons/yr)	41,424	1,634	1,390	65	211	15,823
Minimum Generation/ Facility (metric tons/yr)	0.4	0.4	0.4	0.1	0.0	0.01
10th Percentile Generation/ Facility (metric tons/yr)	3.9	1.4	1.3	0.2	0.2	0.5
25th Percentile Generation/ Facility (metric tons/yr)	15	12	4.1	1.3	0.7	4.3
50th Percentile Generation/ Facility (metric tons/yr)	51	31	25	2.7	2.5	14
75th Percentile Generation/ Facility (metric tons/yr)	164	59	41	15	7.0	59
90th Percentile Generation/ Facility (metric tons/yr)	348	203	98	21	18	223
Maximum Generation/ Facility (metric tons/yr)	5,671	610	530	25	94	1,711
Average Generation/ Facility (metric tons/yr)	163	82	51	8.1	9.6	87
Standard Deviation (metric tons/yr)	418	151	102	9.6	21	224
Number of LQGs Shipping Off Site	247	19	28	7	22	175
Number of LQGs Shipping <15.18 metric tons*	63 (24.8%)	6 (30.0%)	12 (42.9%)	NA	NA	92 (50.8%)
Number of LQGs Shipping <18.2 metric tons**	NA	NA	NA	6 (75.0%)	19 (86.4%)	NA

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Table 4-3. 1997 Biennial Report Data for SIC 2851 (Paints And Allied Products) [continued.....]

Source: 1997 Biennial Report (see Appendix A for data query algorithm).

* Shipping costs for liquids vary between bulk and drum shipments. For our transportation cost analysis we need to estimate the number of generators who are likely to ship in bulk vs. drum. We have assumed that a tanker truck transporting liquids has 4,000 to 6,000 gallon capacity. We have also assumed drum pickup instead of bulk pickup if a facility's generated 90-day accumulation is < 1,000 gallons (4.17 tons assuming 8.34 lbs/gallon). Under this scenario, annual total generation equals 4,000 gallons or 16.68 tons (15.18 metric) per year. Those generating greater than this quantity of liquids are assumed to ship bulk..

** Shipping costs for solids vary between bulk and drum shipments. For our transportation cost analysis, we need to estimate the number of generators who are likely to ship in bulk vs. drum. We have assumed that a truck dumpster transporting solid waste has 10 to 20 cubic yards (cy)(10 to 20 ton) capacity. We have also assumed drum/jumbo bag pickup instead of bulk (dumpster) pickup if a facility's generated 90-day accumulation is < 5 cy (5 tons assuming 1 ton/cy). Under this scenario, annual total generation equals 20 cy or 20 tons (18.2 metric) per year. Those generating greater than this quantity of solids are assumed to ship bulk..

*** One data point (12,904.2 tons or 11,742.8 metric tons) was assumed to be an outlier compared to the other reported data and omitted. This plant was the only one to report managing this waste via direct discharge to surface water/POTW. All other plants ship their aqueous cleaning waste off site for management.

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Table 4-4a. RCRA 3007 Survey Data for Nonwastewater Generation (Proposed K179)
1998 Data from the Paints and Coatings Industry

	Solvent Cleaning Sludges		Caustic Cleaning Sludges		Aqueous Cleaning Sludges		Wastewater Treatment Sludge		Emission Control Dust		Off-Specification Production Wastes	
	NH	H	NH	H	NH	H	NH	H	NH	H	NH	H
No. of Survey Respondents with Waste of Concern	4	49	1	7	21	3	15	NA	44	5	40	70
Total Reported Generation (metric tons)	32	3,336	0.6	98	2,585	25	927	NA	1,163	38	965	2,340
Total Reported Generation (gallons)	7,831	870,693	150	20,865	465,386	6,087	148,238	NA	181,356	16,799	216,414	587,215
No. Surveyed	15	105	9	8	71	3	28	NA	76	8	105	140
Total Weighted Generation (metric tons)	35	4,291	5.6	99	2,990	30	1,490	NA	1,971	39	1,948	3,029
Total Weighted Generation (gallons)	8,682	1,104,289	1,329	21,009	524,940	7,238	215,386	NA	598,175	17,071	437,213	747,842
Avg. Weighted Generation (metric tons/generator/yr)	2.3	40.9	0.6	12.4	42.1	10.0	53.2	NA	25.9	4.9	18.6	21.6
Avg. Weighted Generation (gal/generator/yr)	579	10,517	148	2,626	7,394	2,413	7,692	NA	7,871	2,134	4,164	5,342

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Table 4-4a. RCRA 3007 Survey Data for Nonwastewater Generation (Proposed K179)
1998 Data from the Paints and Coatings Industry

	Solvent Cleaning Sludges		Caustic Cleaning Sludges		Aqueous Cleaning Sludges		Wastewater Treatment Sludge		Emission Control Dust		Off-Specification Production Wastes	
	NH	H	NH	H	NH	H	NH	H	NH	H	NH	H
Weighted No. Shipping <18.2 metric tons*	14 (93%)	79 (75%)	9 (100%)	7 (87%)	61 (86%)	2 (65%)	16 (58%)	NA	59 (78%)	6 (75%)	84 (80%)	104 (78%)
Estimated Number of Generators in Universe of 972	26	180	15	14	122	5	48	0	131	14	180	241
Total Universe Generation (metric tons)	60	7,369	10	170	5,135	52	2,559	0	3,385	67	3,345	5,202
Total Universe Generation (gallons)	14,910	1,896,411	2,282	36,079	901,487	12,430	369,885	0	1,027,255	29,316	750,832	1,284,280

Source: RCRA 3007 Survey - Paint Manufacturing Waste (data for 1998).

NH: Non-Hazardous;
H: Hazardous

Note: Universe based on scaling factor of 972/566.

* Shipping costs for solids vary between bulk and drum shipments. For our transportation cost analysis, we need to estimate the number of generators who are likely to ship in bulk vs. drum. We have assumed that a truck dumpster transporting solid waste has 10 to 20 cubic yards (cy)(10 to 20 ton) capacity. We have also assumed drum/jumbo bag pickup instead of bulk (dumpster) pickup if a facility's generated 90-day accumulation is < 5 cy (5 tons assuming 1 ton/cy). Under this scenario, annual total generation equals 20 cy or 20 tons (18.2 metric) per year. Those generating greater than this quantity of solids are assumed to ship bulk..

Table 4-4b. RCRA 3007 Survey Data for Wastewater Generation (Proposed K180)
1998 Data from the Paints and Coatings Industry

	Solvent Cleaning Liquids		Caustic Cleaning Liquids		Aqueous Cleaning Liquids	
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous
No. of Survey Respondents with Wastes of Concern	1	97	3	6	70	16
Total Reported Generation (metric tons)	3.5	9,804	61	524	15,465	260
Total Reported Generation (gallons)	937	2,750,687	15,930	134,850	4,008,046	68,418
Number Surveyed	1	195	3	6	154	38
Total Weighted Generation (metric tons)	3.7	14,216	66	526	31,036	393
Total Weighted Generation (gallons)	984	4,009,226	17,276	135,210	8,066,196	101,288
Avg. Weighted Generation (metric tons/generator/yr)	3.7	72.9	22.0	87.7	201.5	10.3
Avg. Weighted Generation (gal/generator/yr)	984	20,560	5,759	22,535	52,378	2,665
No. Shipping <15.18 metric tons*	1 (100%)	101 (53%)	1 (31%)	3 (53%)	61 (41%)	31 (81%)
Estimated Number of Generators in Universe of 972	2	335	5	10	265	65
Total Universe Generation (metric tons)	6	24,413	113	903	53,299	675
Total Universe Generation (gallons)	1,690	6,885,102	29,668	232,198	13,852,195	173,943

Source: RCRA 3007 Survey - Paint Manufacturing Waste (data for 1998).

Note: Universe based on scaling factor of 972/566.

* Shipping costs for liquids vary between bulk and drum shipments. For our transportation cost analysis we need to estimate the number of generators who are likely to ship in bulk vs. drum. We have assumed that a tanker truck transporting liquids has 4,000 to 6,000 gallon capacity. We have also assumed drum pickup instead of bulk pickup if a facility's generated 90-day accumulation is < 1,000 gallons (4.17 tons assuming 8.34 lbs/gallon). Under this scenario, annual total generation equals 4,000 gallons or 16.68 tons (15.18 metric) per year. Those generating greater than this quantity of liquids are assumed to ship bulk..

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4.2 Baseline Management Practices and Costs

Baseline management practices are presented in Tables 4-5a and 4-5b and management unit cost estimates are included in Tables 4-6a and 4-6b. Incremental cost estimates presented in Chapter 5 are derived primarily from the information presented in these tables. Baseline management waste quantities examined in this section will not directly correlate with generation quantities presented in the previous section due to waste storage and alternative accounting periods for waste generation vs management. In addition, various facilities responding to our survey reported waste management but failed to report or fully report quantities managed. We were able to some obtain additional information and clarifications through our follow-up telephone communications. However, in some cases, facility waste consolidation, storage, and carryover practices did not allow for clear documentation of waste management vs generation within the time frame requested. *[Note: The totals presented in the paragraphs below refer to the column, "Universe Excluding Intermediate Steps" in Tables 4-5a and 4-5b.]*

4.2.1 Equipment (Solvent, Water or Caustic) Cleaning Wastes

Solvent Cleaning Wastes

Solvent cleaning wastes are typically managed by either reuse in subsequent comparable batches as part of the formulations, collected and distilled either on or off site, or reused as washwater following settling until spent, while settled solids are drummed and disposed.[31]

Based on 1997 BRS data, several solvent cleaning wastes are currently being managed under the Subtitle C program by solvent recovery, fuel blending, aqueous treatment, energy recovery (i.e., cement kiln or boiler or industrial furnace (BIF)), and incineration. The 3007 Survey data are consistent with our assumption that nearly all solvent cleaning sludge and liquid wastes already are currently managed as hazardous waste.

The extrapolated RCRA 3007 Survey data (Table 4-5a) suggest that the paint industry manages approximately 1,029,886 gallons (see note above) of ***solvent cleaning sludges***, of which, 1.4 percent is managed as nonhazardous waste and 98.6 percent is managed as hazardous waste. Nonhazardous wastes are managed in a Subtitle D landfill. Hazardous wastes are managed by Subtitle D landfill, fuel blending, incineration, cement kiln, and by other methods.

The extrapolated RCRA 3007 Survey data (Table 4-5b) suggest that the paint industry manages approximately 3,919,029 gallons (see note above) of ***solvent cleaning liquids***, of which, 0.04 percent is managed as nonhazardous waste and 99.96 percent is managed as hazardous waste. Nonhazardous wastes are managed through fuel blending. Hazardous wastes are managed by Subtitle D landfill, fuel blending, incineration, cement kiln, BIF, light-weight aggregate kiln, and by other methods.

[31] ibid.

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Water Cleaning Wastes

Water cleaning wastes are typically managed by either reuse in subsequent comparable batches as part of the formulations, reused as washwater following settling until spent, while settled solids are drummed and disposed, or drummed without reuse, treated and disposed. Based on professional judgement, we estimate that about 40 percent of the water washes are reused in subsequent paint batches.[32] The wastewater treatment plant typically involves chemical addition and gravity settling of suspended solids. It is a batch operation with pH adjustment, coagulant and/or coagulant aid addition, settling, and discharge or reuse of supernatant. The wastewater treatment sludge is evaluated as a separate waste stream.[33]

Based on 1997 Biennial Report data, we believe some water cleaning wastes are currently being managed under the RCRA Subtitle C program by incineration, fuel blending, solvent recovery, energy recovery, fuel blending, aqueous treatment, direct discharge to surface water/POTW, and stabilization (i.e., mixing into cement mixture) and landfill.

The extrapolated RCRA 3007 Survey data (Table 4-5a) suggest that the paint industry manages approximately 910,440 gallons of ***water cleaning sludges***, of which, 99.7 percent is managed as non-hazardous waste and 0.3 percent is managed as hazardous waste. Nonhazardous wastes are managed by Subtitle D landfill, Subtitle C landfill, fuel blending, incineration, and other. Hazardous wastes are managed by fuel blending.

The extrapolated RCRA 3007 Survey data (Table 4-5b) suggest that the paint industry manages approximately 15,775,381 gallons of ***water cleaning liquids***, of which, 98.9 percent is managed as nonhazardous waste and 1.1 percent is managed as hazardous waste. Nonhazardous wastes are managed by Subtitle D landfill, on-site treatment tanks, POTW, NPDES, on- and off-site wastewater treatment, fuel blending, incineration, cement kiln, and by other methods. Hazardous wastes are managed by off-site wastewater treatment, fuel blending, incineration, and by other methods.

Caustic Cleaning Wastes

Caustic cleaning wastes are typically reused until they lose their cleaning ability when they are drummed and sent off site for treatment/disposal or neutralized and sent to a treatment facility. The water rinse following a caustic wash is rarely used in subsequent batches. It is typically reused as caustic makeup waste (possibly involving evaporation) until they lose their cleaning ability followed by treatment (neutralization) and discharge or disposal. The wastewater treatment plant typically involves chemical addition and gravity settling of suspended solids. It is a batch operation with pH adjustment, coagulant and/or coagulant aid addition, settling, and discharge or reuse of supernatant.[34]

Based on 1997 Biennial Report data, we believe that some caustic cleaning wastes are currently being managed under the RCRA Subtitle C program by incineration, fuel blending, energy

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32 ibid.

33 ibid.

34 ibid.

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recovery, direct discharge to surface water/ POTW, and aqueous treatment.

The extrapolated RCRA 3007 Survey data (Table 4-5a) suggest that the paint industry manages approximately 38,361 gallons of ***caustic cleaning sludges***, of which, 5.9 percent is managed as non-hazardous waste and 94.1 percent is managed as hazardous waste. Nonhazardous wastes are managed by incineration. Hazardous wastes are managed by Subtitle D landfill, off-site wastewater treatment, fuel blending, incineration, and by other methods.

The extrapolated RCRA 3007 Survey data (Table 4-5b) suggest that the paint industry manages approximately 261,866 gallons of ***caustic cleaning liquids***, of which, 11.4 percent is managed as non-hazardous waste and 88.6 percent is managed as hazardous waste. Nonhazardous wastes are managed by on-site treatment tanks, POTW and by other methods. Hazardous wastes are managed by off-site wastewater treatment, incineration, and by other methods.

4.2.2 Wastewater Treatment Sludge

Wastewater treatment sludges are recycled back into the production line or more commonly disposed as nonhazardous solid waste in a Subtitle D landfill. Some facilities that specialize in solvent-based products and generate little wastewater dispose of the sludge as hazardous waste along with other process waste such as spent solvents and spent caustic.[35]

Based on 1997 Biennial Report data, we believe that some wastewater treatment sludges are currently being managed under the RCRA Subtitle C program by fuel blending or stabilization and landfill.

The extrapolated RCRA 3007 Survey data (Table 4-5a) suggest that the paint industry manages approximately 369,886 gallons of **wastewater treatment sludge**, of which 100 percent is managed as nonhazardous waste. Nonhazardous wastes are managed by Subtitle D landfill, on-site treatment tanks, nonhazardous fuel blending, off-site wastewater treatment facility, and incineration.

4.2.3 Emission Control Dust

Emission control dust is reused in the formulation of low-grade paint products or disposed as a nonhazardous waste in a Subtitle D landfill. Some facilities may also solidify the waste prior to disposal in either a Subtitle C or D landfill.

Based on 1997 Biennial Report data, we believe that some emission control dust wastes are currently being managed under the RCRA Subtitle C program by incineration, fuel blending, energy recovery, landfill, and stabilization and landfill.

The extrapolated RCRA 3007 Survey data (Table 4-5a) suggest that the paint industry manages approximately 1,056,052 gallons of **emission control dust**, of which, 97.3 percent is managed as non-hazardous waste and 2.7 percent is managed as hazardous waste. Nonhazardous wastes are managed by Subtitle D landfill, Subtitle C landfill, on-site treatment tanks, incineration and by other methods. Hazardous wastes are managed by Subtitle D landfill, Subtitle C landfill,

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[35] ibid.

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incineration, and BIF.

4.2.4 Off-Specification Production Wastes

Off-specification products are usually reworked into saleable materials because of their high value. Other options include sale in a new market, rework into a primer or undercoat, sale to waste exchangers, donation to volunteer organization, and Subtitle D landfill.[36] Some facilities may also solidify the waste prior to disposal in either a Subtitle C or D landfill.

Based on 1997 Biennial Report data, we believe that several off-specification production wastes are currently being managed under the RCRA Subtitle C program by solvent recovery, incineration, fuel blending, energy recovery, aqueous treatment, landfill, and stabilization and landfill.

The extrapolated RCRA 3007 Survey data (Table 4-5a) suggest that the paint industry manages approximately 2,264,339 gallons of **off-specification production waste**, of which, 28.4 percent is managed as nonhazardous waste and 71.6 percent is managed as hazardous waste. Nonhazardous wastes are managed by Subtitle D landfill, Subtitle C landfill, fuel blending, off-site wastewater treatment, incineration, cement kiln, BIF, and by other methods. Hazardous wastes are managed by Subtitle D landfill, fuel blending, incineration, cement kiln, BIF, and by other methods.

[36] ibid.

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Table 4-5a:
Paint Production Waste Baseline Management Practices
Proposed K179 - Nonwastewater (Solids And Sludges)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	**Universe** (gallons)++	**Universe Excluding Intermediate Steps** (gallons)++
Solvent Cleaning Sludge	***Non-Hazardous Waste Stream Management***			
	Subtitle D Landfill	8,682	14,910	14,910
	Container Storage*	582	999	
	Waste Pile*	7,969	13,685	
	Sub-Total and (percent):	17,233	29,594 (1.4%)	14,910 (1.4%)
	Hazardous Waste Stream Management			
	Subtitle D Landfill	2,067	3,550	3,550
	On-Site Storage Tanks*	416,273	714,872	
	Fuel Blending	523,154	898,420	898,420
	Incineration	46,344	79,587	79,587
	Cement Kiln	18,540	31,839	31,839
	Containers*	193,884	332,960	
	Other	920	1,580	1,580
	Sub-Total and (percent):	1,201,182	2,062,807 (98.6%)	1,014,976 (98.6%)
TOTAL -		*1,218,415*	*2,092,402*	*1,029,886*

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Table 4-5a:
Paint Production Waste Baseline Management Practices
Proposed K179 - Nonwastewater (Solids And Sludges)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	**Universe** (gallons)++	**Universe Excluding Intermediate Steps** (gallons)++
Water Cleaning Sludge	***Non-Hazardous Waste Stream Management***			
	Subtitle D Landfill	451,838	775,948	775,948
	Subtitle C Landfill	66,700	114,545	114,545
	On-site Storage Tanks*	324,149	556,666	
	Fuel Blending	893	1,534	1,534
	Incineration	9,043	15,530	15,530
	Containers*	200,309	343,994	
	Other	102	175	175
	Sub-Total and (percent):	1,053,034	1,808,391 (99.7%)	907,732 (99.7%)
	Hazardous Waste Stream Management			
	Fuel Blending	1,577	2,708	2,708
	Containers*	1,577	2,708	
	Sub-Total and (percent):	3,154	5,416 (0.3%)	2,708 (0.3%)
TOTAL -		*1,056,188*	*1,813,807*	*910,440*
Caustic Cleaning Sludge	***Non-Hazardous Waste Stream Management***			
	Incineration	1,329	2,282	
	Containers*	1,329	2,282	2,282
	Sub-Total and (percent):	2,658	4,565 (5.9%)	2,282 (5.9%)
	Hazardous Waste Stream Management			

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Table 4-5a:
Paint Production Waste Baseline Management Practices
Proposed K179 - Nonwastewater (Solids And Sludges)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	**Universe** (gallons)++	**Universe Excluding Intermediate Steps** (gallons)++
	Fuel Blending	1,106	1,899	1,899
	Off-Site Wastewater Treat. Fac.	2,145	3,684	3,684
	Incineration	17,700	30,396	30,396
	Containers*	21,009	36,079	
	Other	58	100	100
	Sub-Total and (percent):	42,018	72,158 (94.1%)	36,079 (94.1%)
TOTAL -		*44,676*	*76,723*	*38,361*
Wastewater Treatment Sludge	***Non-Hazardous Waste Stream Management***			
	Subtitle D Landfill	204,214	350,700	350,700
	On-Site Treatment Tanks*	74,320	127,631	
	Fuel Blending	4,640	7,968	7,968
	Off-Site Wastewater Treat. Fac.	1,250	2,147	2,147
	Incineration	5,282	9,071	9,071
	Containers*	139,025	238,750	
	TOTAL -	*428,731*	*736,266 (100.0%)*	*369,886 (100.0%)*
	Hazardous Waste Stream Management			
	No Haz. Waste Mgmt. Reported	None Reported	None Reported	None
Emission Control Dust	***Non-Hazardous Waste Stream Management***			
	Subtitle D Landfill	587,268	1,008,524	1,008,524

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Table 4-5a:
Paint Production Waste Baseline Management Practices
Proposed K179 - Nonwastewater (Solids And Sludges)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	**Universe** (gallons)++	**Universe Excluding Intermediate Steps** (gallons)++
	Subtitle C Landfill	4,728	8,119	8,119
	On-Site Treatment Tanks*	93,995	161,419	
	Incineration	1,370	2,353	2,353
	Containers*	691,980	1,188,347	
	Other	4,709	8,087	8,087
	Sub-Total and (percent):	1,384,050	2,376,849 (97.6%)	1,027,083 (97.3%)
	Hazardous Waste Stream Management			
	Subtitle D Landfill	18	31	31
	Subtitle C Landfill	11,520	19,783	19,783
	Incineration	5,250	9,016	9,016
	Boiler or Industrial Furnace	81	139	139
	Containers*	16,869	28,969	
	Sub-Total and (percent):	33,738	57,939 (2.4%)	28,969 (2.7%)
TOTAL -		*1,417,788*	*2,434,788*	*1,056,052*
Off-specification Production Waste	***Non-Hazardous Waste Stream Management***			
	Subtitle D Landfill	199,205	342,098	342,098
	Subtitle C Landfill	16,700	28,679	28,679

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Table 4-5a:
Paint Production Waste Baseline Management Practices
Proposed K179 - Nonwastewater (Solids And Sludges)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	Universe (gallons)++	Universe Excluding Intermediate Steps (gallons)++
	On-Site Storage Tanks*	12,500	21,466	
	Fuel Blending	82,429	141,557	141,557
	Off-site Wastewater Treat. Fac.	12,293	21,111	21,111
	Incineration	18,397	31,593	31,593
	Cement Kiln	12,976	22,284	22,284
	Boiler or Industrial Furnace	844	1,449	1,449
	Containers*	457,880	786,324	
	Other	31,130	53,460	53,460
	Sub-Total and (percent):	844,354	1,450,021 (30.9%)	642,231 (28.4%)
	Hazardous Waste Stream Management			
	Subtitle D Landfill	4,048	6,952	6,952
	On-Site Storage Tanks*	441,550	758,280	
	Fuel Blending	442,571	760,034	760,034
	Incineration	108,732	186,727	186,727
	Cement Kiln	34,290	58,887	58,887
	Boiler or Industrial Furnace	534	917	917
	Containers*	499,857	858,412	

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Table 4-5a:
Paint Production Waste Baseline Management Practices
Proposed K179 - Nonwastewater (Solids And Sludges)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	**Universe** (gallons)++	**Universe Excluding Intermediate Steps** (gallons)++
	Other	354,386	608,592	608,592
	Sub-Total and (percent):	1,885,968	3,238,800 (69.1%)	1,622,108 (71.6%)
TOTAL -		*2,730,322*	*4,688,822*	*2,264,339*

* *These are intermediate steps - waste volumes are also added in final destinations.*
\+ *Totals based on the total number of facilities surveyed in the RCRA 3007 Survey, weighted to adjust for survey representation.*
++ *Totals for the total Universe of 972 paint manufactures derived by scaling the weighted generation total by 972/566.*

Source: U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Wastes - RCRA 3007 Survey Database* ,management and quantity information obtained from a table (MgtUnitVSWasteStream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

Note: The quantities and percentages presented reflecting management as hazardous or nonhazardous waste differ from those presented in Section 4.1 reflecting the amount generated characterized as hazardous or nonhazardous waste. The difference is that all respondents to the RCRA 3007 survey reported a generation quantity, but, not all respondents reported how they managed their waste. In addition, given the RCRA 3007 survey was limited to the 1998 calendar year, not all waste generated in 1998 was managed in 1998. Some quantities were in storage awaiting management in calendar year 1999. The ultimate dispositions of these wastes are unknown. Finally, there may be some reporting error.

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Table 4-5b
Paint Production Waste Baseline Management Practices
Proposed K180 - Wastewater (Liquids)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	Universe (gallons)++	Universe Excluding Intermediate Steps (gallons)++
Solvent Cleaning Liquids	***Non-Hazardous Waste Stream Management***			
	Fuel Blending	984	1,690	1,690
	Container Storage*	984	1,690	
	Sub-Total and (percent):	1,968	3,380 (0.04%)	1,690 (0.04%)
	Hazardous Waste Stream Management			
	Subtitle D Landfill	394	677	677
	On-Site Storage Tanks*	1,349,113	2,316,851	
	Fuel Blending	649,887	1,116,060	1,116,060
	Incineration	116,192	199,538	199,538
	Cement Kiln	107,278	184,230	184,230
	Boiler or Industrial Furnace	2,671	4,587	4,587
	Light-Weight Aggregate Kiln	23,985	41,190	41,190
	Containers*	1,635,356	2,808,421	
	Other	1,380,677	2,371,057	2,371,057
	Sub-Total and (percent):	5,265,553	9,042,610 (99.96%)	3,917,339 (99.96%)
TOTAL -		*5,267,521*	*9,045,990*	*3,919,029*

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Table 4-5b
Paint Production Waste Baseline Management Practices
Proposed K180 - Wastewater (Liquids)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	Universe (gallons)++	Universe Excluding Intermediate Steps (gallons)++
Water Cleaning Liquids	***Non-Hazardous Waste Stream Management***			
	Subtitle D Landfill	656	1,127	1,127
	On-Site Storage Tanks*	3,825,413	6,569,437	
	Off-Site Storage Tanks*	197	338	
	On-Site Treatment Tanks*	2,019,960	3,468,907	
	Fuel Blending	93,039	159,777	159,777
	POTW	7,105,520	12,202,412	12,202,412
	On- and Off-Site Wastewater Treatment Facility	1,640,372	2,817,035	2,817,035
	NPDES	20,238	34,755	34,755
	Incineration	14,089	24,195	24,195
	Cement Kiln	12,976	22,284	22,284
	Containers*	386,260	663,330	
	Other	200,492	344,308	344,308
	Sub-Total and (percent):	15,319,212	26,307,915 (98.7%)	15,605,893 (98.9%)
	Hazardous Waste Stream Management			
	On-Site Storage Tank*	43,320	74,394	

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Table 4-5b
Paint Production Waste Baseline Management Practices
Proposed K180 - Wastewater (Liquids)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	Universe (gallons)++	Universe Excluding Intermediate Steps (gallons)++
	Fuel Blending	35,373	60,747	60,747
	Off-Site Wastewater Treatment Facility	15,042	25,832	25,832
	Incineration	29,133	50,031	50,031
	Containers*	55,374	95,095	
	Other	19,145	32,878	32,878
	Sub-Total and (percent):	197,387	338,976 (1.3%)	169,488 (1.1%)
TOTAL -		*15,516,599*	*26,646,890*	*15,775,381*
Caustic Cleaning Liquids	***Non-Hazardous Waste Stream Management***			
	On-Site Storage Tanks*	8,730	14,992	
	On-Site Treatment Tanks*	7,286	12,512	
	POTW	8,546	14,676	14,676
	Other	8,730	14,992	14,992
	Sub-Total and (percent):	33,292	57,172 (11.4%)	29,668 (11.3%)
	Hazardous Waste Stream Management			
	On-Site Storage Tanks*	9,814	16,854	
	Off-Site Wastewater Treatment Facility	8,814	15,136	15,136
	Incineration	126,396	217,062	217,062

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Table 4-5b
Paint Production Waste Baseline Management Practices
Proposed K180 - Wastewater (Liquids)

Waste	Reported Management Practice	Total Quantity Managed, Based on Extrapolated Survey Data		
		Weighted (gallons)+	Universe (gallons)++	Universe Excluding Intermediate Steps (gallons)++
	Containers*	2,130	3,658	
	Other*	112,162	192,617	
	Sub-Total and (percent):	259,316	445,327 (88.6%)	232,198 (88.7%)
TOTAL -		*292,608*	*502,499*	*261,866*

* *These are intermediate steps - waste volumes are also added in final destinations.*
\+ *Totals based on the total number of facilities surveyed in the RCRA 3007 Survey, weighted to account for survey representation.*
++ *Totals for the Universe of paint manufactures derived by scaling the weighted total by 972/566.*

Source: U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Wastes, RCRA 3007 Survey Database* ,management and quantity information obtained from a table (MgtUnitVSWasteStream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

Note: The quantities and percentages presented reflecting management as hazardous or nonhazardous waste differ from those presented in Section 4.1 reflecting the amount generated characterized as hazardous or nonhazardous waste. The difference is that all respondents to the RCRA 3007 survey reported a generation quantity, but, not all respondents reported how they managed their waste. In addition, given the RCRA 3007 survey was limited to the 1998 calendar year, not all waste generated in 1998 was managed in 1998. Some quantities were in storage awaiting management in calendar year 1999. The ultimate dispositions of these wastes are unknown. Finally, there may be some reporting error.

4.3 Compliance Management Practices and Costs

Under RCRA Subtitle C regulation, most reuse, recycle, and reclamation management/reuse practices are already exempt from RCRA regulation and therefore, can be continued without an increase in cost. For other baseline management practices, see Table 4-6a and 4-6b for listings of the assumed regulatory compliance management practices and unit costs. Given available average unit costs and varying waste specific gravities (i.e., densities) applied to these average unit costs, some compliance unit costs are lower than baseline unit costs. In this case, no incremental savings are anticipated as a result of the proposed concentration-based listing. The compliance unit cost should likely be higher for wastes with "non-average" characteristics, such as incineration of water cleaning sludge and caustic cleaning sludge with low Btu values that currently are managed in off-site Subtitle C wastewater treatment facilities under baseline.

4.3.1 Solvent Cleaning Wastes

For solvent cleaning sludges, the assumed regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash if the waste tests hazardous. The waste is ultimately disposed at a Subtitle D facility, post treatment to LDR standards. The waste is assumed to contain 25 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $740/bulk metric ton to $926/drummed metric ton.

For solvent cleaning liquids, one assumed regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle C landfill of the incinerator ash if the waste tests hazardous and is proposed for listing. The waste is ultimately disposed at a Subtitle C facility, post treatment to LDR standards. The waste is assumed to contain 5 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $165/bulk metric ton to $604/drummed metric ton. Another alternative is off-site activated sludge biological treatment and metals precipitation with solidification and Subtitle C landfill of residual sludge. The waste is assumed to generate 5 percent residual sludge by volume. The unit cost is estimated to be $1,197/drummed metric ton.

For both solvent cleaning sludge and solvent cleaning liquid, the Agency believes that waste going to hazardous waste fuel blending/cement kiln is likely to continue, thus no cost impact, except for testing. The ash at cement kilns is currently recycled into the cement product. The ash would receive a Bevell exemption from RCRA Subtitle C requirements. As a sensitivity analysis (i.e., Bevell exemption is not applied), a compliance management practice of commercial Subtitle C incineration followed by stabilization and Subtitle D landfill (Subtitle C landfill for K180) of the incinerator ash is assumed. For the proposed K179 waste, the sensitivity unit cost is estimated to range from $740/bulk metric ton to $926/drummed metric ton. For the proposed K180 waste, the sensitivity unit cost is estimated to range from $165/bulk metric ton to $604/drummed metric ton.

Based on the extrapolated RCRA 3007 Survey data 98.6 percent of solvent cleaning sludges and 99.96 percent of solvent cleaning liquids are currently managed in RCRA Subtitle C regulated disposal units.[37] In a sample of 50 LQG paint manufactures reporting hazardous waste generation

[37] U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Industry RCRA 3007 Survey Database*, management and quantity information obtained from electronic file

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quantities in the 1995 Biennial Reporting System (BRS) database, 50 out of 50 (100%) report generating a hazardous waste that was ignitable (D001), 36 out of 50 (72%) report generating methyl ethyl ketone waste (D035), 39 out of 50 (78%) reported generating F003 spent solvents, and 36 out of 50 (72 %) reported generating F005 spent solvents.[38]

(MgtUnitVSWaste Stream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

38 U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Strategy Document for the Determination of Potential Constituents of Concern Paint Wastes,* prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 11, 1999, pp. 6.

US EPA ARCHIVE DOCUMENT

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TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
Solvent Cleaning Sludge sp. gr. = 1.1	Subtitle D Landfill (drum)	$75/drum[1] $1.36/gal $256/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Solidification & Subtitle D Landfill (drum)	$113/drum[3] $2.05/gal $492/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Subtitle D Landfill (bulk)	$0.30/gal $71.14/metric ton[4]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle D Landfill (bulk)	$0.70/gal $167/metric ton[6]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Incineration (drum)	$207/drum[2] $3.76/gal $902/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Subtitle C Incineration (bulk)	$2.99/gal $716/metric ton[5]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Fuel Blending and Subtitle C Cement Kiln (drum)	$2.11/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton

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TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	\Fuel Blending and Subtitle C Cement Kiln (bulk)	$2.11/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
Water Cleaning Sludge sp. gr. = 1.4	Subtitle D Landfill (drum)	$75/drum[1] $1.36/gal $256/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Solidification and Subtitle D Landfill (drum)	$113/drum[3] $2.05/gal $386/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Subtitle C Landfill (drum)	$80/drum[7] $1.45/gal $273/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Subtitle C Landfill (bulk)	$0.57/gal $108/metric ton[8]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification & Subtitle C Landfill (drum)	$118/drum[8] $2.15/gal $405/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Solidification & Subtitle C Landfill (bulk)	$1.08/gal $204/metric ton[8]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton

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TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Subtitle D Landfill (bulk)	$0.38/gal $71.14/metric ton[4]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle D Landfill (bulk)	$0.89/gal $167/metric ton[6]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Incineration (drum)	$207/drum[2] $3.76/gal $708/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Subtitle C Incineration (bulk)	$3.80/gal $716/metric ton[5]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Fuel Blending and Hazardous Cement Kiln (drum)	$2.69/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Fuel Blending and Hazardous Cement Kiln (bulk)	$2.69/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Fuel Blending and Non-Hazardous Cement Kiln (drum)	$0.32/gal $59/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Fuel Blending and Non-Hazardous Cement Kiln (bulk)	$0.32/gal $59/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.92/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
Caustic Cleaning Sludge sp. gr. = 1.1	Subtitle C Incineration (drum)	$207/drum[2] $3.76/gal $902/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Subtitle C Incineration (bulk)	$2.99/gal $716/metric ton[5]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Fuel Blending and Subtitle C Cement Kiln (drum)	$2.11/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Fuel Blending and Subtitle C Cement Kiln (bulk)	$2.11/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Off-Site Subtitle C Wastewater Treatment (drum)	$248/drum $4.50/gal[9] $1,186/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Off-Site Subtitle C Wastewater Treatment (bulk)	$165/drum $3.00/gal[9] $791/metric ton	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
Wastewater Treatment Sludge sp. gr. = 1.5	Subtitle D Landfill (drum)	$75/drum[1] $1.36/gal $239/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.54/gal = $3.90/gal $661/metric ton + 0.25 * $96/metric ton[6] = $685/metric ton
	Solidification and Subtitle D Landfill (drum)	$113/drum[3] $2.05/gal $361/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.54/gal = $3.90/gal $661/metric ton + 0.25 * $96/metric ton[6] = $685/metric ton
	Subtitle D Landfill (bulk)	$0.40/gal $71.14/metric ton[4]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $4.07/gal + 0.25 * $0.54/gal = $4.21/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle D Landfill (bulk)	$0.95/gal $167/metric ton[6]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $4.07/gal + 0.25 * $0.54/gal = $4.21/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Incineration (drum)	$207/drum[2] $3.76/gal $661/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.54/gal = $3.90/gal $661/metric ton + 0.25 * $96/metric ton[6] = $685/metric ton
	Subtitle C Incineration (bulk)	$4.07/gal $716/metric ton[5]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $4.07/gal + 0.25 * $0.54/gal = $4.21/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Fuel Blending and Nonhazardous Cement Kiln (drum)	$0.34/gal $59/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk))	Assuming 25% ash: $3.76/gal + 0.25 * $0.54/gal = $3.90/gal $661/metric ton + 0.25 * $96/metric ton[6] = $685/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Fuel Blending and Nonhazardous Cement Kiln (bulk)	$0.34/gal $59/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $4.07/gal + 0.25 * $0.54/gal = $4.21/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Off-Site Non-Hazardous Wastewater Treatment (drum)	$144/drum $2.63/gal[10] $462/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.54/gal = $3.90/gal $661/metric ton + 0.25 * $96/metric ton[6] = $685/metric ton
	Off-Site Non-Hazardous Wastewater Treatment (bulk)	$96/drum $1.75/gal[10] $308/metric ton	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $4.07/gal + 0.25 * $0.54/gal = $4.21/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
Emission Control Dust sp. gr. = 1.4	Subtitle D Landfill (drum)	$75/drum[1] $1.36/gal $256/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Solidification and Subtitle D Landfill (drum)	$113/drum[3] $2.05/gal $386/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Subtitle D Landfill (bulk)	$0.38/gal $71.14/metric ton[4]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.93/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle D Landfill (bulk)	$0.89/gal $167/metric ton[6]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.93/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Subtitle C Landfill (drum)	$80/drum[7] $1.45/gal $273/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Solidification and Subtitle C Landfill (drum)	$118/drum[8] $2.15/gal $405/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Subtitle C Landfill (bulk)	$0.57/gal $108/metric ton[8]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.93/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle C Landfill (bulk)	$1.08/gal $204/metric ton[8]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.93/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Incineration (drum)	$207/drum[2] $3.76/gal $708/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton
	Subtitle C Incineration (bulk)	$3.80/gal $716/metric ton[5]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.93/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Cement Kiln (drum)	$2.69/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.51/gal = $3.89/gal $708/metric ton + 0.25 * $96/metric ton[6] = $733/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Subtitle C Cement Kiln (bulk)	$2.69/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.80/gal + 0.25 * $0.51/gal = $3.93/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	On-Site Non-Hazardous Treatment Tank	NA	Same as baseline. Exempt from listing.	NA
Off-Specification Production Wastes sp. gr. = 1.1	Subtitle D Landfill (drum)	$75/drum[1] $1.36/gal $326/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Solidification and Subtitle D Landfill (drum)	$113/drum[3] $2.05/gal $492/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Subtitle D Landfill (bulk)	$0.30/gal $71.74/metric ton[4]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle D Landfill (bulk)	$0.70/gal $167/metric ton[6]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Landfill (drum)	$80/drum[7] $1.45/gal $348/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Solidification and Subtitle C Landfill (drum)	$118/drum[8] $2.15/gal $516/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Subtitle C Landfill (bulk)	$0.45/gal $108/metric ton[8]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Solidification and Subtitle C Landfill (bulk)	$0.85/gal $204/metric ton[8]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Off-Site Non-Hazardous Wastewater Treatment (drum)	$144/drum $2.63/gal[10] $692/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Off-Site Non-Hazardous Wastewater Treatment (bulk)	$96/drum $1.75/gal[10] $420/metric ton	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Incineration (drum)	$207/drum[2] $3.76/gal $902/metric ton	Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Subtitle C Incineration (bulk)	$2.99/gal $716/metric ton[5]	Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Fuel Blending and Nonhazardous Cement Kiln (drum)	$14/drum $0.25/gal $59/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS				
Waste	**Baseline Management Practice**	**Baseline Unit Cost***	**Compliance Management Practice**	**Compliance Unit Cost***
	Fuel Blending and Nonhazardous Cement Kiln (bulk)	$14/drum $0.25/gal $59/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton
	Subtitle C Cement Kiln (drum)	$116/drum $2.11/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $3.76/gal + 0.25 * $0.40/gal = $3.86/gal $902/metric ton + 0.25 * $96/metric ton[6] = $926/metric ton
	Subtitle C Cement Kiln (bulk)	$116/drum $2.11/gal $507/metric ton[11]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle D Landfill (bulk)	Assuming 25% ash: $2.99/gal + 0.25 * $0.40/gal = $3.09/gal $716/metric ton[5] + 0.25 * $96/metric ton[6] = $740/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6A: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR NONWASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*

Notes:

NA = Not Applicable; sp. gr. = specific gravity (average value reported in RCRA 3007 Survey); All **drums** are 55 gallon.

Where baseline management practices identify a single price with treatment only and no disposal identified, disposal is included in the waste management cost and priced as a package by the vender (For example, see caustic cleaning sludge off-site subtitle C wastewater treatment)

* Transportation costs need to be added to the unit costs. They already are incorporated into the Subtitle D landfill unit costs. ECHOS reported transportation costs to be $0.01875/drum/mile and $0.09/metric ton/mile with a minimum of $683 per shipment; however this minimum charge appears unrepresentative based on contacts with industry. We applied a minimum charge of $300 per shipment. We assumed 200 miles to the nearest Subtitle C landfill, hazardous wastewater treatment facility, and nonhazardous fuel blender/cement kiln and 300 miles to the nearest Subtitle C incinerator and fuel blender/cement kiln. Costs per ton mile are approximately $0.13 for bulk wastes for a 200 mile haul; $0.12 for a 300 mile haul. Under the compliance scenario, for LQGs assume a 90-day waste accumulation period and for SQGs assume a 180-day waste accumulation period. For facilities currently shipping solid and liquid paint wastes to off-site wastewater treatment facilities that use impoundments assume the facilities will ship to another WWTF that uses tanks located 100 miles further away.
Also, the cost for stabilized waste sent to a Subtitle D landfill equals approximately $107/metric ton accounting for the residual increase of 1.5 from stabilization (ref. *Assessment of the Potential Costs and Benefits of the Hazardous Waste Identification Rule for Industrial Process Wastes, as Proposed*, May 25, 1995). This is equivalent to the unit cost of a non-stabilized waste sent to a Subtitle C landfill of approximately $108/metric ton. Therefore, no incremental landfill disposal savings/costs are included for stabilized ash disposed in a Subtitle D landfill under compliance.

1. Environmental Cost Handling Options and Solutions (ECHOS), *Environmental Remediation Cost Data-Unit Price*, 5th Annual Edition, published by R.S. Means, 1999, Assembly #33 19 7205 (for the remainder of the notes only the final four digits, e.g., #7205 will be reported for this source). In 1999 R.S. Means, an "assembly" is an index number for the record (line item) in the book containing the unit price for this activity.
2. Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; drum unit price for pumpable sludge.
3. #7205 ($75/drum) + the stabilization cost ($38/drum) reported for hazardous waste in Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; $118/drum with stabilization - $80/drum without stabilization = $38/drum.
4. #7269 ($64.47/ton)
5. Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; bulk unit price for pumpable sludge.
6. #7269 ($64.67/ton) + the stabilization cost ($87/ton) reported for hazardous waste in Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; $185/ton with stabilization - $98/ton without stabilization = $87/ton ($96/metric ton).
7. Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; drum unit cost estimate.
8. Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; bulk unit cost estimate.
9. #7303; Published unit costs were available for bulk shipments. Assumed drum unit costs are 50 percent higher than the bulk unit costs to account for the additional handling costs.
10. #7302; Published unit costs were available for bulk shipments. Assumed drum unit costs are 50 percent higher than the bulk unit costs to account for the additional handling costs.
11. Memorandum: Costs of the Phase IV LDRs on MGP Wastes, January 1998. Inflated to 1998 dollars assuming a 2.5% inflation rate.

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TABLE 4-6B: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR WASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
Solvent Cleaning Liquids sp. gr. = 1.0	Subtitle D Landfill (drum only because of small quantity reported)	$135/drum[4] $2.45/gal $647/metric ton	Off-site (because of small qty.) Activated Sludge Biological Treatment and Metals Precipitation (drum) and Off-Site Solidification of Wastewater Treatment Sludge and Subtitle C Landfill (bulk)	Assuming 5% sludge: $4.50/gal[2] + 0.05 * $0.77/gal = $4.54/gal $1,187/metric ton + 0.05 * $204/metric ton[1] = $1,197/metric ton
	Solidification & Subtitle D Landfill (drum only because of small quantity reported)	$173/drum[5] $3.15/gal $829/metric ton	Off-site (because of small qty.) Activated Sludge Biological Treatment and Metals Precipitation (drum) and Off-Site Solidification of Wastewater Treatment Sludge and Subtitle C Landfill (bulk)	Assuming 5% sludge: $4.50/gal[2] + 0.05 * $0.77/gal = $4.54/gal $1,187/metric ton + 0.05 * $204/metric ton[1] = $1,197/metric ton
	Subtitle C Incineration (drum)	$124/drum[6] $2.25/gal $594/metric ton	Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Subtitle C Incineration (bulk)	$0.59/gal[6] $155/metric ton	Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton
	Fuel Blending and Non-Hazardous Cement Kiln (drum)	$13/drum $0.23/gal $59/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Fuel Blending and Non-Hazardous Cement Kiln (bulk)	$0.23/gal $59/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton

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TABLE 4-6B: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR WASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*
	Fuel Blending and Subtitle C Cement Kiln (drum)	$106/drum $1.92/gal $507/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Fuel Blending and Subtitle C Cement Kiln (bulk)	$1.92/gal $507/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton
Water Cleaning Liquids sp. gr. = 1.0	Subtitle D Landfill (drum only because of small quantity reported)	$135/drum[4] $2.45/gal $647/metric ton	Off-site (because of small qty.) Activated Sludge Biological Treatment and Metals Precipitation (drum) and Off-Site Solidification of Wastewater Treatment Sludge and Subtitle C Landfill (bulk)	Assuming 5% sludge: $4.50/gal[2] + 0.05 * $0.77/gal = $4.54/gal $1,187/metric ton + 0.05 * $204/metric ton[1] = $1,197/metric ton
	Solidification & Subtitle D Landfill (drum only because of small quantity reported)	$173/drum[5] $3.15/gal $829/metric ton	Off-site (because of small qty.) Activated Sludge Biological Treatment and Metals Precipitation (drum) and Off-Site Solidification of Wastewater Treatment Sludge and Subtitle C Landfill (bulk)	Assuming 5% sludge: $4.50/gal[2] + 0.05 * $0.77/gal = $4.54/gal $1,187/metric ton + 0.05 * $204/metric ton[1] = $1,197/metric ton
	Subtitle C Incineration (drum)	$124/drum[6] $2.25/gal $598/metric ton	Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Subtitle C Incineration (bulk)	$0.59/gal[6] $155/metric ton	Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton

US EPA ARCHIVE DOCUMENT

TABLE 4-6B: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR WASTEWATERS				
Waste	**Baseline Management Practice**	**Baseline Unit Cost***	**Compliance Management Practice**	**Compliance Unit Cost***
	Fuel Blending and Non-Hazardous Cement Kiln (drum)	$13/drum $0.23/gal $59/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Fuel Blending and Non-Hazardous Cement Kiln (bulk)	$0.23/gal $59/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton
	Fuel Blending and Subtitle C Cement Kiln (drum)	$106/drum $1.92/gal $507/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Fuel Blending and Subtitle C Cement Kiln (bulk)	$1.92/gal $507/metric ton[3]	Same as baseline. For sensitivity analysis assume: Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton
	On-Site Subtitle C Treatment Tank and On-Site Wastewater Treatment Facility	NA	Same as baseline. Exempt from listing.	NA
	POTW	NA	Same as baseline. Exempt from RCRA because regulated under Clean Water Act.	NA
	NPDES	NA	Same as baseline. Exempt from RCRA because regulated under Clean Water Act.	NA

US EPA ARCHIVE DOCUMENT

TABLE 4-6B: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR WASTEWATERS				
Waste	**Baseline Management Practice**	**Baseline Unit Cost***	**Compliance Management Practice**	**Compliance Unit Cost***
	Off-Site Subtitle D or C Wastewater Treatment (drum or bulk)	NA	Same as baseline. Exempt from listing.	NA
Caustic Cleaning Liquids sp. gr. = 1.0	Subtitle C Incineration (drum)	$124/drum[6] $2.25/gal $594/metric ton	Incineration (drum) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $2.25/gal + 0.05 * $0.77/gal = $2.29/gal $594/metric ton + 0.05 * $204/metric ton[1] = $604/metric ton
	Subtitle C Incineration (bulk)	$0.59/gal[6] $155/metric ton	Incineration (bulk) and Ash Solidification and Subtitle C Landfill (bulk)	Assuming 5% ash: $0.59/gal[6] + 0.05 * $0.77/gal = $0.63/gal $155/metric ton + 0.05 * $204/metric ton[1] = $165/metric ton
	On-Site Non-Hazardous Treatment Tank	NA	Same as baseline. Exempt from listing.	NA
	POTW	NA	Same as baseline. Exempt from RCRA because regulated under Clean Water Act.	NA
	Off-Site Subtitle C Wastewater Treatment (drum or bulk)	NA	Same as baseline. Exempt from RCRA if managed in tanks regulated under Clean Water Act.	NA

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TABLE 4-6B: WASTE MANAGEMENT BASELINE AND COMPLIANCE UNIT COST ESTIMATES (1999 DOLLARS) FOR WASTEWATERS

Waste	Baseline Management Practice	Baseline Unit Cost*	Compliance Management Practice	Compliance Unit Cost*

Notes:

NA = Not Applicable; sp. gr. = specific gravity (average value reported in 1998 RCRA 3007 Survey); All **drums** are 55 gallon.

* Transportation costs need to be added to the unit costs. ECHOS reported transportation costs to be $0.01875/drum/mile and $0.09/metric ton/mile with a minimum of $683 per shipment; however this minimum charge appears unrepresentative based on contacts with industry and a minimum charge of $300 is applied. Assume 50 miles to the nearest off-site nonhazardous wastewater treatment facility, 200 miles to the nearest Subtitle C landfill, hazardous wastewater treatment facility, and nonhazardous fuel blender/cement kiln and 300 miles to the nearest Subtitle C incinerator and fuel blender/cement kiln. Costs per ton mile are approximately $0.13 for bulk wastes for a 200 mile haul; $0.12 for a 300 mile haul. Under the compliance scenario, for LQGs assume a 90-day waste accumulation period and for SQGs assume a 180-day waste accumulation period. For facilities currently shipping solid and liquid paint wastes to off-site wastewater treatment facilities that use impoundments assume the facilities will ship to another WWTF that uses tanks located 100 miles further away.
Also, the cost for stabilized waste sent to a Subtitle D landfill equals approximately $107/metric ton accounting for the residual increase of 1.5 from stabilization (ref. *Assessment of the Potential Costs and Benefits of the Hazardous Waste Identification Rule for Industrial Process Wastes, as Proposed*, May 25, 1995). This is equivalent to the unit cost of a non-stabilized waste sent to a Subtitle C landfill of approximately $108/metric ton. Therefore, no incremental landfill disposal savings/costs are included for stabilized ash disposed in a Subtitle D landfill under compliance.

1. Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; used bulk unit cost estimate ($185/ton for Subtitle C landfill with stabilization, $98/ton for Subtitle C landfill without stabilization, and $87/ton for stabilization).
2. Environmental Cost Handling Options and Solutions (ECHOS), *Environmental Remediation Cost Data-Unit Price*, 5th Annual Edition, published by R.S. Means, 1999, Assembly #33 19 7303. Published unit costs were available for bulk shipments. Assumed drum unit costs are 50 percent higher than the bulk unit costs to account for the additional handling costs.
3. Memorandum: Costs of the Phase IV LDRs on MGP Wastes, January 1998. Inflated to 1998 dollars assuming a 2.5% inflation rate.
4. Environmental Cost Handling Options and Solutions (ECHOS), *Environmental Remediation Cost Data-Unit Price*, 5th Annual Edition, published by R.S. Means, 1999, Assembly #33 19 7214 ($135/drum).
5. Environmental Cost Handling Options and Solutions (ECHOS), *Environmental Remediation Cost Data-Unit Price*, 5th Annual Edition, published by R.S. Means, 1999, Assembly #33 19 7214 ($135/drum) + the stabilization cost ($38/drum) reported for hazardous waste in Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; $118/drum with stabilization - $80/drum without stabilization = $38/drum.
6. Hazardous Waste Resource Center - January 2000 Incinerator and Landfill Cost Data, http://www.etc.org/costsurvey3.cfm; Used drum unit price for non-halogen liquid.

4.3.2 Water Cleaning Wastes

For water cleaning sludges the assumed regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash. The waste is ultimately disposed at a Subtitle D facility, post treatment to LDR standards. The waste is assumed to contain 25 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $733/drummed metric ton to $740/bulk metric ton.

For water cleaning liquid, one assumed regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle C landfill of the incinerator ash if the waste tests hazardous and is proposed for listing. The waste is ultimately disposed at a Subtitle C facility, post treatment to LDR standards. The waste is assumed to contain 5 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $165/bulk metric ton to $604/drummed metric ton. Another alternative is off-site activated sludge biological treatment and metals precipitation with solidification and Subtitle C landfill of residual sludge. The waste is assumed to generate 5 percent residual sludge by volume. The unit cost is estimated to be $1,197/drummed metric ton.

Water cleaning liquids currently managed in RCRA-regulated or RCRA-exempt wastewater treatment tank units are assumed to continue to be managed in this manner. However, wastewater treatment sludge generated by Subtitle D wastewater treatment facilities may be subject to Subtitle C requirements because of the derived-from rule.[39] It is assumed the Subtitle C wastewater treatment facilities already manage their wastewater treatment sludge appropriately.

For both water cleaning sludge and water cleaning liquid, the Agency believes that waste going to hazardous waste fuel blending/cement kiln should continue, thus no cost (regulatory impact), except for testing, if appropriate. The ash at cement kilns is currently recycled into the cement product. The ash would receive a Bevell exemption from RCRA Subtitle C requirements. As a sensitivity analysis (i.e., Bevell exemption is not applied), a compliance management practice of commercial Subtitle C incineration followed by stabilization and Subtitle D landfill (Subtitle C landfill for K180) of the incinerator ash is assumed. For water cleaning sludge waste, the sensitivity unit cost is estimated to range from $733/drummed metric ton to $740/bulk metric ton. For water cleaning liquid waste, the sensitivity unit cost is estimated to range from $165/bulk metric ton to $604/drummed metric ton.

Based on the extrapolated RCRA 3007 Survey data 0.3 percent of water cleaning sludges and 1.1 percent of water cleaning liquids are currently managed in RCRA Subtitle C regulated disposal units.[40]

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39 Assumed 0.3 percent of the wastewater will become wastewater treatment sludge. Source: U.S. EPA, Office of Solid Waste, *Assessment of the Potential Costs and Benefits of the Hazardous Waste Identification Rule for Industrial Process Wastes, as Proposed*, footnote on Exhibit 3-2, May 25, 1995.

40 U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Industry RCRA 3007 Survey Database*, management and quantity information obtained from electronic file (MgtUnitVSWaste Stream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

US EPA ARCHIVE DOCUMENT

4.3.3 Caustic Cleaning Wastes

For caustic cleaning sludges, we assumed that the regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash if the waste tests hazardous. The solid waste is ultimately disposed at a Subtitle D facility, post treatment to LDR standards. The waste is assumed to contain 25 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $740/bulk metric ton to $926/drummed metric ton.

For caustic cleaning liquid, one assumed regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle C landfill of the incinerator ash if the waste tests hazardous and is proposed for listing. The liquid waste ash is ultimately disposed at a Subtitle C facility, post treatment to LDR standards. The waste is assumed to contain 5 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $165/bulk metric ton to $604/drummed metric ton.

Caustic cleaning wastes currently managed in RCRA-regulated or RCRA-exempt wastewater treatment tank units are assumed to continue to be managed in this manner.

For caustic cleaning sludge, the Agency believes that waste going to hazardous waste fuel blending/cement kiln should continue, thus this waste should experience no cost impact, except for testing, if appropriate. The ash at cement kilns is currently recycled into the cement product. The ash would receive a Bevell exemption from RCRA Subtitle C requirements. As a sensitivity analysis (i.e., Bevell exemption is not applied), a compliance management practice of commercial Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash is assumed. For this waste, the sensitivity unit cost is estimated to range from $740/bulk metric ton to $926/drummed metric ton.

Based on the extrapolated RCRA 3007 Survey data, we estimate that 94.0 percent of caustic cleaning sludges and 88.7 percent of caustic cleaning liquids are currently managed in RCRA Subtitle C regulated disposal units.[41] In a sample of 50 LQG paint manufactures reporting hazardous waste generation quantities in the 1995 BRS database, 28 out of 50 (56%) report generating corrosive waste (D002).[42]

4.3.4 Wastewater Treatment Sludge

For wastewater treatment sludge, the assumed regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash if the waste tests hazardous. The waste is ultimately disposed at a Subtitle D facility, post treatment to

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41 U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Industry RCRA 3007 Survey Database*, management and quantity information obtained from electronic file (MgtUnitVSWaste Stream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

42 U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Strategy Document for the Determination of Potential Constituents of Concern Paint Wastes*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 11, 1999, pp. 43-47.

US EPA ARCHIVE DOCUMENT

LDR standards. The waste is assumed to contain 25 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $685/drummed metric ton to $740/bulk metric ton.

The Agency believes that waste going to hazardous waste fuel blending/cement kiln should continue, thus should experience no cost impact, except for testing, if appropriate. The ash at cement kilns is currently recycled into the cement product. The ash would receive a Bevell exemption from RCRA Subtitle C requirements. As a sensitivity analysis (i.e., Bevell exemption is not applied), a compliance management practice of commercial Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash is assumed. The sensitivity unit cost is estimated to range from $685/drummed metric ton to $740/bulk metric ton.

Based on the extrapolated RCRA 3007 Survey data, no wastewater treatment sludges are currently managed in RCRA Subtitle C regulated disposal units.[43] In a sample of 50 LQG paint manufactures reporting hazardous waste generation quantities in the 1995 BRS database, 24 out of 50 (48%) report generating ignitable waste (D004), 17 out of 50 (34%) report generating cadmium waste (D005), 38 out of 50 (76%) reported generating chromium waste (D007, and 34 out of 50 (68 %) reported generating lead waste (D008).[44]

4.3.5 Emission Control Dust

For emission control dust, we assumed the regulatory compliance management practice to be Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash if the waste tests hazardous. The waste is ultimately disposed at a Subtitle D facility, post treatment to LDR standards. The waste is assumed to contain 25 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $733/drummed metric ton to $740/bulk metric ton.

The Agency believes that waste going to hazardous waste fuel blending/cement kiln should continue, thus should experience no cost impact, except for testing, if appropriate. The ash at cement kilns is currently recycled into the cement product. The ash would receive a Bevell exemption from RCRA Subtitle C requirements. As a sensitivity analysis (i.e., Bevell exemption is not applied), a compliance management practice of commercial Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash is assumed. The sensitivity unit cost is estimated to range from $733/drummed metric ton to $740/bulk metric ton.

Based on the extrapolated RCRA 3007 Survey data 2.7 percent of emission control dusts are currently managed in RCRA Subtitle C regulated disposal units.[45] In a sample of 50 LQG paint

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43 U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Industry RCRA 3007 Survey Database*, management and quantity information obtained from electronic file (MgtUnitVSWaste Stream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

44 U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Strategy Document for the Determination of Potential Constituents of Concern Paint Wastes*, prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 11, 1999, pp. 43-47.

45 U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Industry RCRA 3007 Survey Database*, management and quantity information obtained from electronic file

US EPA ARCHIVE DOCUMENT

manufactures reporting hazardous waste generation quantities in the 1995 Biennial Reporting System (BRS), 24 out of 50 (48%) report generating arsenic waste (D004), 17 out of 50 (34%) report generating cadmium waste (D005), 38 out of 50 (76%) reported generating chromium waste (D007), and 34 out of 50 (68 %) reported generating lead waste (D008).[46]

4.3.6 Off-Specification Production Wastes

For off-specification production waste, we assumed the regulatory compliance management practice is Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash if the waste tests hazardous. The waste is ultimately disposed at a Subtitle D facility, post treatment to LDR standards. The waste is assumed to contain 25 percent ash. Compliance unit cost estimates vary depending if the waste is shipped in bulk or drums. The unit cost is estimated to range from $740/bulk metric ton to $926/drummed metric ton.

The Agency believes that waste going to hazardous waste fuel blending/cement kiln should continue, thus should experience no cost impact, except for testing, if appropriate. The ash at cement kilns is currently recycled into the cement product. The ash would receive a Bevell exemption from RCRA Subtitle C requirements. As a sensitivity analysis (i.e., Bevell exemption is not applied), a compliance management practice of commercial Subtitle C incineration followed by stabilization and Subtitle D landfill of the incinerator ash is assumed. The sensitivity unit cost is estimated to range from $740/bulk metric ton to $926/drummed metric ton.

Based on the extrapolated RCRA 3007 Survey data 71.6 percent of off-specification production wastes are currently managed in RCRA Subtitle C regulated disposal units.[47]

4.4 Other Compliance Costs

4.4.1 Sampling and Analysis Costs

Under the proposed rule, each facility would potentially test their wastes to determine if one or more of the constituents of concern (see Chapter 2 of this report). Testing will determine if the constituent concentrations in the waste equal or exceed the concentration-based listing standard. The percentages of wastes assumed to test hazardous are estimated at 50 percent for solid wastes and 80 percent for liquid wastes. These percentages are based on an analysis of RCRA 3007 data, and the percentage of waste streams which were reported to have at least one of the constituents of

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(MgtUnitVSWaste Stream8_31.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 31, 2000.

46 U.S. Environmental Protection Agency, Office of Solid Waste, *Draft Strategy Document for the Determination of Potential Constituents of Concern Paint Wastes,* prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 11, 1999, pp. 43-47.

47 U.S. Environmental Protection Agency, Office of Solid Waste, *Paint Manufacturing Industry RCRA 3007 Survey Database (File Name: Paint RedidualMasterNoZeroes0815.mdb)* ,management and quantity information obtained from electronic file (MgtUnitVSWasteStream.WK4) prepared by Dynamac Corporation, Contract No. 68-W-98-231, August 15, 2000.

US EPA ARCHIVE DOCUMENT

concern.[48]

Paint manufacturers produce several different product lines during a year. Each changeover between product lines typically requires a clean-out of the production equipment. These multiple clean-outs conducted annually result in multiple waste streams being produced that are likely to require sampling and analyses. Multiple wastestreams are often consolidated into single "batches." These batches are what are assumed to be analyzed. The number of different batches requiring testing may significantly impact a facility's analytical costs. However, information obtained from site visits, and our RCRA 3007 survey data indicate that most wastestreams are consolidated.

For small (<40 metric tons per year) nonwastewater generators, we assumed zero (operator knowledge) samples for the first and out years. For large (40 or greater metric tons/year) nonwastewater generators we assumed 40 waste samples being tested initially in the first year and 10 in subsequent years. For small (<100 metric tons per year) wastewater generators, we assumed zero (operator knowledge) samples for the first and out years. For large (100 or greater metric tons/year) wastewater generators we assumed 40 waste samples being tested initially in the first year and 10 in subsequent years.

The Agency assumed that the "appropriate number" of samples per batch of waste is four in order to accurately characterize the waste based on the requirements specified in 40 CFR 260.22(h) to petition for exclusion of a waste from being listed. The Agency also assumed a large facility will need to test 10 batches of waste in the first year resulting in a total of 40 samples. In subsequent years only one sample per batch of waste is assumed. It should be noted that this level of sampling is based on "EPA's methods experts" and historical listing determinations for costing purposes only. However, facilities are not required to take four samples per batch.

The prorated and non-prorated unit sampling and analytical costs are estimated to be $131/non-wastewater sample and $502/non-wastewater sample, respectively, based on the need to test for 5 priority pollutants.[49] Similarly, the prorated and non-prorated unit sampling and analytical costs are estimated to be $162/wastewater sample and $502/wastewater sample, respectively, based on

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48 The RCRA 3007 survey data had only limited observations regarding the concentrations of the constituents in the waste streams; concentrations were not examined because of the limited number of observations. Accordingly, the estimates used in this analysis (50 percent solid, 80 percent liquid cited above) are likely worst case estimates, as some of the wastes may not have the constituents of concern at concentrations sufficient to trigger the hazardous waste designation.

49 Sampling costs include ½-hour of labor ($78.50 * 0.5 = $39.25), an ice chest for packaging used 10 times ($32.63/10 = $3.26), shipping ($31.62), and blank and sample preparation ($25.00) for a total of $99.13/sample. Sampling unit costs were obtained from Environmental Cost Handling Options and Solutions (ECHOS), *1999 Environmental Remediation Cost Data - Unit Price*, 5th Annual Edition, published by R.S. Means, 1999. Analytical costs for semi-VOCs and VOCs were derived from a vendor quote of $389.00 to analyze one sample for the 88 semi-VOCs and VOCs on the priority pollutant list including one blank. The unit cost per constituent prorated is $4.42 ($389.00/88 = $4.42). Analytical costs for metals were obtained from 1999 R.S. Means ($14.00/metal). The 5 priority pollutants included in the paint wastes include 4 semi-VOCs and VOCs (acrylamide, acrylonitrile, methyl isobutyl ketone and methyl methacrylate) and 1 metal (antimony). Total analytical costs equal $31.68/sample (4 * $4.42 + 1 * $14.00 = $31.68). Total sampling and analytical costs are estimated to be $131/sample. Assuming no prorating of the $389 unit cost for analyzing 88 semi-VOCs and VOCs results in a non-prorated unit sampling and analytical cost of $502/sample.

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the need to test for 12 priority pollutants.[50] While we have examined analytical costs based on both a prorated and non-prorated scenario, some labs may charge a fixed fee for analysis of a predetermined group of chemicals.

The requirement to test for acrylamide and formaldehyde are likely to require somewhat new or special procedures that most labs are not currently set up to do. New testing requirements for these constituents coming from several hundred paint manufacturers throughout the country may result in higher costs due to a demand crunch, lack of lab availability, and the lab's need to implement some new procedures for these chemicals. At this time, the Agency has no actual documentation as to how much, if any, testing costs may actually go up due to these two chemicals; therefore testing costs have not been modified.

4.4.2 RCRA Administrative Costs

Facilities generating the proposed waste listings may be subject to Parts 262, 264, 266, and 270 of RCRA. Compliance activities for each of these parts are briefly described below.

RCRA Part 262 standards regulate generators of hazardous waste. All facilities producing a newly listed waste would be subject to this part. There are four subparts to the Part 262 standards. First, those plants generating hazardous waste must obtain an EPA identification number. Second, an approved manifest system must be established for those facilities shipping wastes off site. Third, before transporting hazardous waste off site, a series of pre-transport requirements must be satisfied such as labeling, marking, and placarding. Fourth, specified record keeping and reporting rules are applicable.

The incremental costs for this listing associated with RCRA Part 262 are estimated based on the conservative assumption that the facilities are not currently hazardous waste generators and no facility will permit a TSD. As presented earlier in Section 4.1, we assume that a high percentage of the waste is currently hazardous because of a hazardous characteristic or previous listing. We estimate that the following percentage of each total waste quantity is currently hazardous: solvent cleaning sludge (99.2%), water cleaning sludge (1.0%), caustic cleaning sludge (94.4%), wastewater treatment sludge (0%), emission control dust (1.9%), off-specification production waste (60.9%), solvent cleaning liquid (99.98%), water cleaning liquid (1.3%), and caustic cleaning liquid (88.9%).

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50 Sampling costs include ½-hour of labor ($78.50 * 0.5 = $39.25), an ice chest for packaging used 10 times ($32.63/10 = $3.26), shipping ($31.62), and blank and sample preparation ($25.00) for a total of $99.13/sample. Sampling unit costs were obtained from Environmental Cost Handling Options and Solutions (ECHOS), *1999 Environmental Remediation Cost Data - Unit Price*, 5th Annual Edition, published by R.S. Means, 1999. Analytical costs for semi-VOCs and VOCs were derived from a vendor quote of $389.00 to analyze one sample for the 88 semi-VOCs and VOCs on the priority pollutant list including one blank. The unit cost per constituent prorated is $4.42 ($389.00/88 = $4.42). Analytical costs for metals were obtained from 1999 R.S. Means ($14.00/metal). The 12 priority pollutants included in the paint wastes include 11 semi-VOCs and VOCs (acrylamide, acrylonitrile, dichloromethane (i.e., methylene chloride), ethylbenzene, formaldehyde, methyl isobutyl ketone, methyl methacrylate, n-butyl alcohol, styrene, toluene, and xylene) and 1 metal (antimony). Total analytical costs equal $62.62/sample (11 * $4.42 + 1 * $14.00 = $62.62). Total sampling and analytical costs are estimated to be $161.75/sample. Assuming no prorating of the $389 unit cost for analyzing 88 semi- VOCs and VOCs results in a non-prorated unit sampling and analytical cost of $502/sample.

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The initial (one-time) costs to review and understand responsibilities under regulations, assess current waste generation and management practices, obtain EPA ID number, review and determine applicable DOT requirements, develop procedures for manifesting, packaging, and labeling, and purchase file cabinet for storing manifests and reports are estimated to be $2,550 per facility. The annual costs associated with completing manifests, packaging and labeling of hazardous waste for off-site shipment, completing the annual portion of biennial report, and filing exception report are estimated to be $1,600 per year. Initial costs are annualized assuming a discount rate of 7 percent over three years (i.e., using a capital recovery factor (CRF) of 0.38105) to reflect a shorter borrowing period for operating capital (i.e., line of credit). The annualized costs associated with RCRA Part 262 are therefore estimated to be $2,600 per year, per facility ($972 in annualized costs [$2,550 at 7 percent over 3 years] or ~ $1,000 + $1,600 in annual costs = $2,600)[51].

In completing this analysis we assumed that RCRA Parts 264, 266 and 270 would not apply. Part 264 addresses standards for owners and operators of hazardous waste treatment, storage and disposal facilities. The assumption is made in completing this assessment that all facilities will be following the hazardous waste accumulation regulations from CFR Part 262.34 (i.e., accumulation time) and therefore Part 264 does not apply. Part 266 applies to permitting on-site boilers and industrial furnaces (BIFs). It is assumed that all waste affected by this ruling will continue to be managed off site or in RCRA-exempt wastewater treatment tanks. Part 270 (i.e., permitting) applies to facilities with on-site treatment units subject to Part 264. It is assumed that all waste affected by this ruling would continue to be managed off site or in RCRA-exempt wastewater treatment tanks. Therefore, no permitting would be required for existing or future units.

4.5 Leachate Management Costs for Municipal and Industrial Waste Landfills Containing Paint Industry Wastes

Common disposal practices for the two paint industry wastes addressed in this proposed listing, particularly for nonwastewaters, are off-site disposal in industrial and municipal solid waste landfills. In 1991 (56 FR 50978, October 9, 1991) the Agency promulgated municipal solid waste (MSW) landfill management design and operating criteria under Subtitle D of RCRA, effective October 9, 1993. Design criteria require the installation of leachate collection systems at new landfills (or lateral expansions of existing landfills). Subsequently, leachate derived from the two wastes traditionally has been collected and recirculated, treated, or disposed. Because of the proposed listing, collected leachate from these landfills (i.e., cells) is hazardous under the Derived-from Rule. Also, when the leachate from these two wastes mixes with leachate from other wastes disposed in these landfills, the entire leachate quantity is considered hazardous under the Mixture Rule. Even though the Agency has not developed management design criteria for industrial waste landfills, many of these landfills have been designed according to MSW landfill regulations in preparation of future federal regulations or to meet current state regulations. Therefore, many industrial waste landfills also collect leachate that will be considered hazardous under the proposed listing. By changing the regulatory status of this leachate to be covered under Subtitle C of RCRA, MSW and industrial landfills that have accepted these wastes may be subject to an increase in leachate management costs.

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[51] Administrative costs derived and updated from: *Estimating Costs for the Economic Benefits of Noncompliance*, EPA Office of Regulatory Enforcement. September 1997.

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Population of Affected Landfills

Based on a review of the RCRA 3007 Survey, several generators have disposed the two paint wastes in MSW (Subtitle D) and industrial landfills that may have leachate collection systems. Extrapolating these data, we estimate that approximately 26 of the projected 972 paint facilities have disposed solvent cleaning sludges, 98 water cleaning sludges, 41 wastewater treatment sludges, 93 emission control dusts, 77 off-specification production sludge, 2 solvent cleaning liquids, and 4 water cleaning liquids in MSW and industrial landfills. Therefore, we estimate that between 251 and 335 paint facilities (assumed 25 percent duplication of landfills) disposed nonwastewater paint wastes and approximately 4 to 6 (assuming 25 percent duplication) disposed liquid paint wastes. Overall, we estimate that between 255 and 341 MSW and industrial landfills may be impacted.

Regulatory Options

The following three regulatory options to address landfills are evaluated. Option 1 is the Agency's proposed option, while Options 2 and 3 are alternatives.

1. *Clean Water Act Exemption With Two-Year Impoundment Deferral:* Upon promulgation/signature of listing these wastes the landfill leachate is exempt from being regulated as hazardous under RCRA Subtitle C if it is appropriately managed under the Clean Water Act (e.g., NPDES discharge, POTW disposal via pipeline, and trucking to an off-site POTW) or through recirculation. After two years, impoundments will no longer be allowed to manage exempt leachate. If the leachate is managed in a surface impoundment after two years the impoundment will be subject to regulation under Subtitle C. This regulatory option assumes that landfill operators will avoid Subtitle C regulation by building tank systems to replace their impoundments before the two-year deadline. However, after two years these impoundments can still be used for emergency storage of exempt leachate and it will continue to remain exempt from Subtitle C regulation.

2. *Standard Listing:* Treat the leachate as hazardous waste and subject to Subtitle C regulation under the Derived-from and Mixture Rules. Existing exemptions apply under the Standard Listing regulatory option including the wastewater treatment tank exemption (on-site tanks and associated piping are not Subject to Subtitle C permits and standards if either of two exclusions are applicable), Industrial Point Source exclusion (excludes leachate/wastewater once it is directly discharged under a NPDES permit), and domestic sewage exclusion (excludes hazardous waste introduced into sewers en route to POTWs). In addition, leachate collection tanks are considered to be an integral part of the leachate collection system at Subtitle C landfills and do not need to meet Subpart J standards for tanks. Leachate collected and recirculated back into the landfill the Agency considers not to be "actively managed" outside the landfill unit and therefore does not trigger listing regulations. Off-site shipment, direct discharge to a POTW not through a sewer line, and management in impoundments are management practices that are not exempt.

3. *No List:* Do not list the nonwastewater and wastewater paint wastes. Leachate generated at MSW landfills is subject to management requirements under Subtitle D of RCRA. Leachate generated at industrial waste landfills is subject to applicable state and local regulations. Under this option there would be no additional costs associated with leachate management.

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Baseline Leachate Management Practices

Comments received by the RCRA Docket Information Center, Office of Solid Waste, pursuant to the Notice of Data Availability and Request for Comment on the newly listed Petroleum Refinery Wastes (K169-K172), provide a sample of how leachate management may be distributed. Data on leachate management practices and quantities were received for 58 landfills operated by Browning-Ferris Industries (BFI), Waste Management, Inc. (WMX), members of the National Solid Waste Management Association, Superior Services, and the West Contra Costa Landfill. Lacking *ANY* other reasonable data, we have assumed that the distribution of management practices for these landfills are representative of the landfills receiving the two paint wastes proposed for listing.

Table 4-7 presents the distribution of leachate management practices and the application of this distribution to the population of between 255 and 341 landfills potentially affected by the proposed paint waste listings. In addition, these data also were used to predict the number of surface impoundments that manage leachate. Reported leachate management practices from the most to least prevalent are trucking to an off-site POTW (31%), discharge to an off-site POTW (21%), recirculation back into the landfill for dust control and possible treatment or attenuation with wastes present in landfill (19%), trucking a portion of the volume to an off-site POTW and recirculating the majority of the leachate (12%), direct discharge to surface water via an NPDES permit (9%), and evaporation in a pond (2%). Approximately 7 percent of the landfills do not generate any leachate (or condensate from methane off-gas treatment) because they are located in an arid climate. Applying this distribution of management practices to the population of 255 to 341 landfills which received these two wastes produces the following results: 79 to 106 of the landfills truck leachate to an off-site POTW, 48 to 65 landfills recirculate leachate, 53 to 70 landfills discharge to a POTW directly, 31 to 41 landfills truck leachate to and off-site POTW and conducts recirculation, 22 to 29 landfills discharge via an NPDES outfall, 18 to 24 landfills generate no leachate, and 4 to 6 landfills manage leachate in an evaporation pond.

Approximately 14 percent of the landfills utilize surface impoundments in their leachate management practices. These impoundments are used for either evaporating leachate, oxidation treatment (assume biological) of leachate prior to discharge, temporary storage prior to recirculation, and emergency storage. The distribution of landfills utilizing surface impoundments in their leachate management practices from most to least prevalent is as follows: NPDES discharge (7%), recirculation only (3%), trucking to off-site POTW and recirculation (2%), and evaporation pond (2%). The remaining landfills (86%) do not utilize surface impoundments in their management practices (see Table 4-7). For the population of 255 to 341 landfills which received the two proposed waste streams, 35 to 48 landfills are assumed to utilize surface impoundments.

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TABLE 4-7. ASSUMED DISTRIBUTION OF LEACHATE MANAGEMENT PRACTICES FOR LANDFILLS THAT RECEIVED PETROLEUM (K167 - K168) WASTES Extrapolated to Paint Wastes (Proposed K179 -K180) Landfill Management

	Trucked to POTW	Truck to POTW/ Recirculate	Recirculate Only	POTW	NPDES	Evaporation Pond	No Leachate/ Condensate	Total
BFI Sample [1]	11 [2]	2	6	5	1 (1 SI)	0	2	27
WMX Sample [1]	5	5 (1 SI)	4 (2 SI)	6 (1 sewer, 1 recirc.)	2 (2 SI)	1 (1 SI)	2	25
NSWMA Survey [1]	Yes (assume 2)		Yes (assume 1)		Yes (assume 1)			4
Superior Services [1]					1 (1 SI: emerg.)			1
West Contra Costa Landfill [1]				1				1
Known Total	18 (0 SI)	7 (1 SI)	11 (2 SI)	12 (0 SI)	5 (4 SI)	1 (1 SI)	4 (0 SI)	58 (8 SI)
Leachate Management Distribution (SI Distribution)	31.0% (0.0%)	12.1% (1.7%)	19.0% (3.4%)	20.7% (0.0%)	8.6% (6.9%)	1.7% (1.7%)	6.9% (0.0%)	100% (13.7%)
Extrapolation of Petroleum Sample Leachate Management Distribution to Total Population of Landfills Receiving Paint Wastes								
Total of **255** Affected Landfills [4]	79 (0 SI)	31 (4 SI)	48 (9 SI)	53 (0 SI)	22 (18 SI)	4 (4 SI)	18 (0 SI)	255 (35 SI)
Total of **341** Affected Landfills [4]	106 (0 SI)	41 (6 SI)	65 (12 SI)	70 (0 SI)	29 (24 SI)	6 (6 SI)	24 (0 SI)	341 (48 SI)

SI: Surface Impoundment

[1] Comments received by RCRA Docket Information Center, Office of Solid Waste pursuant to the Notice of Data Availability and Request for Comment on the newly listed Petroleum Refinery Wastes (K169, K170, K171, and K172), published August 6, 1998, FR 151, Vol. 63. Document Nos. PR3A-00008, PR3A-L0001, PR3A-00002, PR3A-00006, and PR3A-00007.

[2] One landfill only generates condensate (no leachate) that is trucked to an off-site POTW. Document No. PR3A-0008.

[3] In 1996, approximately 2,400 MSW landfills were reported in the contiguous U.S. U.S. EPA, *Characterization of Municipal Solid Waste in the United States: 1997 Update*, EPA530-R-98-007, May 1998, pp. 11. The industrial landfill leachate collection system requirements have yet to be proposed under RCRA Subtitle D. Therefore, it is unknown how many of these landfills had leachate collection systems to comply with state regulations.

[4] Based on the RCRA Section 3007 Survey of Paint Manufacturers.

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Leachate Quantities

Lacking any other reasonable data, we have used leachate data provided by BFI and WMX as a representative sample of leachate generation quantities. Average annual generation quantities per landfill were estimated for each leachate management practice. The data were divided by leachate management practice because the quantity of leachate quantity to be managed often dictates the chosen management practice.

Leachate quantities are dependent upon the geographic location, area, leachate collection system design, and operation of the landfill. The Agency does not have site-specific data on landfills to assess these factors at landfills which have received these two paint wastes.

Leachate quality (chemical strength) and quantity are reduced in the first few years after closure. The chemical strength goes up for a while after closure (increase in biological oxygen demand, BOD) and then declines over time. The quantity, especially with a good final cover also declines with time. A "closed" landfill (i.e., one no longer accepting waste but having not applied the final cover) will experience a decline in leachate flows over time even though rainwater can still penetrate the landfill. The decline in leachate at a closed landfill is associated with the fact that the leachable material in the landfilled has already leached out. This decrease in leachate volume could be associated with an increase in leachate chemical strength.

Leachate quantities dramatically reduce when the landfill is capped. A capped landfill minimizes the amount of precipitation that will penetrate through the landfill. Capping of a landfill cell does not always immediately follow closure. There may be permit issues that delay capping. In addition, many landfills wait until several cells close before they cap them because it makes more economic sense to cap several cells at one time.

The implementation of leachate collection systems (LCS) became a requirement under the Subtitle D MSW landfill regulations in 1993. Therefore, leachate from these two waste streams at least has been collected since then. Since MSW landfills are typically operated as a series of cells the Agency assumed that one landfill cell is opened and closed every year. Leachate generation from closed cells declines with time. To develop leachate quantity estimates, the Agency assessed two different cases representing different declining rates of leachate generation from closed cells. For a conservative case, the Agency assumed a linear decrease in leachate quantity (and quality) collected over a 10-year period (i.e., 10 percent reduction per year). The method used to calculate the annual leachate quantity generated per landfill is presented in Table 4-8. Leachate generation data for 15 landfills operated by BFI and WMX that truck their leachate to an off-site POTW are presented in the column under the year 1999. The remaining columns in the table present leachate quantity estimates over the 10-year period assuming a 10 percent annual reduction in quantity. The summed 10-year total quantity is annualized over the 10-year period by dividing it equally among the years. For an expected case, the Agency assumed a linear decrease in leachate quantity (and quality) collected over a 5-year period (i.e., 20 percent reduction per year; Table 4-9). The summed 5-year total quantity is annualized over the 5-year period by dividing it equally among the years. We are assuming that the leachate quantities are representative of all landfill locations in the country.

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TABLE 4-8. 10-YEAR CONSERVATIVE LEACHATE GENERATION CASE: ANNUAL LEACHATE QUANTITY (GALLONS/LANDFILL/YEAR)

Landfill	1999 (100%)	2000 (90%)	2001 (80%)	2002 (70%)	2003 (60%)	2004 (50%)	2005 (40%)	2006 (30%)	2007 (20%)	2008 (10%)
Estimate of the gallons of leachate generated per landfill per year. Estimates assume that collected leachate volumes from the last 10-years worth of closed and operating cells which received the two waste streams will decline 10 percent annually.										
BFI-A	5,184,000	4,665,600	4,147,200	3,628,800	3,110,400	2,592,000	2,073,600	1,555,200	1,036,800	518,400
BFI-B	2,448,000	2,203,200	1,958,400	1,713,600	1,468,800	1,224,000	979,200	734,400	489,600	244,800
BFI-C	1,200,000	1,080,000	960,000	840,000	720,000	600,000	480,000	360,000	240,000	120,000
BFI-D	36,000	32,400	28,800	25,200	21,600	18,000	14,400	10,800	7,200	3,600
BFI-E	3,720,000	3,348,000	2,976,000	2,604,000	2,232,000	1,860,000	1,488,000	1,116,000	744,000	372,000
BFI-F	7,200,000	6,480,000	5,760,000	5,040,000	4,320,000	3,600,000	2,880,000	2,160,000	1,440,000	720,000
BFI-G	3,600,000	3,240,000	2,880,000	2,520,000	2,160,000	1,800,000	1,440,000	1,080,000	720,000	360,000
BFI-H	5,100,000	4,590,000	4,080,000	3,570,000	3,060,000	2,550,000	2,040,000	1,530,000	1,020,000	510,000
BFI-I	4,200,000	3,780,000	3,360,000	2,940,000	2,520,000	2,100,000	1,680,000	1,260,000	840,000	420,000
BFI-J	1,104,000	993,600	883,200	772,800	662,400	552,000	441,600	331,200	220,800	110,400
WMX-O	4,000,000	3,600,000	3,200,000	2,800,000	2,400,000	2,000,000	1,600,000	1,200,000	800,000	400,000
WMX-P	1,000,000	900,000	800,000	700,000	600,000	500,000	400,000	300,000	200,000	100,000
WMX-Q	700,000	630,000	560,000	490,000	420,000	350,000	280,000	210,000	140,000	70,000
WMX-R	1,500,000	1,350,000	1,200,000	1,050,000	900,000	750,000	600,000	450,000	300,000	150,000
WMX-X	2,200,000	1,980,000	1,760,000	1,540,000	1,320,000	1,100,000	880,000	660,000	440,000	220,000
Total	43,192,000	38,872,800	34,553,600	30,234,400	25,915,200	21,596,000	17,276,800	12,957,600	8,638,400	4,319,200
10-Yr Avg.	237,556,000 gallons / 15 landfills / 10 years ==> **1,583,700 gallons/landfill/year**									

Note: Estimates developed from information provided in: RCRA Docket Information Center, Office of Solid Waste, pursuant to the Notice of Data Availability and Request for Comment on the newly listed Petroleum Refinery Wastes (K169-K172)

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TABLE 4-9. 5-YEAR EXPECTED LEACHATE GENERATION CASE: ANNUAL LEACHATE QUANTITY (GALLONS/LANDFILL/YEAR)

Landfill	1999 (100%)	2000 (80%)	2001 (60%)	2002 (40%)	2003 (20%)
Estimate of the gallons of leachate generated per landfill per year. Estimates assume that collected leachate volumes from the last 5-years worth of closed and operating cells which received the two waste streams will decline 20 percent annually.					
BFI-A	5,184,000	4,147,200	3,110,400	2,073,600	1,036,800
BFI-B	2,448,000	1,958,400	1,468,800	979,200	489,600
BFI-C	1,200,000	960,000	720,000	480,000	240,000
BFI-D	36,000	28,800	21,600	14,400	7,200
BFI-E	3,720,000	2,976,000	2,232,000	1,488,000	744,000
BFI-F	7,200,000	5,760,000	4,320,000	2,880,000	1,440,000
BFI-G	3,600,000	2,880,000	2,160,000	1,440,000	720,000
BFI-H	5,100,000	4,080,000	3,060,000	2,040,000	1,020,000
BFI-I	4,200,000	3,360,000	2,520,000	1,680,000	840,000
BFI-J	1,104,000	3,200,000	2,400,000	1,600,000	800,000
WMX-O	4,000,000	800,000	600,000	400,000	200,000
WMX-P	1,000,000	560,000	420,000	280,000	140,000
WMX-Q	700,000	1,200,000	900,000	600,000	300,000
WMX-R	1,500,000	1,760,000	1,320,000	880,000	440,000
WMX-X	2,200,000	883,200	662,400	441,600	220,800
Total	43,192,000	34,553,600	25,915,200	17,276,800	8,638,400
5-Yr Avg.	129,576,000 gallons / 15 landfills / 5 years ==> **1,727,700 gallons/landfill/year**				

Note: Estimates developed from information provided in: RCRA Docket Information Center, Office of Solid Waste, pursuant to the Notice of Data Availability and Request for Comment on the newly listed Petroleum Refinery Wastes (K169-K172)

Table 4-10 presents the expected and conservative case average annual quantities of leachate and condensate managed for each management practice. The average leachate and condensate quantities for the 5-year expected case from highest to lowest amount are the following:

- 5.0 million gallons per year per landfill discharge via a NPDES-permitted outfall (only one data point),
- 4.2 million gallons per year per landfill discharged to a POTW,
- 2.0 million gallons per year per landfill trucked to an off-site POTW,
- 1.6 million gallons per year per landfill for which a portion is trucked and the remainder is recirculated,
- 0.6 million gallons per year per landfill that is recirculated, and
- less than 0.2 million gallons per year per landfill disposed in an on-site evaporation pond (only one data point).

The average leachate and condensate quantities for the 10-year conservative case from highest to lowest amount are the following:

- 4.6 million gallons per year per landfill discharge via a NPDES-permitted outfall (only one data point),
- 3.9 million gallons per year per landfill discharged to a POTW,
- 1.8 million gallons per year per landfill trucked to an off-site POTW,
- 1.5 million gallons per year per landfill for which a portion is trucked and the remainder is recirculated,
- 0.5 million gallons per year per landfill that is recirculated, and
- less than 0.2 million gallons per year per landfill disposed in an on-site evaporation pond (only one data point).

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TABLE 4-10. 10-YEAR AND 5-YEAR ANNUAL LEACHATE MANAGEMENT QUANTITIES AND CAPACITIES [1]				
Management Practice	**Cost Component**	**No. of Landfills w/ Quantity Data**	**10-Year Conservative Case Average Annual Quantity**	**5-Year Expected Case Average Annual Quantity**
Trucked to POTW	Leachate Management	15	1,583,600 gal/LF/yr	1,727,700 gal/LF/yr
	Condensate Mgt.	10	211,700 gal/LF/yr	230,900 gal/LF/yr
	Storage Tank Upgrade	10	369,700 gal. capacity/LF	369,700 gal. capacity/LF
	Piping Upgrade	10	23,700 feet/LF	23,700 feet/LF
Truck to POTW/ Recirculate	Leachate Management[2]	7	1,453,900 gal/LF/yr	1,586,100 gal/LF/yr
	Condensate Mgt.	2	1,000 gal/LF/yr	1,100 ga;/LF/yr
	Storage Tank Upgrade	2	375,000 gal. capacity/LF	375,000 gal. capacity/LF
	Piping Upgrade	2	1,300 feet/LF	1,300 feet/LF
	Switch SI to Tank System	1	12,000,000 gal/yr/SI x 1 SI / 7 LFs	12,000,000 gal/yr/SI x 1 SI / 7 LFs
Recirculate	Leachate Recirculated	6	522,500 gal/LF/yr	570.000 gal/LF/yr
	Condensate Recirculated[3]	6	3,300 gal/LF/yr	3,600 gal/LF/yr
	Switch SI to Tank System	2	2,046,700 gal/yr/SI x 2 SI / 11 LFs	2,046,700 gal/yr/SI x 2 SI / 11 LFs
POTW	Discharge to POTW	10	3,869,600 gal/LF/yr	4,221,400 ga;/LF/yr
NPDES	NPDES Discharge	1	4,620,000 gal/LF/yr	5,040,000 gal/LF/yr
	Switch SI to Tank System	4	4,073,300 gal/yr/SI x 4 SI / 5 LFs	4,073,300 gal/yr/SI x 4 SI / 5 LFs
Evaporation Pond	Switch SI to Tank System	1	200,000 gal/yr/SI x 1 SI / 1 LF	200,000 gal./yr/SI x 1 SI / 1 LF

[1] Tables 4-8 and 4-9 demonstrate how the average annual leachate and condensate quantities are calculated. Tank capacities, piping lengths, and surface impoundment capacities are calculated as simple averages.

[2] Leachate volume data provided by BFI did not indicate what percentage of the volume is recirculated and what percentage is trucked off site a POTW. A 50/50 split was assumed for the BFI sites.

[3] One site trucks 500 gallons of condensate to an off-site POTW, yet, recirculates 35,000 gallons per month of leachate. EPA assumes this landfill will begin recirculating its condensate to avoid tank storage capacity and pipe upgrade and commercial hazardous wastewater treatment costs.

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Baseline Leachate Management Costs

Baseline (current) leachate and condensate management cost data were provided by BFI and WMX. These data were assumed to be representative, and used to develop average unit cost estimates on a per year per landfill basis for each leachate management practice. Average leachate management costs from most to least expensive management practice were estimated as follows: truck to an off-site POTW ($0.07/gallon), truck a portion to an off-site POTW and recirculate the remaining fraction ($0.05/gallon), discharge to an NPDES outfall ($0.04/gallon; one data point), discharge to POTW ($0.03/gallon), recirculate ($0.01/gallon), and evaporation pond (cost data not provided). Industry-provided unit costs decline in trend that one would expect given the nature of the activities involved. We assume that the unit costs provided in industry comments are reasonable for trucking leachate to an off-site POTW and upgrading tanks and pipelines (Table 4-11). For this analysis, the Agency used unit cost estimates derived from industry cost data to estimate baseline leachate management costs.

For unlined surface impoundments, the Agency estimated baseline management unit costs (Table 4-11). Three landfill owners provided estimates of the leachate volumes they manage in impoundments (20,000 gallons/year, 200,000 gallons/year, and 12,000,000 gallons/year). The average of the three reported leachate volumes is 4,073,333 gallons per year.

When estimating the size of the impoundments for developing cost estimates, the Agency assumed a two-day retention time and 365 operating days per year for the equalization, treatment, or temporary storage impoundments which result in the following capacities: 110 gallons, 1,100 gallons, and 65,750 gallons. Assuming a leachate density similar to water (7.48 gallons per cubic foot), an impoundment depth of 8 feet, and a conversion factor of 43,560 square feet per acre results in the following impoundment sizes for the three leachate generation rates: 0.00004 acres, 0.0004 acres, and 0.024 acres. In developing the baseline cost estimate the agency assumed a minimum size of 0.1 acres (66' x 66' x 8') which allows for more than a magnitude of error in the sizing assumptions. Baseline unlined impoundment cost estimates include excavation and indirect costs (e.g., engineering, contractor's overhead and profit, and contingency) and are annualized over the 20-year remaining operating life of the landfill and the 10-year conservative case and 5-year expected case RCRA-regulated life of the landfill.[52,53]

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52 Used baseline cost estimates developed for the EPA/OSW, *Cost and Economic Impact Analysis of Listing Hazardous Wastes from the Organic Dye and Pigment Industries*, November 28, 1994, for unlined surface impoundments. Inflated the cost estimate to 1998 dollars assuming a 5 percent annual inflation rate.

53 EPA/OSW, *Additional Listing Support Analysis for the Petroleum Listing Determination*, February 26, 1998, based on the municipal landfill survey conducted by OSW in 1986, as reported in "National Survey of Solid Waste (Municipal) Landfill Facilities", EPA/530-SW88-034, September 1988. The average age of a facility (from the year waste was first placed in the landfills to the time of survey) is 18.6 years (including closed and active units) and the average remaining life of a facility (from the time of survey to the year landfills were expected to be filled) is 21.3 years (including active and planned units).

US EPA ARCHIVE DOCUMENT

TABLE 4-11. SUMMARY OF LEACHATE MANAGEMENT UNIT COSTS (1998 $)		
Management Practice	**Industry Unit Costs**	**Agency Unit Costs**
Truck and Discharge in POTW	0.0703/gallon of leachate 0.0603/gallon of condensate	---
Nonhazardous POTW Discharge Fee	(assume $0.0015/gallon POTW discharge fee per Agency estimate)	$1.50/1000 gallons[1]
Transportation to POTW (0-200 mi)	$0.0688/gallon of leachate (foot) $0.0588/gallon of condensate	flat fee of $732.32 per shipment[1] / 6,000 gallon tanker = $0.12/gallon
Transportation to POTW 200+ miles	---	$2.48/mile[1] 6,000 gal tanker and 250 miles = $0.10/gal.
Hazardous POTW/ TSD Discharge/ Disposal Fee	$1.75/gallon[2]	$2.96/gallon[1]
Unlined Surface Impoundment (0.1ac.)	---	$6,000/SI[4] ($600/yr; $900/yr; 1,500/yr)[3]
Closure of Unlined Surface Impoundment (0.1 acres, 0.1% solids collected for 20 years) and Installation of Tank System with Annual Sludge Removal MT = metric ton	---	$173,400/SI ($16,400/yr; $24,700/yr; $42,400/yr)[3] Closure Sludge Removal: $17.69/MT[4] ($1.67/MT/yr; $2.52/MT/yr; $4.31/MT/yr)[3] New Tank System:[5] 0-350 MT/yr: $5,000/yr; $6,000/yr; $8,000/yr[10] capital - $22,600 initial O&M - $2,900/yr 5-yr O&M - $300/5-yr closure - $33,500 after 20 years 1,040-2,420 MT/yr: $5,900/yr; $7,200/yr; $9,800/yr[10] capital - $29,900 initial O&M - $3,100/yr 5-yr O&M - $800/5-yr closure - $35,600 after 20 years 43,200-69,130 MT/yr: $27,500/yr;$35,500/yr; $51,700/yr[10] capital - $209,600 initial O&M - $7,600/yr 5-yr O&M - $13,900/5-yr closure - $99,800 after 20 years Annual Sludge Removal: $460/MT[4] removal - $7/MT transportation - $28/MT treatment - $425/MT

Continued...

US EPA ARCHIVE DOCUMENT

TABLE 4-11. SUMMARY OF LEACHATE MANAGEMENT UNIT COSTS (1998 $)		
Management Practice	**Industry Unit Costs**	**Agency Unit Costs**
Storage Tank Upgrade	*Upgrade Existing Tank System w/ Secondary Containment ($98):* [6,8] Capacity — Annual Cost 750 gal — $200/yr 20,000 gal — $5,200/yr *Assume New Tank Systems ($98):* [6,8] Capacity — Annual Cost 48,000 gal — $4,500/yr --- 150,000 gal — $38,900/yr 178,000 gal — $46,200/yr 250,000 gal — $649,000/yr [7] 280,000 gal — $72,700/yr 500,000 gal — $130,000/yr 1,000,000 gal — $260,000/yr 2,000,000 gal — $520,000/yr	*Upgrade Existing Tank System w/ Secondary Containment ($98):* [5,8] Capacity — Annual Cost 500 gal — $1,000/yr 20,000 gal — $6,700/yr *Assume New Tank Systems ($98):* [5,8] Capacity — Annual Cost 50,000 gal — $22,900/yr 75,000 gal — $27,500/yr 125,000 gal — $34,700/yr 3 - 50,000 gal tanks — $68,700/yr 2 -125,000 gal tanks — $69,400/yr 2 -125,000 gal tanks — $69,400/yr 4 - 125,000 gal tanks — $138,800/yr 8 - 125,000 gal tanks — $277,600/yr 16 - 125,000 gal tanks — $555,200/yr
Piping Upgrade	Upgrade Piping System ($98): [6] Unit Cost = $20/foot	Install Double-Walled Fiber Reinforced Plastic Piping ($97): For verification of industry unit cost estimate assume 4" diameter piping. Unit costs include material and labor. [9] 25' lengths = $8.40/ft 1 elbow/25' length = $142 ea/25' = $5.68/ft Subtotal $14.08/ft Overhead and Profit @ 30% $ 4.22/ft Subtotal $18.30/ft Contingencies @ 10% $ 1.83/ft Total $20.13/ft
Truck to POTW	0.0703/gallon of leachate (nonhaz.) 0.0603/gallon of condensate (nonhaz.) tank upgrade = $1,017,000/LF pipe upgrade = $473,000/LF	1.853 - 3.063/gallon of leachate (haz.) 1.853 - 3.063/gallon of leachate (haz.) — —
Truck to POTW/ Recirculate	0.0474/gallon of leachate 0.0800/gallon of condensate tank upgrade = $1,050,000/LF pipe upgrade = $25,000/LF ---	1.853 - 3.063/gallon of leachate (haz.) 1.853 - 3.063/gallon of leachate (haz.) — — switch SI to tank = $479,400/SI ($45,200/yr; $61,400/yr; 93,500/yr)[10]
Recirculate	$0.013/gallon of leachate $0.040/gallon of condensate ---	--- --- switch SI to tank = $136,500/SI ($12,900/yr; $17,500/yr; $26,600/yr)[10]

US EPA ARCHIVE DOCUMENT

TABLE 4-11. SUMMARY OF LEACHATE MANAGEMENT UNIT COSTS (1998 $)		
Management Practice	**Industry Unit Costs**	**Agency Unit Costs**
POTW	$0.031/gallon of leachate	---
		Continued...
NPDES Discharge	$0.040/gallon of leachate ---	--- switch SI to tank = $173,400/SI ($16,400/yr; $24,700/yr; $42,400/yr)[10]
Evaporation Pond	---	switch SI to tank = $110,200/SI ($10,400/yr; $14,100/yr; $21,500/yr)[10]

1 R.S. Means, Environmental Remediation Cost Data, 4th Annual Edition (1998).

2 Back-calculated from a Browning-Ferris Industries estimate of $52 million per year in total O&M compliance costs to treat leachate from landfills that have received any petroleum wastes (Comments received by the RCRA Docket Information Center, Office of Solid Waste pursuant to the Notice of Data Availability and Request for Comment on the newly listed Petroleum Refinery Wastes (K169-K172); PR3A-00008).

3 Annualized inflated cost assuming a discount rate of seven percent over 20 years, 10 years, and 5 years and a no salvage value, respectively (i.e., capital recovery factors of 0.09439, 0.14238, and 0.24389, respectively).

4 Inflated cost in the EPA/OSW, *Cost and Economic Impact Analysis of Listing Hazardous Wastes from the Organic Dye and Pigment Industries*, November 28, 1994, assuming a 5 percent annual inflation rate.

5 Inflated cost in the EPA/OSW/EMRAD, *Background Documents for the Cost and Economic Impact Analysis of Listing Four Petroleum Refining Wastes as Hazardous Under RCRA Subtitle C*, January 10, 1998, pp. 3-43 and 3-44, assuming a 5 percent annual inflation rate.

6 Average of industry provided values in cost analysis excluding the noted outlier.

7 This data point is assumed to be an outlier and not included in developing average unit costs.

8 Annualized inflated cost assuming a discount rate of seven percent over 20 years and no salvage value for the purpose of comparing cost estimates (i.e., capital recovery factor of 0.09439).

9 Unit cost obtained from R.S. Means, Site Work and Landscape Cost Data, 16th Annual Edition (1997).

10 Annualized inflated cost assuming a discount rate of seven percent over 20 years with no salvage value, 10 years with a 10 percent salvage , and 5 years with a 20 percent salvage value, respectively (i.e., capital recovery factors of 0.09439, 0.14238, and 0.24389, respectively).

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Table 4-12 shows how we calculated the annual baseline operation and maintenance (O&M) costs per landfill. The 10-year conservative leachate generation case is used as an example assuming a seven percent discount rate, the upper end unit cost estimate for off-site hazardous wastewater POTW management of $3.063 per gallon (1998 $), and a 10-year amortization of O&M costs. Table 4-13 presents the estimated baseline unit cost per landfill per year for each leachate management practice based on a 5-year, 10-year, and 20-year period of amortization of costs to reflect the period under RCRA regulation and the remaining life of the landfill.

Compliance Management Practices

Under the Standard Listing regulatory option, the leachate collected from landfill cells that received these two waste streams would be managed according to the requirements specified under Subtitle C of RCRA. Under Subtitle C, leachate trucked off site must be managed at a RCRA permitted treatment, storage, or disposal (TSD) facility. The practice of recirculating leachate back into landfills is exempt from Subtitle C regulation because it is never considered by the Agency to be managed. Discharging directly to a POTW via a sewer is exempt from RCRA regulation and subject to CWA and local regulation. Discharging directly to a POTW via a "hardpipe" is subject to RCRA regulations and alternative management practices such as trucking off site, recirculating, or discharging via a sewer or an NPDES permitted outfall will need to be implemented. Tank and piping systems must meet the design requirements specified under 40 CFR 262 (accumulation) and 264 (storage) unless exempted as a wastewater treatment tank regulated under the Clean Water Act. In addition, surface impoundments must meet the design requirements under 40 CFR 264 and associated land disposal restriction (LDR) pretreatment requirements. Therefore, the Agency assumes that wastewater treatment tank systems will be constructed to replace impoundments to avoid RCRA Subtitle C regulation.

Under the Clean Water Act Exemption regulatory option, the Agency would exempt the leachate from being regulated as hazardous under Subtitle C if it is appropriately managed in tank systems under the Clean Water Act (including POTWs) or through recirculation. If the leachate is managed in a surface impoundment it is subject to regulation under Subtitle C and the Agency assumes that wastewater treatment tank systems will be constructed to avoid Subtitle C regulation. The Agency assumes landfill operators will have the tank systems constructed and ready for operation at the end of the two-year deferment period. The Agency assumes that landfill operators will close their impoundments within the next two years to avoid Subtitle C regulation and triggering corrective action.

Under a No List regulatory option, leachate quantities generated at MSW landfills would continue to be regulated under Subtitle D of RCRA and leachate quantities generated at industrial waste landfills would be subject to state and local regulations. However, the Agency currently is developing design and operating criteria under Subtitle D for industrial waste landfills. No changes in management practice would be required under a no list decision.

The Agency conducted queries of the 1995 Biennial Report System (BRS) National Oversight Database on the EPA waste code F039 pertaining to its current generation and management. The EPA code F039 is defined as leachate resulting from the treatment, storage, or disposal of more than one EPA listed waste. How this waste is managed represents an approximation of how the municipal and industrial landfills will manage leachate derived from the two paint wastes under Subtitle C of RCRA.

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In 1995, a total of 161 large quantity generators (LQGs) reported generating only a F039 waste. The number increases to 231 if the query includes all LQGs that reported generating multiple EPA-code wastes where F039 is one of the codes included in the list. The 161 LQGs reported managing all or a portion of their F039-only leachate quantity through on or off-site recovery (8% of LQGs), thermal destruction (50%), aqueous treatment (62%), sludge and other treatment (35%), and disposal (50 %) practices. Table 4-14 presents the distribution of reported management practices for F039 hazardous leachate.

In 1995, a total of 51 hazardous waste treatment, storage, and disposal (TSD) facilities reported receiving F039-only waste. These TSDs report managing all or a portion of the F039-only leachate received using recovery (3 TSDs), thermal destruction (19 TSDs), aqueous treatment (8 TSDs), sludge and other treatment (11 TSDs), and landfill disposal (10 TSDs) practices.

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TABLE 4-12. 10-YEAR CONSERVATIVE LEACHATE GENERATION CASE: ANNUALIZED O&M COST CALCULATION EXAMPLE FOR TRUCKING TO AN OFF-SITE POTW/TSD FACILITY (MILLION 1998$)

	1999 (100%)	2000 (90%)	2001 (80%)	2002 (70%)	2003 (60%)	2004 (50%)	2005 (40%)	2006 (30%)	2007 (20%)	2008 (10%)
Leachate Quantity for 15 LF (gal)	43,192,000	38,872,800	34,553,600	30,234,400	25,915,200	21,596,000	17,276,800	12,957,600	8,638,400	4,319,200
Baseline O&M Cost ($0.070/gal)	$3.04	$2.73	$2.43	$2.13	$1.82	$1.52	$1.21	$0.91	$0.61	$0.30
Baseline PW (million $)[1]	$3.04	$2.55	$2.12	$1.74	$1.39	$1.08	$0.81	$0.57	$0.35	$0.17
Baseline O&M Cost	(Total Present Worth / 15 landfills) * (10-Yr Capital Recovery Factor) = ($13.81 / 15 landfills) * 0.14238 = **$0.13/landfill/year**									
Compliance O&M Cost ($3.063/gal)	$132.31	$119.08	$105.85	$92.62	$78.39	$66.16	$52.93	$39.69	$26.46	$13.23
Compl. PW (million $)[1]	$132.31	$111.29	$92.45	$75.61	$60.57	$47.17	$35.27	$24.72	$15.40	$7.20
Compl. O&M Cost[1]	(Total Present Worth / 15 landfills) * (10-Yr Capital Recovery Factor) = ($601.99 / 15 landfills) * 0.14238 = **$5.71/landfill/year**									
Incremental O&M Cost ($2.993/gal)	$129.28	$116.35	$103.42	$90.49	$77.57	$64.64	$51.71	$38.78	$25.85	$12.93
Incr. PW (million $)[1]	$129.28	$108.74	$90.33	$73.87	$59.18	$46.09	$34.46	$24.15	$15.05	$7.03
Increment. O&M Cost[1]	(Total Present Worth / 15 landfills) * (10-Yr Capital Recovery Factor) = ($588.17 / 15 landfills) * 0.14238 = **$5.58/landfill/year**									

[1] A discount rate of 7 percent is assumed.

Source: Data from Table 4-8 and 4-11.

US EPA ARCHIVE DOCUMENT

TABLE 4-13. BASELINE UNIT COST DATA (MILLION 1998$/LANDFILL/YEAR)

Management Practice	Cost Component	No. of Landfills w/ Cost Data	5-Year Amortization	10-Year Amortization	20-Year Amortization	
			5-Year Expected Generation Case	10-Year Conservative Generation Case	5-Year Expected Generation Case	10-Year Conservative Generation Case
Trucked to POTW	Leachate Management [1]	15	$0.14	$0.13	$0.05	$0.09
	Condensate Management [1]	10	$0.02	$0.02	$0.01	$0.01
TOTAL UNIT COST			$0.15	$0.15	$0.06	$0.10
Truck to POTW/ Recirculate	Leachate Management [1]	7	$0.08	$0.08	$0.03	$0.05
	Condensate Management [1]	2	$0.00	$0.00	$0.00	$0.00
	Switch SI to Tank System [2]	0	$0.00 ($0.001/yr/SI x 1 SI/ 7 LF)	$0.00 ($0.001/yr/SI x 1 SI/ 7 LF)	$0.00 ($0.001/yr/SI x 1 SI/ 7 LF)	
TOTAL UNIT COST			$0.08	$0.08	$0.03	$0.05
Recirculate	Leachate Recirculation [1]	6	$0.01	$0.01	$0.00	$0.01
	Condensate Recirculation [1]	6	$0.00	$0.00	$0.00	$0.00
	Switch SI to Tank System [2]	0	$0.00 ($0.001/yr/SI x 2 SI/ 11 LF)	$0.00 ($0.001/yr/SI x 2 SI/ 11 LF)	$0.00 ($0.001/yr/SI x 2 SI/ 11 LF)	
TOTAL UNIT COST			$0.01	$0.01	$0.00	$0.01
POTW	Discharge to POTW [1]	10	$0.15	$0.14	$0.06	$0.09
NPDES	NPDES Discharge [1]	1	$0.23	$0.22	$0.09	$0.14
	Switch SI to Tank System [2]	0	$0.001 ($0.001/yr/SI x 4 SI/ 5 LF)	$0.001 ($0.001/yr/SI x 4 SI/ 5 LF)	$0.001 ($0.001/yr/SI x 4 SI/ 5 LF)	
TOTAL UNIT COST			$0.23	$0.22	$0.09	$0.14

US EPA ARCHIVE DOCUMENT

TABLE 4-13. BASELINE UNIT COST DATA (MILLION 1998$/LANDFILL/YEAR)

Management Practice	Cost Component	No. of Landfills w/ Cost Data	5-Year Amortization	10-Year Amortization	20-Year Amortization	
			5-Year Expected Generation Case	10-Year Conservative Generation Case	5-Year Expected Generation Case	10-Year Conservative Generation Case
Evaporation Pond	Switch SI to Tank System [2]	0	$0.001 ($0.001/yr/SI x 1 SI/ 1 LF)	$0.001 ($0.001/yr/SI x 1 SI/ 1 LF)	$0.001 ($0.001/yr/SI x 1 SI/ 1 LF)	

[1] Landfill unit costs are calculated by multiplying the leachate quantity in Table 4-10 by the baseline (nonhazardous) unit cost in Table 4-12 times the capital recovery factor (CRF) for the amortization period.

[2] Landfill unit costs are calculated by multiplying the unlined surface impoundment unit cost in Table 4-12 by the expected probability a landfill will operate a surface impoundment in their leachate management practice times the CRF for the amortization period.

5-year CRF = 0.24389 assuming a 7 percent discount rate.
10-year CRF = 0.14238 assuming a 7 percent discount rate.
20-year CRF = 0.09439 assuming a 7 percent discount rate.

Source: Data from Table 4-8 through 4-11.

Table 4-14. Distribution of Management Practices for 161 LQGs of F039-Only Hazardous Leachate in 1995		
Management Practice	**Number of LQGs**	**Percent**
Recovery		
Metal Recovery	4	2.5%
Other Recovery	9	5.6%
SUBTOTAL	13	**8.1%**
Thermal Destruction		
Incineration	72	44.7%
Energy Recovery	5	3.1%
Fuel Blending	4	2.5%
SUBTOTAL	81	**50.3%**
Aqueous Treatment		
Aqueous Inorganic Treatment	17	10.6%
Aqueous Organic Treatment	61	37.9%
Aq. Inorganic and Organic Treatment	22	13.7%
SUBTOTAL	100	**62.1%**
Sludge and Other Treatment		
Stabilization	25	15.5%
Other Treatment	31	19.3%
SUBTOTAL	56	**34.8%**
Disposal		
Landfill	43	26.7%
Deep Well Injection	28	17.4%
Direct Discharge to POTW	4	2.5%
Direct Discharge to NPDES Outfall	1	0.6%
Other Disposal	4	2.5%
SUBTOTAL	80	**49.7%**
Unknown Management		
Transfer Facility	35	21.7%
No Reported Management Code	11	6.8%
SUBTOTAL	46	**28.6%**

Note: Estimates developed from information provided in: RCRA Docket Information Center, Office of Solid Waste, pursuant to the Notice of Data Availability and Request for Comment on the newly listed Petroleum Refinery Wastes (K169-K172)

US EPA ARCHIVE DOCUMENT

Compliance Leachate Management Costs

We derived cost estimates for compliance management and transportation activities using unit costs from R.S. Means, Environmental Remediation Cost Data, 4th Annual Edition (1998), annualized costs developed in the previously proposed organic dye and pigment hazardous waste listings (K162-K166), and the recent final listing of four petroleum refining waste streams (K069-K172). Table 4-15 presents the estimated compliance unit capital and O&M costs per landfill per year for each leachate management practice based on a 5-year, 10-year, and 20-year period of amortization of costs to reflect the period under RCRA regulation and the remaining life of the landfill. Additional unit cost data on a per gallon, mile, or metric ton basis used to derive these compliance per landfill unit costs are presented in Table 4-11.

Because there are fewer commercial treatment/POTW facilities permitted to receive manifested hazardous wastewaters (i.e., leachate), total transport distances are assumed to increase with the promulgation of the rule from 50 miles to 200 miles. A range of unit costs for management in a commercial POTW ($1.75 - $2.96/gallon) are used in the cost estimate. The lower-end unit cost reflects the potential discounts a landfill operator may receive as a steady customer. The upper-end unit cost reflects the typical unit cost currently paid by remediation firms on a one-time basis.

Costs for replacing an unlined surface impoundment with a tank system were approximated using estimates developed in previous EPA hazardous waste listings.[54] The cost for closure of an existing unlined impoundment (prior to expiration of the two-year deferral date) includes pumping free liquid from the impoundment, pumping sludge (20 years accumulation) from the impoundment, transportation and disposal of sludge at a POTW, excavation of two-feet of contaminated soil, transportation and disposal of contaminated soil at a Subtitle D municipal landfill, and indirect costs (e.g., contractor's overhead and profit and contingency). The Agency assumed the leachate contained 0.1 percent solids and a collection efficiency of 50 percent for estimating sludge generation amounts. The costs for sludge management assume transportation and disposal at a POTW. Compliance one-time costs estimated for impoundment closure are annualized over a 20-year operating life and the 10-year conservative case and 5-year expected case RCRA-regulated life of the landfill.[55]

For tank systems, the Agency assumed a cone-roofed carbon steel tank with a two-day retention time capacity is installed, including site work, piping, foundation and supports, and indirect costs (e.g., engineering, contractor's overhead and profit, and contingency).[56] Compliance costs includes removing sludge from the tank and managing it as a hazardous waste (even though the Agency has yet to list this wastewater treatment sludge as hazardous). The Agency assumed the leachate contained 0.1 percent solids and a collection efficiency of 50 percent for estimating

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54 Note: Costs were inflated to 1998 dollars using a simple 5 percent annual inflation rate.

55 Used compliance cost estimates presented in the EPA/OSW, *Cost and Economic Impact Analysis of Listing Hazardous Wastes from the Organic Dye and Pigment Industries*, November 28, 1994, for unlined surface impoundments inflated to 1998 dollars assuming a 5 percent annual inflation rate.

56 Used compliance cost estimates presented in the EPA/OSW/EMRAD, *Background Documents for the Cost and Economic Impact Analysis of Listing Four Petroleum Refining Wastes as Hazardous Under RCRA Subtitle C*, January 10, 1998, pp. 3-44, for tank system costs inflated to 1998 dollars assuming a 5 percent annual inflation rate.

US EPA ARCHIVE DOCUMENT

sludge generation amounts. The costs for sludge management include sludge removal, transportation and hazardous waste landfill disposal.[57]

[57] Used compliance cost estimates presented in the EPA/OSW, *Cost and Economic Impact Analysis of Listing Hazardous Wastes from the Organic Dye and Pigment Industries*, November 28, 1994, for sludge removal, transportation and management inflated to 1998 dollars assuming a 5 percent annual inflation rate.

US EPA ARCHIVE DOCUMENT

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TABLE 4-15. COMPLIANCE UNIT COST DATA (MILLION 1998$/LANDFILL/YEAR)

Management Practice	Cost Component	No. of Landfills w/ Cost Data	5-Year Amortization	10-Year Amortization	20-Year Amortization	
			5-Year Expected Generation Case	10-Year Conservative Generation Case	5-Year Expected Generation Case	10-Year Conservative Generation Case
Trucked to POTW	Leachate Management [1]	15	$3.58 - $5.92	$3.46 - $5.71	$1.39 - $2.29	$2.29 - $3.79
	Condensate Management [1]	10	$0.48 - $0.79	$0.46 - $0.76	$0.18 - $0.31	$0.31 - $0.51
	Tank Upgrade [2]	10	$0.20	$0.13	$0.10	
	Piping Upgrade [2]	10	$0.09	$0.06	$0.04	
TOTAL UNIT COST			$4.35 - $7.00	$4.13 - $6.69	$1.71 - $2.74	$2.74 -$4.44
Truck to POTW/ Recirculate	Leachate Management [1]	7	$3.29 - $5.43	$3.17 - $5.24	$1.27 - $2.10	$2.10 - $3.48
	Condensate Management [1]	2	$0.00 - $0.00	$0.00 - $0.00	$0.00 - $0.00	$0.00 - $0.00
	Tank Upgrade [2]	2	$0.20	$0.13	$0.10	
	Piping Upgrade [2]	2	$0.00	$0.00	$0.00	
	Switch SI to Tank System [3]	0	$0.013 ($0.094/yr/SI x 1 SI/ 7LF)	$0.009 ($0.061/SI/yr x 1 SI/ 7LF)	$0.006 ($0.045/SI/yr x 1 SI/ 7LF)	
TOTAL UNIT COST			$3.50 - $5.64	$3.31 - $5.38	$1.38 - $2.21	$2.21 - $3.59
Recirculate	Leachate Recirculation	6	Same as Baseline			
	Condensate Recirculation	6	Same as Baseline			
	Switch SI to Tank System [3]	0	$0.005 ($0.027/yr/SI x 2 SI/ 11LF)	$0.003 ($0.018/yr/SI x 2 SI/ 11LF)	$0.002 ($0.013/yr/SI x 2 SI/ 11LF)	
TOTAL UNIT COST			$0.02	$0.01	$0.00	$0.01
POTW	Discharge to POTW	10	Same as Baseline			
NPDES	NPDES Discharge	1	Same as Baseline			

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TABLE 4-15. COMPLIANCE UNIT COST DATA (MILLION 1998$/LANDFILL/YEAR)

Management Practice	Cost Component	No. of Landfills w/ Cost Data	5-Year Amortization	10-Year Amortization	20-Year Amortization	
			5-Year Expected Generation Case	10-Year Conservative Generation Case	5-Year Expected Generation Case	10-Year Conservative Generation Case
	Switch SI to Tank System [3]	0	$0.034 ($0.042/yr/SI x 4 SI / 5 LF)	$0.020 ($0.025/yr/SI x 4 SI / 5 LF)	$0.013 ($0.016/yr/SI x 4 SI / 5 LF)	
TOTAL UNIT COST			$0.26	$0.24	$0.10	$0.15
Evaporation Pond	Switch SI to Tank System [3]	0	$0.022 ($0.022/yr/SI x 1 SI / 1 LF)	$0.014 ($0.014/yr/SI x 1 SI / 1 LF)	$0.010 ($0.010/yr/SI x 1 SI / 1 LF)	
RCRA	Administrative Costs - Off-site Management		$0.004	$0.003	$0.001	$0.002
RCRA	Administrative Costs - On-site Management		$0.001	$0.001	$0.000	$0.000

[1] Landfill unit costs are calculated by multiplying the leachate quantity in Table 4-10 by the compliance (hazardous) unit cost in Table 4-11 times the capital recovery factor (CRF) for the amortization period.

[2] Landfill unit costs are calculated by multiplying the tank upgrade or piping upgrade unit cost in Table 4-11 times the CRF for the amortization period and assuming that after 20 years the tanks have no salvage value, after 10 years the tanks have a 10 percent salvage , and after 5 years the tanks have a 20 percent salvage value. The unit costs are adjusted accordingly to account for the salvage value of the tank system at the end of the amortization period.

[3] Landfill unit costs are calculated by multiplying the closure unlined surface impoundment and installation of new tank unit cost in Table 4-11 by the expected probability a landfill will operate a surface impoundment in their leachate management practice times the CRF for the amortization period.

5-year CRF = 0.24389 assuming a 7 percent discount rate.
10-year CRF = 0.14238 assuming a 7 percent discount rate.
20-year CRF = 0.09439 assuming a 7 percent discount rate.

Source: R.S. Means, Environmental Remediation Cost Data, 4th Annual Edition (1998)

RCRA Compliance

Facilities generating the proposed waste listings are subject to Part 262 of RCRA. Compliance activities for Part 262 are briefly described below.

RCRA Part 262 standards regulate generators of hazardous waste. All facilities producing a newly listed waste will be subject to this standard. There are four primary requirements specified in the Part 262 standards. First, plants generating hazardous waste must obtain an EPA identification number. Second, an approved manifest system must be established for those facilities shipping wastes off site. Third, before transporting hazardous waste off site, a series of pre-transport requirements must be satisfied such as labeling, marking, and placarding. Fourth, specified record keeping and reporting rules are applicable (see Table 4-10 for unit cost estimates).

In completing this analysis it is assumed that RCRA Part 262, accumulation tank design standards are applicable. Part 264 addresses standards for owners and operators of hazardous waste treatment, storage and disposal facilities. For purposes of developing a cost estimate, it is assumed that wastewater treatment tank systems constructed to replace surface impoundments will be designed to meet Part 264 design requirements even though they are excluded as being regulated under CWA. Part 270 (i.e., permitting) applies to facilities with on-site treatment units subject to Part 264. It is assumed no permitting is required for existing or future units because of the wastewater treatment tank exemption under RCRA and that tanks will be operated under the accumulation standards. Part 270 permitting standards are not applicable.

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Table 4-16. RCRA Administrative Costs (1998 Dollars) [1]

RCRA Part	Activity	Initial Items	Initial Cost	Periodic Items	Periodic Cost
262	Generator Requirements: New listing (i.e., facility currently a hazardous waste generator) and new wastes managed off-site	Assess current waste generation and management practices, evaluate regulations listing the new wastes, and review procedures for packaging and labeling	$1,200	Additional time for completing manifest for newly listed wastes, packaging and marking, and annual portion of biennial report	$1,000/yr
262	Generator Requirements: New listing and all new wastes managed on-site	Assess current waste generation and management practices, evaluate regulations listing the new wastes, and review procedures for packaging and labeling	$1,000	Additional time for annual portion of biennial report	$0/yr [2]
262	Generator Requirements: First listing (i.e., facility not currently a hazardous waste generator) and new wastes managed off-site	Become aware of and understand responsibilities under regulations, assess current waste generation and management practices, obtain EPA ID number, review and determine applicable DOT requirements, develop procedures for manifesting, packaging, and labeling, and purchase file cabinet for storing manifests and reports	$2,700	Complete manifest, packaging and labeling of hazardous waste for off-site shipment, annual portion of biennial report, and filing exception report	$1,700/yr
262	Generator requirements: First listing and all new wastes managed on-site	Become aware of and understand responsibilities under regulations, assess current waste generation and management practices and obtain EPA ID number	$1,600	Annual portion of biennial report	$200/yr

[1] Source: *Cost and Economic Impact Analysis of Listing Hazardous Wastes from the Organic Dye and Pigment Industries*, OSW/EPA, November 28, 1994.
Costs inflated assuming a simple 5 percent annual inflation rate.
[2] Results presented here due to rounding to the nearest hundred dollars.

Incremental Compliance Costs

Incremental compliance unit costs per landfill per year are presented in Table 4-17. These unit costs are multiplied by the number of affected landfills in each leachate management category to derive total incremental compliance costs.

Total incremental compliance costs for the projected 255 to 341 affected landfills that received these two waste streams are presented in Table 4-18. Overall, total cost impacts to the affected landfills are estimated to range from $176 to $979 million per year over a 5- to 10-year period under the Standard Listing regulatory option accounting for uncertainty in the amount of hazardous leachate generated, the amortization period chosen by landfill operators, the hazardous waste POTW/TSD price, and the number of landfills affected. However, the upper bound may be lower as the result of possible savings gained through contract negotiations for repeat customers who provide consistent revenue streams to shipping companies through their regularly scheduled shipments of leachate. It also is likely that not all landfills that received paint wastes in 1998 have leachate collection systems which would lower the cost estimates. Finally, there should be some overlap from paint facilities disposing in the same landfill. This would result in lower aggregate leachate management costs for the landfill industry as fewer facilities may be impacted. Expected total cost impacts for the Standard Listing regulatory option are estimated assuming the expected leachate generation case, a 5-year amortization period, the industry-expected hazardous POTW/TSD price of $1.75 per gallon, and 255 affected landfills. This results in total cost impact of approximately $448 million per year over a 5-year period.

Incremental costs are estimated to be approximately $300,000 to $400,000 annually for the Clean Water Act Exemption with Two-Year Impoundment Replacement Deferral regulatory option (the Agency's proposed option), with between 35 and 48 of the affected landfills expected to currently operate a surface impoundment. A 20-year amortization period over the remaining life of the landfill is assumed in this case given the significantly lower operation and maintenance costs involved.

Finally it is important to note that the costs presented in this analysis do not include costs for the Agency's proposed addition of Acrylamide and Styrene to uniform treatment standards (UTS) and F039. The addition of these constituents could result in additional costs to the landfill industry. The Agency recognizes the potential for additional indirect costs associated with this action. The scope of this analysis, however, does not facilitate the quantification of these potential impacts.

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TABLE 4-17. INCREMENTAL UNIT COST DATA (MILLION 1998$/LANDFILL/YEAR) [1]				
Management Practice	**5-Year Amortization**	**10-Year Amortization**	**20-Year Amortization**	
	5-Year Expected Generation Case	**10-Year Conservative Generation Case**	**5-Year Expected Generation Case**	**10-Year Conservative Generation Case**
Trucked to POTW	$4.20 - $6.85	$3.98 - $6.54	$1.65 - $2.68	$2.64 - $4.34
Truck to POTW/ Recirculate	$3.42 - $5.56	$3.23 - $5.30	$1.35 - $2.18	$2.16 - $3.54
Recirculate	$0.01	$0.00	$0.00	0.00
POTW	$0.00	$0.00	$0.00	$0.00
NPDES	$0.03	$0.02	$0.01	$0.01
Evaporation Pond	$0.02	$0.01	$0.01	$0.01

[1] Incremental landfill unit costs are calculated by subtracting the baseline landfill unit costs in Table 4-13 from the corresponding summed compliance and RCRA administrative landfill unit costs in Table 4-15.

Source: Calculated from data presented in previous tables.

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

TABLE 4-18. INCREMENTAL COMPLIANCE COST ESTIMATES FOR LANDFILLS THAT RECEIVED PAINT WASTES (1999$)[1]

	Trucked to POTW	Truck to POTW/Recirc	Recirculate Only	POTW	NPDES	Evaporation Pond	No Leach./ Condensate	Total
Standard Listing Regulatory Option								
Affected Population	79 to 106 LF 0 SI	31 to 41 LF 4 to 6 SI	48 to 65 LF 9 to 12 SI	53 to 70 LF 0 SI	22 to 29 LF 18 to 24 SI	4 to 6 LF 4 to 6 SI	18 to 24 LF 0 SI	255 to 341 LF 35 to 48 SI
Conservative Generation Case:10-Year Amortization								
Incremental Compliance Cost (million $/LF)	$4.08 - $6.70	$3.31 - $5.43	$0	$0	$0.02	$0.01	$0	---
Total Incremental Compliance Cost (million $/year)	$322 - $710	$103 - $222	$0	$0	$0.44 - $0.58	$0.04 - $0.06	$0	$425 - $932
Expected Generation Case:5-Year Amortization								
Incremental Compliance Cost (million $/LF)	$4.31 - $7.02	$3.50 - $5.70	$0.01	$0	$0.03	$0.02	$0	---
Total Incremental Compliance Cost (million $/year)	$340 - $744	$108 - $234	$0.09 - $0.12	$0	$0.54 - $0.72	$0.08 - $0.12	$0	$448 - $979
Conservative Generation Case:20-Year Amortization								
Incremental Compliance Cost (million $/LF)	$2.71 - $4.45	$2.21 - $3.63	$0	$0	$0.01	$0.01	$0	---
Total Incremental Compliance Cost (million $/year)	$214 - $472	$69 - $149	$0	$0	$0.18 - $0.24	$0.04 - $0.06	$0	$283 - $621
Expected Generation Case:20-Year Amortization								

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TABLE 4-18. INCREMENTAL COMPLIANCE COST ESTIMATES FOR LANDFILLS THAT RECEIVED PAINT WASTES (1999$)[1]

	Trucked to POTW	Truck to POTW/Recirc	Recirculate Only	POTW	NPDES	Evaporation Pond	No Leach./ Condensate	Total
Incremental Compliance Cost (million $/LF)	$1.69 - $2.75	$1.38 - $2.23	$0	$0	$0.01	$0.01	$0	---
Total Incremental Compliance Cost (million $/year)	$133 - $292	$43 - $91	$0	$0	$0.18 - $0.24	$0	$0	$176 - $383
Clean Water Act Exemption w/ Two-year Impoundment Replacement Deferral Regulatory Option (Surface Impoundments Converted to Tank Systems)[2]								
Conservative and Expected Generation Case: 20-Year Capital Amortization								
Incremental Compliance Cost (million $/LF)	$0	$0.006	$0.002	$0	$0.012	$0.009	$0	---
Total Incremental Compliance Cost (million $/year)	$0	$0.02 - $0.04	$0.02 - $0.02	$0	$0.22 - $0.29	$0.04 - $0.05	$0	***$0.30 - $0.40***

[1] 1998 cost estimates were inflated to 1999 dollars assuming a 2.5 percent annual inflation rate.

[2] This regulatory option assumes that surface impoundments will be closed prior to 2-year deferment avoiding Subtitle C closure requirements and replaced with newly constructed tank systems with Subtitle C management of collected sludge from tank systems. It assumes that an exemption from Subtitle C regulation is granted up until the point the leachate enters any impoundment structure. The analysis assumes that no off-site POTW currently receiving leachate manages it in an impoundment structure.

Source: Calculated from data presented in previous tables.

5.0 ECONOMIC IMPACT ANALYSIS

The estimated economic impacts from the proposed rule are presented in this chapter. The first section describes the methodology, which is followed by the cost and economic impacts estimates.

5.1 Methodology

General

We conducted an economic assessment of the proposed rulemaking by using the unit management costs presented in Section 4.0 of this report in conjunction with waste generation data from the RCRA 3007 survey, employment data, and average sales per employee data from the Dun and Bradstreet data. All estimates are based on the RCRA 3007 responses indicating the types of wastes facilities generate. The cost estimates for these facilities are then adjusted by the weighting factors described in Section 3, and the extrapolation factor to arrive at aggregate costs for the industry.

Production of Product

Information on sales (value of shipments) and employment size were derived from Dun and Bradstreet data. We divided the value of shipments data by employment to estimate average sales value for each employee and model plant (representative of the size range of each model plant). The sales per employee information was then divided by average industry paint price/unit (derived from the Census Current Industrial Reports). This per employee figure was then multiplied by the reported number of employees per facility to derive total estimated model facility product production. For example, if Duns reported Facility *X* had $1,000 annual sales and employed 10 persons, we estimated revenues to average $100 per employee. If the average product price was estimated at $5 per gallon, the $100 per employee would be divided by the $5 per gallon of product to derive average production per employee of 20 gallons. This figure would then be multiplied by the total reported number of employees per facility. Lacking more detailed industry data, we believe that this approach reflects the most up-to-date average production estimates.

Number of Facilities and Size Distribution

The size distribution of facilities (as proxied by the number of employees), obtained from the Dun and Bradstreet data, is presented in Table 5-1. The facility sizes indicate the overall size distribution of paint manufacturing facilities. Based on the results of the RCRA 3007 survey of the industry, we assume that many of these facilities do not generate the wastes under consideration for this listing. We estimate that a total of 615 facilities[58] could be directly affected by the rule, as proposed.

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[58] The 615 is derived by summing the facility weighting factors for each of the models/facilities generating waste. This totals 358.4. Thus the 151facilities represent 358.4 facilities within the population of facilities from which Dynamac drew their sample. The 358.4 is then scaled up to the whole industry using the 972/566 scaling factor. This results in 614.8 facilities.

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Table 5-1. Derived Distribution of the Total Number of Facilities, by Employment		
Employees Per Facility	**Number of Facilities**	**Percent of Facilities**
1-19	592	61%
20-49	194	20%
50-99	97	10%
100-249	68	7%
250-499	10	1%
> 500	10	1%
Total	**972**	100%
Note: The total number of facilities may not add due to rounding within cells *Sources:* U.S. Census and RCRA 3007 Survey Data		

Waste Generation Rates

Waste generation quantities derived from our RCRA 3007 Survey are summarized in Tables 5-2a and 5-2b below and presented in detail in Appendix Tables 7a and 7b. These tables indicate the amount of waste generated for each of the facilities. In total, the 151 facilities that responded to the survey reported generating approximately 37,628 metric tons of waste in 1998. Applying the weighting and scaling factors to this quantity results in an estimated Universe total of 106,763 metric tons of waste for all paint manufacturers potentially subject to ruler requirements. These waste quantities were applied in the development of facility and Universe cost and economic impact estimates.

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TABLE 5-2A. FACILITY WASTE GENERATION (WASTEWATERS; METRIC TONS)

Waste Generation	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total [1]	Weighted Total [2]	Universe Total [3]
Total	524	9,805	260	61	4	15,465	26,118	46,237	79,403

[1] Numbers may not add due to rounding (Rounding within cells of this and related tables may result in inexact totals)
[2] Unweighted total times weighting factor to arrive at the sampling universe
[3] Weighted total times extrapolation factor 1.7173 (972/566) to arrive at the industry total

Table 5-2b. Facility Waste Generation (Nonwastewaters; Metric Tons)

Waste Generation	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total [1]	Weighted Total [2]	Universe Total [3]
Total	98	38	2,341	3,336	25	1	1,163	965	32	2,585	927	11,510	15,932	27,360

[1] Numbers may not add due to rounding (Rounding within cells of this and related tables may result in inexact totals)
[2] Unweighted total times weighting factor to arrive at the sampling universe
[3] Weighted total times extrapolation factor 1.7173 (972/566) to arrive at the industry total

Estimated Annual Sales

Census data from 1997 were used to derive average annual sales per employee for facilities listed under NAICS 325510; estimates were then updated to 1999 dollars using the GNP implicit price deflator. Estimated average sales per employee is estimated at $370,000. Sales for each facility were subsequently estimated by multiplying the average sales per employee by the number of employees at each facility. It is important to note that some facilities (six) did not report employment, consequently no sales data were derived for these facilities.[59]

Calculation of Baseline and Compliance Waste Management Costs

Baseline and compliance waste management costs were calculated using the unit costs from Tables 4-6a and 4-6b. The unit cost data were multiplied by waste generation rates, as presented in Appendix Tables 7a and 7b to arrive at total costs. It is important to note that many of the facilities reported unidentified waste management codes. For example the ultimate waste management code was frequently reported as "other." Where this occurred, we used the most predominant management code for that particular waste.

Compliance Transportation Costs

Environmental Cost Handling Options and Solutions (ECHOS)[60] data were used to estimate transportation costs for the compliance management scenario. Based on this information, transportation costs were assumed to be $0.13/metric ton/mile to a Subtitle C landfill (200 miles average distance) and $0.12/metric ton/mile to a Subtitle C incinerator (300 miles average distance) with a minimum of $300 for each shipment[61]. A minimum charge of $300 is assumed per quarterly (90 day) shipment. Many facilities generate waste in small enough amounts on a quarterly basis to incur a minimum charge; it is important to note that many of these facilities are assumed to incur minimum charges in the baseline, since many are already managing at least some of their wastes as hazardous.

The same trucking company is assumed to be under contract to ship wastes to the nearest Subtitle C incinerator, cement kiln, fuel blender, and landfill. The quantities to be disposed are combined to calculate if a minimum charge will be incurred. ECHOS data reflects costs associated with remediation. Paint manufacturers may sign contracts that agree to a lower minimum charge given the guarantee of regular shipments (i.e., cash flow) to the transporter. The minimum charge

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59 Sales information was available for a number of facilities from Dun & Bradstreet. However these data appeared to represent total corporate sales, as opposed to facility sales.

For the six facilities for which we had no employment data we assumed the cost impacts as a percent of sales were equivalent to the other 145 facilities. We do not have adequate data to estimate the magnitude (positive or negative) of this limitation (Please see Appendix Table 9 for facilities without employment data).

60 Environmental Cost Handling Options and Solutions (ECHOS), *Environmental Remediation Cost Data-Unit Price*, 5th Annual Edition, published by R.S. Means, 1999, Assembly #33 19 7205

61 ECHOS reported transportation costs to be $0.01875/drum/mile and $0.09/metric ton/mile with a minimum of $683 per shipment; however this minimum charge appears unrepresentative based on contacts with industry and a minimum charge of $300 is applied.

US EPA ARCHIVE DOCUMENT

reported in ECHOS is used as a conservative approximation of such an agreement because remediation transport costs generally reflect single source costs.

Facilities generating less than 12 metric tons per year are assumed to be small quantity generators with a 180-day waste accumulation period. It also was assumed that the maximum truck load is 20 short tons (18.1 metric tons).[62]

Compliance Analytical Costs

As discussed in Chapter 4, we assume that multiple waste streams from multiple different product runs are combined into single waste "batches." These batches may require sampling and analyses for adequate characterization. However, facilities may also segregate their wastes, if such an action helps to ensure greater certainty of waste characterization. The number of different batches requiring testing will impact a facility's analytical costs. However, information obtained from site visits, and our RCRA 3007 survey data indicate that most wastestreams are consolidated.

For small (<40 metric tons per year) nonwastewater generators, we assumed zero (operator knowledge) samples for the first and out years. For large (40 or greater metric tons/year) nonwastewater generators we assumed 40 waste samples being tested initially in the first year and 10 in subsequent years, up to the three-year limit (if no process change). For small (<100 metric tons per year) wastewater generators, we assumed zero (operator knowledge) samples for the first and out years. For large (100 or greater metric tons/year) wastewater generators we assumed 40 waste samples being tested initially in the first year and 10 in subsequent years, up to the three-year limit (if no process change).

The Agency assumed that the "appropriate number" of samples per batch of waste is four in order to accurately characterize the waste based on the requirements specified in 40 CFR 260.22(h) to petition for exclusion of a waste from being listed. The Agency also assumed a large facility will need to test 10 batches of waste in the first year resulting in a total of 40 samples. In subsequent years only one sample per batch of waste is assumed. It should be noted that this level of sampling is based on "EPA's methods experts" and historical listing determinations for costing purposes only. However, facilities are not required to take four samples per batch.

The prorated and non-prorated unit sampling and analytical costs are estimated to be $131/non-wastewater sample and $502/non-wastewater sample, respectively, based on the need to test for 5 priority pollutants (see Chapter 4).[63] Similarly, the prorated and non-prorated unit sampling and

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62 M. Lee Rice, World Resources Company, letter to RCRA Docket Information Center (Docket Number – F-1999-F06P-FFFFF) presenting comments on the proposed rule "180-day Accumulation Time for Waste Water Treatment Sludges from the Metal Finishing Industry," March 22, 1999, pp. 4.

63 Sampling costs include ½-hour of labor ($78.50 * 0.5 = $39.25), an ice chest for packaging used 10 times ($32.63/10 = $3.26), shipping ($31.62), and blank and sample preparation ($25.00) for a total of $99.13/sample. Sampling unit costs were obtained from Environmental Cost Handling Options and Solutions (ECHOS), *1999 Environmental Remediation Cost Data - Unit Price*, 5th Annual Edition, published by R.S. Means, 1999. Analytical costs for semi-VOCs and VOCs were derived from a vendor quote of $389.00 to analyze one sample for the 88 semi-VOCs and VOCs on the priority pollutant list including one blank. The unit cost per constituent prorated is $4.42 ($389.00/88 = $4.42). Analytical costs for metals were obtained from 1999 R.S. Means ($14.00/metal). The 5 priority pollutants included in the paint wastes include 4 semi-VOCs and VOCs (acrylamide, acrylonitrile, methyl isobutyl ketone and

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analytical costs are estimated to be $162/wastewater sample and $502/wastewater sample, respectively, based on the need to test for 12 priority pollutants.[64] While we have examined analytical costs based on both a prorated and non-prorated scenario, some labs may charge a fixed fee for analysis of a predetermined group of chemicals.

Under the traditional and no-list options there are no analytical requirements and costs are zero. Under our proposed approach, the 30 additional samples in the first year for the large facility are annualized using a capital recovery factor of 0.38105 (based on a 7 percent discount rate over 3 years[65]), and a prorated unit sampling cost is assumed. We also examined a high-cost analytical scenario where the 30 additional samples are not annualized and a non-prorated unit sampling cost is used.

5.2 Estimated Economic Costs

We have estimated cost impacts under the proposed concentration-based listing approach, two different scenarios related to this approach, and two alternative regulatory options. These are as follows: Proposed Concentration-Based Listing Approach, Proposed Concentration-Based Approach with Sensitivity Analysis Scenario (i.e., waste going to fuel blending in the baseline is diverted to commercial incineration), Proposed Concentration-Based Approach excluding Liquids, A Traditional or Standard Listing Option (not concentration-based), and the No-List - Status Quo option.

The first analysis presented below (5.2.1) discusses impacts associated with our proposed regulatory approach. Under this section we discuss compliance waste management costs, transportation costs, analytical and administrative costs, and finally, model facility and aggregate

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methyl methacrylate) and 1 metal (antimony). Total analytical costs equal $31.68/sample (4 * $4.42 + 1 * $14.00 = $31.68). Total sampling and analytical costs are estimated to be $131/sample. Assuming no prorating of the $389 unit cost for analyzing 88 semi-VOCs and VOCs results in a non-prorated unit sampling and analytical cost of $502/sample.

64 Sampling costs include ½-hour of labor ($78.50 * 0.5 = $39.25), an ice chest for packaging used 10 times ($32.63/10 = $3.26), shipping ($31.62), and blank and sample preparation ($25.00) for a total of $99.13/sample. Sampling unit costs were obtained from Environmental Cost Handling Options and Solutions (ECHOS), *1999 Environmental Remediation Cost Data - Unit Price*, 5th Annual Edition, published by R.S. Means, 1999. Analytical costs for semi-VOCs and VOCs were derived from a vendor quote of $389.00 to analyze one sample for the 88 semi-VOCs and VOCs on the priority pollutant list including one blank. The unit cost per constituent prorated is $4.42 ($389.00/88 = $4.42). Analytical costs for metals were obtained from 1999 R.S. Means ($14.00/metal). The 12 priority pollutants included in the paint wastes include 11 semi-VOCs and VOCs (acrylamide, acrylonitrile, dichloromethane (i.e., methylene chloride), ethylbenzene, formaldehyde, methyl isobutyl ketone, methyl methacrylate, n-butyl alcohol, styrene, toluene, and xylene) and 1 metal (antimony). Total analytical costs equal $62.62/sample (11 * $4.42 + 1 * $14.00 = $62.62). Total sampling and analytical costs are estimated to be $161.75/sample. Assuming no prorating of the $389 unit cost for analyzing 88 semi- VOCs and VOCs results in a non-prorated unit sampling and analytical cost of $502/sample.

65 The three year amortization period is based on common industry practice of maintaining a three-year revolving line-of-credit which is accessed for unexpected single-year expenses that are larger than normal, but not in the realm of capital costs (new equipment, buildings, etc.). While the interest rate for this type of credit may be higher than 7 percent, we have applied this rate to be consistent with OMB suggestions.

US EPA ARCHIVE DOCUMENT

compliance cost impacts. Section 5.2.2 discusses impacts of the proposed approach under the sensitivity analysis scenario. The proposed approach excluding liquids is next examined (Section 5.2.3). Regulation under a standard or non-concentration-based approach is examined in Section 5.2.4. We have also considered the option of no regulation. Beyond some minor costs to facilities to read the final regulation, this would be a no-cost option and is not examined further in this Chapter.

This section of Chapter 5 also examines selected market impacts potentially associated with the proposed regulatory approach. These impacts include: aggregate price and quantity impacts (5.3), employment impacts (5.4), and social cost impacts (5.5). We also briefly discuss potential impacts to landfill operators (5.6) associated with the proposed listing approach.

5.2.1 Proposed Listing Approach

The impacts presented in this section depict costs which are expected under the Agency's proposed concentration-based listing approach. Detailed tables presenting waste management (treatment and disposal), transportation, analytical, and administrative costs for each model (representative) facility are presented in Appendix D.

Waste Management Costs (Treatment and Disposal)

Waste management costs in this section refer to waste treatment and disposal only. Waste transport, analysis, and related administrative costs are discussed in a later section. Waste management cost impacts for the 151 model facilities (see Section 3.4.2) were estimated based on current (baseline) waste management practices. These costs, along with compliance and incremental costs, are presented in Tables 5-3 and 5-4 for nonwastewaters and wastewaters, respectively. As mentioned above, more detailed costs are presented for each model facility in Appendix D tables.

Total unweighted baseline waste management costs for the model facilities are estimated at $3.8 million/year for nonwastewaters and $5.1 million/year for wastewaters. The compliance waste management costs for the proposed approach are also presented in Tables 5-3 and 5-4. Annual compliance costs for the model facilities are estimated at $7.2 and $5.1 million for nonwastewaters and wastewaters, respectively. Compliance costs are only modestly higher than baseline costs for wastewaters because of two factors: 1) much of the waste is managed as hazardous in the baseline and 2) much of the waste managed as nonhazardous is treated at offsite wastewater treatment facilities with only a modest increase in cost associated with the management of sludge.

The incremental unweighted waste management costs for the model facilities are estimated at $3.5 and $.05 million per year for nonwastewaters and wastewaters, respectively. Aggregate weighted and scaled costs for the entire paints industry are estimated at $4.3 and $0.1 million for nonwastewaters and wastewaters, respectively (Tables 5-3, and 5-4).
Tables 5-3 and 5-4 show the model facility waste management cost multiplied by the facility weighting factor, the result of which is adjusted to account for the quantity of waste which is estimated to actually test as hazardous (50 percent for solids, and 80 percent for liquids, as previously discussed). This result is then multiplied by 1.72 (972/566) to arrive at industry costs. Note that for the waste that is assumed to test as nonhazardous, baseline waste management costs

US EPA ARCHIVE DOCUMENT

(excluding analytical and administrative) are included in the compliance cost estimate, resulting in no incremental costs for waste treatment and/or disposal.

Transportation Costs

Transportation costs under baseline and compliance were estimated as previously described in Section 5-1[66]. Transportation costs were assumed to be $0.13/metric ton/mile to a Subtitle C landfill (200 miles average distance) and $0.12/metric ton/mile to a Subtitle C incinerator (300 miles average distance) with a minimum of $300 for each shipment. A minimum charge of $300 is assumed per quarterly (90 day) shipment. Facilities generating only small quantities of waste on a quarterly basis are assumed to incur a minimum charge. Facilities generating less than 12 metric tons per year are assumed to be small quantity generators with a 180-day waste accumulation period. Transportation costs are summarized in Table 5-5 below, and presented in detail in Appendix Table 8.

Incremental transportation charges are estimated at only $0.19 million for the model facilities and $0.5 million for the entire industry. These estimates assume 100 percent of the waste is hazardous and thereby are slightly overstated. As discussed earlier, for the waste management cost estimates we have estimated that 50 percent of the solids and 80 percent of the liquids are likely to contain constituents of concern and may become hazardous waste. The remaining waste may never become hazardous, and may be transported accordingly. Of the wastes that contain constituents of concern, some portion may not exceed the proposed listing concentrations and, therefore, would also not become hazardous.

Analytical and Administrative Costs

Analytical and administrative costs are estimated for three scenarios and summarized in Table 5-6, which are the proposed analytical requirements (see discussion above), high-end analytical requirements, and requirements associated with the traditional or straight listing (non-concentration based). In subsequent presentations for the listing alternatives, only the proposed analytical requirements are included -- except for the non-concentration based or traditional listing, where analytical costs are assumed to be zero. Detailed analytical costs for each representative facility are presented in Appendix Table 10.

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66 See footnotes to Tables 4-6a and 4-6b for discussion of baseline cost assumptions and additional discussion of compliance assumptions..

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US EPA ARCHIVE DOCUMENT

TABLE 5-3. BASELINE, COMPLIANCE AND INCREMENTAL COSTS FOR NONWASTEWATERS BASED ON THE AGENCY'S PREFERRED APPROACH
(ANNUAL 1999 DOLLARS)

Item	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total [1]	Weighted Total [2]	Universe Total [3]
Baseline	76,805	15,454	1,280,801	1,731,053	12,845	570	104,222	252,351	2,382	216,577	84,175	3,777,234	5,036,606	8,649,440
Compliance	78,846	28,171	1,283,936	1,736,940	12,845	585	860,150	626,416	23,705	1,911,621	683,891	7,247,107	7,566,504	12,994,100
Incremental	2,042	12,718	3,135	5,886	0	15	755,928	374,065	21,323	1,695,044	599,716	3,469,876	2,529,899	4,344,620

The solid waste generated/facility included in the above table are as follows: Hazardous Caustic Cleaning Residual Sludge (HCS), Hazardous Emission Control Dust (HED), Hazardous Off-Specification Production Residual (HOR), Hazardous Solvent Cleaning Residual Sludge (HSS), Hazardous Water Cleaning Residual Sludge (HWS), Nonhazardous Caustic Cleaning Residual Sludge (NCS), Nonhazardous Emission Control Dust (NED), Nonhazardous Off-Specification Production Residual (NOR), Nonhazardous Solvent Cleaning Residual Sludge (NSS), Nonhazardous Water Cleaning Residual Sludge (NWS), Nonhazardous Wastewater Treatment Sludge (NWTS).
[1] Numbers may not add due to rounding
[2] Weighted total times extrapolation factor 1.7173 (972/566) to arrive at the industry total
[3] To extrapolate from the facilities represented by the RCRA 3007 survey (566) to the industry total (972), a factor of 1.7173 (972/566) is used.
Source: RCRA 3007 Survey.

Table 5-4. Baseline, Compliance and Incremental Costs for Wastewaters
BASED ON THE AGENCY'S PREFERRED APPROACH
(Annual 1999 dollars)

Item	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total [1]	Weighted Total [2]	Universe Total [3]
Baseline	80,764	4,835,829	72,558	0	1,787	99,490	5,090,428	7,511,500	12,899,600
Compliance	83,202	4,837,654	73,211	0	1,787	139,337	5,140,491	7,580,160	13,017,540
Incremental	4,898	3,699	1,217	0	0	40,249	50,065	68,659	117,930

The wastewaters generated/facility included in the above table are as follows: Hazardous Caustic Cleaning Residual (HCL), Hazardous Solvent Cleaning Residual (HSL), Hazardous Water Cleaning Residual (HWL), Nonhazardous Caustic Cleaning Residual (NCL), Nonhazardous Solvent Cleaning Residual (NSL), Nonhazardous Water Cleaning Residual (NWL).
[1] Numbers may not add due to rounding
[2] Weighted total times extrapolation factor 1.7173 (972/566) to arrive at the industry total
[3] To extrapolate from the facilities represented by the RCRA 3007 survey (566) to the industry total (972), a factor of 1.7173 (972/566) is used.
Source: RCRA 3007 Survey

US EPA ARCHIVE DOCUMENT

TABLE 5-5. ESTIMATED TRANSPORTATION COSTS (1999$/YEAR)

Facility	TRANSPORTATION COSTS			Weighted Total [1]	Universe Total [2]
	Baseline	Compliance	Incremental		
Totals	646,100	832,881	186,785	297,240	509,930

[1] Unweighted total times weighting factor (for each representative facility) to arrive at the sampling universe

[2] Weighted total times extrapolation factor 1.7173 (972/566) to arrive at the industry total

TABLE 5-6. Summary of Estimated Analytical Costs

Analytical Scenario	Aggregate Annual Analytical Cost Impacts Under Proposed Listing *(Annual 1999 dollars)*
Proposed Analytical Requirements	$220,530
High-End Cost Estimate for Analytical requirements	$1,425,680
Traditional or Straight Listing (No analytical Requirements)	$0

Model Facility and Aggregate Waste Listing Costs - Agency Preferred Approach

Appendix Table 9 shows the expected total incremental costs of the proposed waste listing for the model facilities and the industry as a whole. Impacts as a percent of sales for the model facilities are estimated to range from only 0.01 percent to just over 4.0 percent. Within the four primary facility size ranges, incremental costs as a percent of gross sales are estimated to average 0.11 percent facilities with less than 20 employees, 0.05 percent for facilities with twenty to forty-nine employees, 0.11 percent for facilities with fifty to 149 employees, and 0.17 percent for facilities employing 150 or more persons. The overall average weighted cost per facility is estimated at 0.07 percent of gross annual sales. These estimates can be considered a high-end cost scenario as they include the total quantity of waste.

As discussed above, based on our RCRA 3007 Survey data we have estimated that 50 percent of the nonwastewaters and 20 percent of the wastewaters are anticipated to test as nonhazardous. The estimated total incremental weighted and scaled costs (treatment, disposal, analytical and transport) costs under the Agency Preferred Approach (APA) are estimated at $7.3 million per year

5.2.2 Proposed Listing Sensitivity Analysis (APA 1)

We also evaluated a scenario where wastes currently going to hazardous fuel blenders and/or directly to hazardous waste burning cement kilns will be forced to discontinue this practice and ship the waste directly to commercial incineration, at the resulting higher cost. Total compliance costs under this scenario are estimated at $18.1 million per year, up from $7.3 million/year under the anticipated impacts of the proposed approach. This scenario is only feasible should blenders and kilns previously accepting the newly listed paint waste refuse this waste due to the new listing for antimony.

5.2.3 Non-Wastewaters Only Listing (APA 2)

Another alternative listing approach that we evaluated assumes that the proposed listing is limited to only nonwastewaters. All liquids would be excluded under this scenario. The aggregate incremental costs under this scenario are estimated at $6.7 million per year, or $600,000 less than the proposed option..

5.2.4 Traditional or Straight Listing - Alternative Option

We also examined a traditional or straight listing approach. Under this option, no consideration is provided for the concentration of the various hazardous constituents of concern. One effect of this approach is to eliminate the need for sampling (analytical) of the waste streams. However, all generated wastes that meet the listing definition are defined as hazardous. Total incremental costs associated with this option are estimated at $10.9 million per year[67]. Cost impacts associated with the Agency Preferred Approach, the two alternative scenarios to this approach, and the analytical options, are presented in Table 5-7 below.

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67 While cost estimates under the Agency Preferred Approach (APA) represent only 50 percent of total nonhazardous solids and 80 percent of the nonhazardous liquids, aggregate impacts do not directly reflect this difference. The unweighted and unscaled waste management costs under the APA are estimated at $1.8 million. The unweighted and unscaled waste management costs under the Traditional Listing Option are estimated at $3.5 million. Applying the weighting and scaling factors, plus transportation, administrative, and analytical (APA only) costs results in aggregate annual nationwide compliance costs of $7.3 million for the APA and $10.9 million for the Traditional Option.

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

TABLE 5-7. SUMMARY OF COSTS IMPACTS FOR ALL REGULATORY OPTIONS

Regulatory Option	Waste Mgmt. Costs **	Transport Costs**	Analytical Costs *	Admin Costs **	Unweighted Costs **	Total Industry Cost ***	Ave. Annual Compliance Costs as Percent of Annual Gross Sales ***
Preferred Approach	3.5	0.2	0.2	0.4	4.3	7.3	0.07%
Sensitivity (APA 1)	5.7	0.2	0.2	0.4	6.5	18.1	0.19%
No Liquids (APA 2)	3.5	0.2	0.1	0.4	4.1	6.7	0.06%
Traditional Listing	3.5	0.2	0.0	0.4	4.1	10.9	0.10%
No Listing	0.0	0.0	0.0	0.0	0.0	0.0	0.00%

All costs expressed in million 1999 dollars

* Analytical costs based on the Agency's proposed analytical requirements
** Costs are unweighted and are not adjusted for component of waste streams assumed to be nonhazardous (i.e., 20 percent of liquid and 50 percent of solid wastes).
*** All except the traditional listing option are weighted and aggregated to industry level. Costs adjusted as per nonhazardous components of waste streams (i.e., 20 percent of liquid and 50 percent of solid wastes).

To extrapolate from the facilities represented by the RCRA 3007 survey (566) to the industry total (972), a factor of 1.7173 (972/566) is used.

Note1: There may be some minor costs associated with the no list option for facilities to read the final rule.
Note2: The waste management costs for the traditional and proposed options assume all waste is hazardous. Appropriate adjustments are made in the aggregate.

5.3 Aggregate Price and Quantity Impacts

We assume that the listing of the two paint wastes would result in some increase in paint production costs. The aggregate economic effect can be represented as an upward shift in the paint supply function, corresponding to the increase in cost of production. Given a downward sloping demand function, the post-listing equilibrium market price-quantity may be characterized by higher average prices and lower paint output quantities. That is, both the price and quantity of paint will likely be affected in the aggregate.

Estimating the potential changes in both quantities and prices is complicated by the fact that the changes in the market for paints depend on the actual products affected. The paint market is actually made up of many market segments, corresponding with different paint characteristics and applications. Consequently estimating impacts based on industry averages may obscure the results for a particular paint product-application. Nevertheless, the analysis presented below helps to provide a range of potential impacts to the industry.

Cost impacts from the waste listing are estimated at approximately $7.3 million per year under the Agency's proposed listing option. With annual paint production in 1999 of 1,310.5 million gallons valued at $16,292.3 million,[68] this cost impact is equivalent to less than $0.01 per gallon or 0.04 percent of the total production value.[69]

We assume that some portion of the cost impacts described above would be passed on to consumers in the form of higher prices. The remaining portion would be absorbed by paint manufacturers in profit reductions. For purposes of establishing a range of impacts, we have examined two scenarios: 1) zero percent cost pass through, and 2) 100 percent cost pass through.

Under the zero cost pass through scenario, product prices charged by the producers would not change from the baseline average of $12.43 per gallon of paint. Corresponding changes in market quantity would also be zero. Producers would absorb all production cost increases under this scenario, ultimately resulting in lower profits to producers. This impact scenario, summarized in Table 5-8 below, is not a likely outcome, However, this scenario helps to bound the potential price and quantity impacts.

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68 U.S. Department of Commerce, Bureau of the Census, Current Industrial Reports, *Paint and Allied Products-Annual Report 2000, MQ* 325F(00)-1, June 2000, *and 1998*, MA325F(98)-1, February 2000. Quantities and values are for the sum of architectural coatings, OEM product coatings and special purpose coatings.

69 Note that the average cost impact in terms of industry production (0.04 percent) is lower than the average cost impact of the affected facilities (0.07 percent). As previously discussed not all paint manufacturers are affected by the proposed waste listing because they do not all generate the wastes, or the wastes are not hazardous under the Agency's proposed concentration-based rule. This fact may limit some affected facilities in their ability to pass on the cost increases in the form of higher prices.

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The second scenario, 100 percent cost pass through is also summarized in Table 5-8. In order to estimate the impacts on market quantities, we must estimate an elasticity of demand. The price elasticity of demand for architectural coatings has been estimated to range from -1.4 to -1.9.[70] While these estimates are limited to architectural coatings, they are presumed here to be representative of all paint products. Consequently, the analysis of the 100 percent cost pass through is based on an elasticity of demand of -1.65 (the midpoint of the estimates). Because architectural coatings represent about 36 percent of the aggregate nationwide paint market, we believe the midpoint of this estimate, as applied, will provide a reasonable approximation.

Table 5-8. Potential Range of Aggregate Price and Quantity Impacts

Effect Measure	Zero Percent Cost Pass Through *	100 Percent Cost Pass Through **
Price Change		
Percentage	0.0%	0.04%
$/gallon	$0.00	$0.0055
Quantity Change		
Percentage	0.0%	0.07%
Million Gallons	0	0.96

* Assumes all costs are absorbed by the affected paint manufacturers
** Assumes all costs are passed on to consumers in the form of higher prices

5.4 Employment Impacts

Because of the modest impacts associated with the proposed rule the Agency anticipates that there will be limited impacts on employment as a result of this rule. While some of the manufacturers who are impacted the most may in fact curtail production and lay off employees, this impact may be largely offset by increases in employment at hazardous waste management facilities.

5.5 Social Cost Impacts

Estimating actual social costs (changes in consumer and producer surplus) expected to result from this rule is made difficult by a lack of information on market supply and demand functions for the various products affected. Consequently this discussion focuses on who may be negatively and positively impacted by the rule.

[70] EPA. Economic Impact and Regulatory Flexibility Analyses of the Final Architectural Coatings VOC Rule. EPA-452/D-96-005. July 1998.

US EPA ARCHIVE DOCUMENT

Positively Impacted Groups

- Paint manufacturers who are not affected by the rule may benefit from a more competitive position, not having to incur costs as a result of the rule.
- Hazardous waste facilities may benefit from increased demand for their services
- Depending on actual exposure patterns, population groups surrounding paint manufacturing facilities and municipal landfills may benefit from lower health risks due to more stringent management controls on these wastes.

Negatively Impacted Groups

- Paint manufacturers who would incur incremental compliance costs under the proposed rule.
- Paint consumers who may be affected by increasing paint prices.
- Municipal landfills who may need to comply with incremental leachate requirements

5.6 Other Impacts

As discussed in Chapter 4, the proposed waste listing may also result in impacts on land disposal facilities which have disposed of the wastes considered in this rulemaking. Because of the proposed listing, leachate from these landfills may be hazardous under the Derived-from Rule. Also, when the leachate from these two wastes mixes with leachate from other wastes disposed in these landfills the entire leachate quantity may be considered hazardous under the Mixture Rule. The Agency is proposing a Clean Water Act Exemption with Two-Year Impoundment Replacement Deferral regulatory option for the management of this waste. The estimated cost of this option is expected to range from approximately $300,000 to $400,000 annually.

US EPA ARCHIVE DOCUMENT

6.0 QUALITATIVE BENEFITS

Possible human health and environmental benefits from the proposed rule are discussed qualitatively in this chapter. The proposed rule is intended to reduce the potential for environmental releases of constituents of concern at levels that may yield unacceptable risks. Depending on actual or future exposure patterns, the primary benefits of the proposed rule could include associated reductions in human health environmental effects from these releases. The proposed rule could also encourage greater waste minimization.

6.1 SOURCES OF BENEFIT

The proposed rule is intended to reduce the potential for environmental releases of constituents of concern at levels that may yield unacceptable risks. The effect of listing wastes is to subject them to stringent management and treatment standards under the Resource Conservation and Recovery Act (RCRA) and to subject them to emergency notification requirements for releases of hazardous substances to the environment. Depending on actual or future exposure patterns, the primary benefits of the proposed rule could include associated reductions in human health environmental effects from these releases. Given the concentration-based approach to the proposed rule, we anticipate that paint manufacturers may increase their waste minimization practices that eliminate, reduce, recycle, or reuse wastes containing these constituents.

6.2 TYPES OF BENEFITS

6.2.1 Human Health Damages Avoided or Reduced

To the extent that the rule, as proposed, reduces actual or potential exposure to the constituents of concern, we expect that the proposed rule may yield benefits from changes in waste management.

In determining whether waste generated from the production of paints and coatings meets the criteria for listing a waste as hazardous, we developed a preliminary list of constituents in three steps: first, out of the thousands of constituents that are used as ingredients in paints, we identified a subset of potentially hazardous constituents used in paint formulations; second, we identified those constituents for which we have adequate data to complete a risk assessment so that we could develop a protective concentration level for the listing, if appropriate; finally, we ensured that test methods were available so paint manufacturers would be able to identify the presence and concentration of constituents in their wastes, as necessary. We ultimately arrived at a list of 66 constituents with test methods and sufficient data to conduct further analyses. We included the 66 constituents in our RCRA 3007 survey. Survey results identified 45 of the 66 constituents occurring in their non-hazardous waste streams. Frequency of occurrence ranged from 127 for barium to one for o-xylene and benzyl alcohol. Ultimately, we ended up modeling 43 constituents (The reader should review the risk assessment background document for further information on constituent selection and modeling).

We examined the fate and mobility of these chemicals, plausible exposure routes, and current and plausible waste management practices. Based on this assessment of the wastes, we determined that a total of five constituents in paint manufacturing waste solids and 12 constituents in paint manufacturing waste liquids may pose unacceptable risks, depending on the actual levels of these constituents in the wastes, on actual waste management practices, and on actual or future exposure patterns. The risk assessment did not estimate population risks from current practices or the incremental risk reduction from future actions. As a result, we did not quantify or monetize benefits to human health. Details of the

US EPA ARCHIVE DOCUMENT

risk assessment approach and results are in the docket for the proposed rule.

6.2.2 Waste Minimization

Paint manufacturers have long recognized the value of limiting waste streams both from an economical and environmental point of view.[71] The National Paint and Coatings Association (NPCA) has sponsored a pollution prevention program for its members since 1990 and has provided support to its members who wish to start or upgrade a program.[72] Many of the ideas the industry is using in the pollution prevention programs are centered around limiting or eliminating waste streams. Waste minimization can lead to improved profitability and competitiveness, lower waste management costs and less impact from government regulations.[73] We anticipate that the concentration-based approach of the proposed rule would encourage additional actions to minimize waste.

Waste minimization is achieved by source reduction and recycling.[74] [75]

Source reduction involves:

- good manufacturing practices:
  - personnel training and incentives;
  - updated procedures;
  - material accounting;
  - management practices;
  - maintenance practices; and
  - building design.

- production process changes:
  - raw material handling, inventory control;
  - production scheduling;
  - equipment modifications/changes;
  - segregation of waste streams;
  - dust, VOC and solvent recovery; and
  - leak prevention.

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71 Randall, P.M. (1993) Pollution Prevention Opportunities in the Manufacture of Paint and Coatings, Pollution Prevention Conference on the Low- and No-VOC Coating Technologies, May 25-27, 1993, San Diego, CA. EPA Report No. EPA/600/A-94/069, NTIS No. PB 94-162690. p. 490.

72 National Paint and Coating (no date) "100+ Pollution Prevention Ideas–from NPCA", http://www.paint.org/ind_issue/pollu.htm.

73 Randall, P.M. (1993) Pollution Prevention Opportunities in the Manufacture of Paint and Coatings, Pollution Prevention Conference on the Low- and No-VOC Coating Technologies, May 25-27, 1993, San Diego, CA. EPA Report No. EPA/600/A-94/069, NTIS No. PB 94-162690. p. 492.

74 National Paint and Coating (no date) "100+ Pollution Prevention Ideas–from NPCA", http://www.paint.org/ind_issue/pollu.htm.

75 Randall, P.M. (1993) Pollution Prevention Opportunities in the Manufacture of Paint and Coatings, Pollution Prevention Conference on the Low- and No-VOC Coating Technologies, May 25-27, 1993, San Diego, CA. EPA Report No. EPA/600/A-94/069, NTIS No. PB 94-162690. p. 493.

US EPA ARCHIVE DOCUMENT

- Input material changes:
    - Use less environmentally sensitive materials;
    - Use reusable raw material containers;
    - Use wet rather than dry materials; and
    - Purchase in bulk.

Recycling can be performed both on-site and off-site. Recycling involves reusing waste stream products in the production of paints or as a feed stock for another industry. Examples of recyclable waste streams are:

- reclaimed solvents;
- baghouse pigment dust;
- raw ingredient containers and packaging;
- off-specification paints;
- paint sludges from tank and equipment cleaning; and
- laboratory sink drains.

US EPA ARCHIVE DOCUMENT

7.0 OTHER ADMINISTRATIVE REQUIREMENTS

This section describes the Agency's response to other rulemaking requirements established by statute and executive order, within the context of the proposed paint waste listing.

7.1 Environmental Justice

The Agency is committed to addressing environmental justice concerns and is assuming a leadership role in environmental justice initiatives to enhance environmental quality for all residents of the United States. The Agency's goals are to ensure that no segment of the population, regardless of race, color, national origin, or income bears disproportionately high and adverse human health and environmental impacts as a result of EPA's policies, programs, and activities, and that all people live in clean and sustainable[76] communities. In response to Executive Order 12898 and to concerns voiced by many groups outside the Agency, EPA's Office of Solid Waste and Emergency Response formed an Environmental Justice Task Force to analyze the array of environmental justice issues specific to waste programs and to develop an overall strategy to identify and address these issues (OSWER Directive No. 9200.3-17).

It is not certain whether the environmental problems addressed by the proposed paint waste listing could disproportionately affect minority or low income communities, due to the location of some paint manufacturing operations. These operations are distributed throughout the country and many are located within highly populated areas. Because the proposed rule increases requirements for paint manufacturers, this rule is intended to decrease risks from paint waste. It is, therefore, not expected to result in any disproportionately negative impacts on minority or low income communities relative to affluent or non-minority communities. Similarly, because the rulemaking is protective, it is intended to result in lower risk to minority or low-income workers handling the wastes in question relative to higher-wage or non-minority workers.

7.2 Unfunded Mandates Reform Act

Under Section 202 of the Unfunded Mandates Reform Act of 1995, signed into law on March 22, 1995, the Agency must prepare a statement to accompany any rule for which the estimated costs to state, local, or tribal governments in the aggregate, or to the private sector, will be $100 million or more in any one year. Under Section 205, the Agency must select the most cost-effective and least burdensome alternative that achieves the objective of the rule and is consistent with statutory requirements. Section 203 requires EPA to establish a plan for informing and advising any small governments that may be significantly affected by the rule.

An analysis of the costs and benefits of the proposed rule was conducted and it was determined that this rule does not include a federal mandate that may result in estimated costs of $100 million or more to either state, local, or tribal governments in the aggregate. The private sector also is not expected to incur costs exceeding $100 million per year associated with this action.

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[76] Sustainable refers to a principle which says that any development must not compromise the welfare of future generations for the benefit of present generations. This principle is designed to support intergenerational equity (i.e.; fairness between generations).

US EPA ARCHIVE DOCUMENT

7.3 Protection of Children from Environmental Health Risks and Safety Risks

On April 21, 1997, the President signed Executive Order 13045 entitled, "Protection of Children from Environmental Health Risks and Safety Risks." The Executive Order requires all economically significant rules[77] that concern an environmental health risk or safety risk that may disproportionately affect children to comply with requirements of the Executive Order. Because the Agency does not consider today's proposed rule to be economically significant, it is not subject to Executive Order 13045. Furthermore, today's proposed rule is intended to reduce potential releases of hazardous wastes to the environment. EPA considered risks to children in its risk assessment and set allowable concentrations for constituents in the waste at levels that are believed to be protective to children, as well as adults. Depending on current and future exposure patterns, any risks to children associated with such releases would also decrease. The management practices proposed in this rule, therefore, are intended to reduce the potential for unacceptable risks to children potentially exposed to the constituents of concern.

7.4 Regulatory Takings

The Agency has complied with Executive Order 12630, entitled Governmental Actions and Interference with Constitutionally Protected Property Rights (53 FR 8859, March 15, 1988), by examining the takings implications of this rule in accordance with the Attorney General's Supplemental Guidelines for the Evaluation of Risk and Avoidance of Unanticipated Takings issued under the Executive Order. The Agency has determined that this rule will not effect a taking of private property or otherwise have taking implications under Executive Order 12630.

7.5 Federalism

Executive Order 13132, entitled "Federalism" (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications." "Policies that have federalism implications" are defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

Under Section 6 of Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, or EPA consults with State and local officials early in the process of developing the proposed regulation. EPA also may not issue a regulation that has federalism implications and that preempts State law, unless the Agency consults with State and local officials early in the process of developing the proposed regulation.

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[77] An economically significant rule is defined by Executive Order 12866 as any rulemaking that has an annual effect on the economy of $100 million or more, or would adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health, or safety, or State, local, or tribal governments or communities.

US EPA ARCHIVE DOCUMENT

Section 4 of the Executive Order contains additional requirements for rules that preempt State or local law, even if those rules do not have federalism implications (i.e., the rules will not have substantial direct effects on the States, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government). Those requirements include providing all affected State and local officials notice, and an opportunity for appropriate participation in the development of the regulation. If the preemption is not based on expressed or implied statutory authority, EPA also must consult, to the extent practicable, with appropriate State and local officials regarding the conflict between State law and federally protected interests within the agency's area of regulatory responsibility.

This proposed rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. This rule, as proposed, is projected to result in economic impacts to privately owned paint manufacturing facilities. Marginal administrative burden impacts may occur to selected States an/or EPA Regional Offices if these entities experience increased administrative needs, enforcement requirements, or voluntary information requests. However, this rule, as proposed, will not have substantial direct effects on the States, intergovernmental relationships, or the distribution of power and responsibilities. Thus, Executive Order 13132 does not apply to this rule.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, we specifically solicit comment on this proposed rule from State and local officials.

7.6 Tribalism

Executive Order 13175, "Consultation and Coordination With Indian Tribal Governments," was signed by the President on November 6, 2000. As of January 6, 2001, Executive Order 13175 (65 FR 67249) took effect and revoked Executive Order 13084. Please note that we addressed tribal considerations under Executive Order 13084 because we developed this proposed rule during the period when this Order was in effect. We will analyze and fully comply with the requirements of Executive Order 13175 before promulgating the final rule.

This Order applies to regulations not specifically required by statute, that significantly or uniquely affect the communities of Indian tribal governments, and that impose substantial direct compliance costs on Indian tribal governments. If any rule is projected to result in significant direct costs to Indian tribal communities, EPA cannot issue this rule unless the Federal government provides funds necessary to pay the direct costs incurred by the Indian tribal government or the tribe, *or* consults with the appropriate tribal government officials early in the process of developing the proposed regulation.

If EPA complies by consulting, we must provide the Office of Management and Budget (OMB) with all required information. We must also summarize, in a separately identified section of the preamble to the proposed or final rule, a description of the extent of our prior consultation with representatives of affected tribal governments, a summary of their concerns, and a statement supporting the need to issue the regulation. Also, Executive Order 13175 requires EPA to develop an effective process permitting elected and other representatives of Indian tribal governments to, "provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities."

US EPA ARCHIVE DOCUMENT

Today's rule implements mandates specifically and explicitly set forth by the U.S. Congress without the exercise of any policy discretion by EPA. This action is proposed under the authority of Sections 3001 (b)(1), and 3001(e)(2) of the Hazardous and Solid Waste Amendments (HSWA) of 1984. These sections direct EPA to make a hazardous waste listing determination for "paint production wastes." Accordingly, the requirements of Executive Order 13175 do not apply to this rule.

Furthermore, today's proposal would not significantly or uniquely affect the communities of Indian tribal governments, nor would it impose substantial direct compliance costs on them. Tribal communities are not known to own or operate any paint/coatings manufacturing facilities, nor are these communities disproportionately located adjacent to or near such facilities. Finally, tribal governments will not be required to assume any administrative or permitting responsibilities associated with this proposed rule.

US EPA ARCHIVE DOCUMENT

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January 19, 2001

Economic Assessment for the Proposed Concentration-Based Listing of Wastewaters and Non-wastewaters from the Production of Paints and Coatings

APPENDICES TO REPORT

DOCKET REPORT

US EPA ARCHIVE DOCUMENT

APPENDIX A
Recent Industry News Article Highlights

"PPG, EPA to speed product approvals." Pittsburgh Post Gazette 15 September 2000.

- Through EPA's Project XL program, PPG plans to utilize EPA's Pollution Prevention Framework database to identify products containing hazardous raw materials. Through use of this database, PPG will be able to introduce products which meet environmental standards to the marketplace at a faster rate.

"Akzo Nobel Buys Coatings." Chemical Market 7, August 2000.

- Akzo Nobel will double its aerospace coatings business through the acquisition of Dexter Corporation's aerospace and specialty coatings business. The acquisition has significantly strengthened Akzo Nobel's position in the coatings market.

"Valspar to acquire Lilly Industries" Chemicalweek 7 July 2000.

- Valspar Industries will acquire paint maker Lilly Industries, based in Indianapolis. The transaction is valued at approximately 975 million dollars. The merger will allow Valspar to offer a broader selection of products to its customers and create greater value for its shareholders. The merger is anticipated to close by the end of the year.

"Scanning Kelvin Probe Promises Corrosion Revolution" Paint and Coatings 22 August 2000.

- The Scanning Kelvin Probe, developed by CSIRO Sustainable Materials Engineering (CSME), is a new scientific instrument which promises to unveil corrosion secrets. This new scientific tool discovers the whole process of corrosion by capturing of the electrochemical reactions which occur during corrosion. This development could significantly reduce the cost of fixing rusty cars or maintaining bridges.

"ICI Canada Partners with EnviroCoatings, Inc." Paint and Coatings 4 August 2000.

- ICI Canada Partners will team up with EnviroCoatings to distribute Ceramic InsulCoat R:E Paint and Coating Systems, a high performance paint and coatings product family. This partnership benefits EnviroCoatings by providing them access to a well established sales and distribution unit and the interaction with the world's leading paint industry.

"BASF builds coatings plant, expands glycols." C&EN 8 March 1999.

- BASF Corporation is building a powder coating plant at its Morgantown, N.C. site. "The 20 million-lb-per-year plant will start up in mid-2000, eventually increasing employment to 50 at the site." Epoxies, acrylics, and hybrid technologies will be used to produce the coatings. In the end, BASF will be able to produce 925 million lbs of ethylene oxide and 860 million lbs of glycols.

"Dupont restructures coatings business." C&EN 12 July 1999

US EPA ARCHIVE DOCUMENT

- Dupont plans to restructure its performance coating business following its acquisition of Herberts. The plan includes a 9 percent reduction in staff. The moves are necessary to streamline operations and improve productivity. Combined, the two companies will be known as Dupont Performance Coatings making Dupont the world's largest supplier of original equipment manufacture and aftermarket coatings and the third largest coatings company.

"PPG completes coatings purchase." C&EN 9 August 1999.

- PPG Industries has completed the purchase of London base ICI's automotive and industrial coatings businesses, as well as automotive solvent and thinner businesses in North America. By year end PPG will close on the purchase of ICI's auto finish and industrial coatings business in Asia, excluding the Indian subcontinent. In a second deal, PPG acquired PRC-De Soto from Akzo Nobel. PRC-De Soto is a global supplier of coatings and sealants for aircraft.

"PPG rolls out auto primer system." C&EN 16 August 1999.

- PPG Industries has introduced a new two-part electrodeposition process which will change the way vehicles are painted. The system includes a corrosion-inhibiting primer followed by a innovative antichip primer-surface coating. The new system will provide a richer coating and cost less then a traditional spray booth. The savings are gained through reduced energy use and labor requirements. In addition, the new process meets stringent environmental regulation by eliminating volatile organic compounds (VOCs).

"Business Roundup." C&EN 15 March 1999.

- BF Goodrich purchased Mydrin textile coatings business of Bostik Ltd., a subsidiary of France's Total. Goodrich was attracted to Mydrin because of its flame-retardant coatings business, which account for 40 percent of 1998 sales.

"Business Roundup." C&EN 27 September 1999.

- Chemetall, a subsidiary of Dynamit Nobel, completed its purchase of Brent International. The acquisition will expand Chemetall surface treatment business.

"Business Roundup." C&EN 25 January 1999.

- BASF Corporation is closing its solvent based automotive paint and coatings manufacturing facility in Detroit. The move will affect about 200 employees. The manufacturing of these products will move to other BASF Corp. facilities.

US EPA ARCHIVE DOCUMENT

"PPG adds to coatings with Belgian buy." C&EN 15 February 1999.

- In an effort to expand business in vehicle refinishes in Europe, PPG has acquired the commercial transport refinish coatings business of Sigma Coatings, a subsidiary of Petrofina. As part of the expansion, about 25 workers will be transferred to PPG.

"Business Roundup." C&EN 13 April 1999.

- Ningbo Powder Coatings, a producers of heat fusible powder coatings located 100 miles south of Shanghai, plans to be sold to Cleveland-based Ferro.

"Valspar to buy Dexter's packaging coatings business." C&EN 31 August 1999.

- Minneapolis-based Valspar Corporation will acquire Windsor Locks, Connecticut based Dexter's packaging coatings business. With operations in more than 12 countries, Dexter's packaging operations produce coatings for beverages and aerosol cans. The purchase of Windsor highlights Valspar's strategy to expand into Europe and other international markets.

"PPG to buy coatings business in Australia." C&EN 31 August 1999.

- In an effort to build its presence in the southern Pacific region, PPG has struck a deal with Orica to purchase its automotive and industrial coatings business. The deal will give PPG manufacturing, office, laboratory, warehouse facilities, and approximately 600 employees. Coatings accounted for 40 percent of PPG total sales in 1997.

"Hoechst to sell its coatings business" C&EN 24 August 1998.

- Hoechst is selling its coatings subsidiary, Herberts, to the investment firm Kohlberg, Kravis, Roberts, and Company and Herberts' managers for $1.7 billion. The proceeds will be used to pay off company debt.

"Hoechst coating going to Dupont" C&EN 2 November 1998.

- Just days after the investment firm Kolberg, Kravis, Roberts, and Company agree to purchase Herberts, the coatings subsidiary of Hoechst, the agreement was dropped because the price was starting to look too high. In the wake of the deal powerhouse Dupont agreed to purchase the coating company and its affiliates.

Note: C&EN = Chemical and Engineering News

US EPA ARCHIVE DOCUMENT

APPENDIX B
1995 and 1997 Biennial Report Data Query Algorithm

Solvent Cleaning Wastes

- Sort based on SIC Code, Source Code and Form Code.
- Keep all records containing SIC Code = 2851, Source Code = A09 (clean-out process equipment), Origin Code = 1 (generated on site from a production process, service activity, or routine cleanup) and Form Codes = B201 through B204, B207, B209, B211)

Caustic Cleaning Wastes:

- Sort based on SIC Code and Source Code.
- Keep all records containing SIC Code = 2851 and Source Code = A03 (caustic cleaning) or A09 (clean-out process equipment), Origin Code = 1 (generated on site from a production process, service activity, or routine cleanup) and Form Codes = B106 - B110

Aqueous Cleaning Wastes:

- Sort based on SIC Code, Source Code and Form Code.
- Keep all records containing SIC Code = 2851 and Source Code = A09 (clean-out process equipment), Origin Code = 1 (generated on site from a production process, service activity, or routine cleanup) and Form Codes = B101, B102, B113, B114, B115

Wastewater Treatment Sludge

- Sort based on SIC Code, Source Code and Form Code.
- Keep all records containing SIC Code = 2851, Source Code = A71 (filtering/screening), A75 (wastewater treatment), or A76 (sludge dewatering), Origin Code = 1 (generated on site from a production process, service activity, or routine cleanup), 3 (derived from the management of a non-hazardous waste), or 5 (residual from on-site TDR of a previously existing hazardous waste) and Form Codes = B301 through B609

Emission Control Dust

- Sort based on SIC Code and Source Code.
- Keep all records containing SIC Code = 2851, Source Code = A78 (air pollution control devices), and Origin Code = 1 (generated on site from a production process, service activity, or routine cleanup), 3 (derived from the management of a non-hazardous waste), or 5 (residual from on-site TDR of a previously existing hazardous waste).

Off-specification Production Wastes:

- Sort based on SIC Code, Source Code and Form Code.
- Keep all records containing SIC Code = 2851, Source Code = A57 (discarding off-spec material) or A58 (discarding out-of-date products or chemicals), and Origin Code = 1 (generated on site from a production process, service activity, or routine cleanup), and Form Code = B001, B003, B004, B009, B101, B102, B113, B201, B202, B203, B204, B207, B209-B212, B219, B315, B316, B403, B405, B409, B604, or B606.

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APPENDIX C

Comparison of Model Facility Waste Generation Rates with 1997 BRS Waste Generation Statistics *					
Model Facility (employees)	**Solvent Cleaning Waste**	**Water/Caustic Cleaning Waste**	**WWTS**	**Emission Control Dust**	**Off Spec Product**
Model Facility Waste Generation Estimates (tons of waste generated per year per facility)**					
10	9.5	7.3	3.0	0.6	2.2
50	58.0	45.0	18.6	3.5	13.4
150	214.0	164.0	68.4	13.0	49.4
300	456.0	349.0	145.6	27.6	105.2
1997 BRS Waste Generation Statistics					
Number of Facilities Reporting	254	20	8	22	181
Total Waste (tons/year)	45,521.0	1,795.0	71.2	232.1	17,388.0
Mean (tons/year/facility)	179.2	89.8	8.9	10.6	96.1
Waste Generation Percentiles (tons of waste generated per year per facility)					
10%	4.3	1.5	0.2	0.2	0.6
25%	16.9	13.4	1.4	0.2	4.7
50%	56.1	33.7	3.0	0.2	15.7
75%	180.3	64.8	16.6	7.7	64.7
90%	382.3	223.6	22.6	19.8	244.6

* **BRS data are limited to a generally small number of firms, all of which are large quantity generators (as are the model facilities). Accordingly, some direct comparisons of the model facility estimates and the BRS data can be made to gain a sense of the validity of the estimates.**

** **Model facility waste generation estimates based on waste generation ratios presented in Table 4-1.**

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APPENDIX D

REPRESENTATIVE FACILITY COMPUTATIONAL TABLES

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DESCRIPTION OF CODES APPLIED IN THE TABLES:

NONWASTEWATERS:

HCS	Hazardous Caustic Sludge
HED	Hazardous Emission Control Dust
HOR	Hazardous Off-Specification Product
HSS	Hazardous Solvent Sludge
HWS	Hazardous Wastewater Sludge
NCS	Nonhazardous Caustic Sludge
NED	Nonhazardous Emission Control Dust
NOR	Nonhazardous Off-Specification Product
NSS	Nonhazardous Solvent Sludge
NWS	Nonhazardous Wastewater Sludge
NWTS	Nonhazardous Wastewater Treatment Sludge

WASTEWATERS:

HCL	Hazardous Caustic Liquid
HSL	Hazardous Solvent Liquid
HWL	Hazardous Wastewater Liquid
NCL	Nonhazardous Caustic Liquid
NSL	Nonhazardous Solvent Liquid
NWL	Nonhazardous Wastewater Liquid

US EPA ARCHIVE DOCUMENT

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TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
1	3.6290	0	0	1,791	0	0	0	0	0	0	7	0	1,798	6,525	11,205
2	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1.0500	0	0	4,970	0	624	0	155	0	0	0	0	5,749	6,036	10,366
4	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	1.2143	0	0	140	0	0	0	0	804	0	0	0	944	1,146	1,968
9	1.0500	0	13,202	848	19,543	0	0	0	0	0	0	0	33,593	35,273	60,575
10	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1.0000	0	0	17,386	8,275	0	0	805	8,590	0	35,381	0	70,437	70,437	120,962
12	1.1951	0	0	0	329	3,289	0	0	0	0	0	0	3,617	4,323	7,424
13	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1.0417	0	0	0	0	0	0	0	0	0	0	2,138	2,138	2,227	3,824
15	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
16	1.2143	0	0	2,153	0	0	0	0	0	0	0	0	2,153	2,615	4,491
17	4.0476	0	0	179	0	0	0	0	0	0	0	0	179	726	1,247
18	1.0417	0	0	230	0	0	0	217	0	0	0	0	447	466	800
19	1.0417	0	0	0	0	0	0	1,431	0	0	1,252	6,158	8,841	9,210	15,816
20	1.0417	0	0	8,669	0	0	0	0	9,017	0	0	0	17,685	18,423	31,638
21	3.6290	0	0	1,446	0	0	0	0	0	0	0	0	1,446	5,248	9,012
22	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	1.0000	0	0	0	0	0	0	716	0	0	0	0	716	716	1,230
26	3.6290	0	0	0	0	0	0	0	0	0	464	0	464	1,686	2,895
27	1.1951	0	0	0	1,282	0	0	0	0	0	0	14,355	15,637	18,688	32,093
28	1.2143	0	0	12,435	0	0	0	70	0	0	0	0	12,504	15,184	26,076
29	4.0476	0	0	0	0	0	0	0	0	0	12	0	12	47	81
30	1.1951	0	0	0	0	0	0	269	0	0	1,909	0	2,178	2,603	4,470
31	1.1951	0	0	0	0	0	0	4,076	0	0	0	0	4,076	4,871	8,365
32	1.0417	0	0	4,091	326	0	0	0	0	0	0	0	4,418	4,602	7,903
33	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
34	1.1951	0	0	0	0	0	0	262	0	0	12,364	0	12,627	15,090	25,914
35	1.1951	0	0	1,328	1,482	0	0	0	0	0	0	0	2,810	3,358	5,767
36	4.0476	0	0	0	5,175	0	0	0	0	0	0	0	5,175	20,947	35,973
37	1.1951	0	0	1,826	249	0	0	0	0	0	0	0	2,076	2,481	4,261
38	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	1.0500	0	0	0	0	0	0	2,322	0	0	0	1,610	3,933	4,129	7,091
40	1.0500	0	0	0	0	0	0	0	1,613	0	0	0	1,613	1,694	2,909
41	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	1.0000	0	0	0	1,464	0	0	0	0	0	0	0	1,464	1,464	2,514
43	3.6290	0	0	0	0	0	0	233	198	0	0	0	431	1,565	2,688
44	4.0476	0	0	0	0	0	0	0	27,309	0	0	0	27,309	110,537	189,827
45	1.0000	0	0	3,517	0	0	0	1,253	8,610	0	0	0	13,380	13,380	22,978
46	1.1951	0	0	0	2,455	0	0	0	0	0	0	0	2,455	2,934	5,039
47	1.1951	0	0	21,824	0	0	0	579	2,761	0	0	0	25,163	30,073	51,645
48	3.6290	0	0	3,647	0	0	0	0	0	0	0	0	3,647	13,236	22,730
49	1.1951	0	0	0	0	0	0	697	0	0	0	2,710	3,407	4,072	6,993
50	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	1.1951	0	0	61,012	0	0	0	1,303	0	0	0	0	62,315	74,473	127,894

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TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
52	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	1.1951	0	0	0	0	0	0	63,324	0	0	17,536	0	80,860	96,635	165,953
54	1.0000	0	0	4,500	0	0	0	0	1,841	0	0	0	6,341	6,341	10,889
55	1.0417	0	0	70,283	712,912	0	0	0	6,809	0	0	0	790,004	822,947	1,413,259
56	1.0417	0	0	17,355	0	0	0	0	0	0	0	0	17,355	18,079	31,047
57	1.0500	0	0	0	0	0	0	141	0	0	0	0	141	148	254
58	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	1.0000	1,215	0	4,739	8,601	0	0	0	0	0	0	0	14,555	14,555	24,996
61	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	1.2143	0	0	0	21,946	0	0	0	0	0	0	0	21,946	26,649	45,765
63	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	1.0417	0	0	214,335	0	0	0	0	0	0	0	0	214,335	223,273	383,430
66	3.6290	0	0	0	1,445	0	0	0	0	0	0	0	1,445	5,244	9,006
67	1.0000	48,872	0	21,618	42,499	0	0	1,553	9,578	0	0	0	124,120	124,120	213,153
68	4.0476	0	0	0	0	0	0	0	0	9	58	0	67	273	469
69	1.0417	0	0	7,969	0	0	0	0	0	0	0	0	7,969	8,301	14,255

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TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
70	1.1951	0	0	0	2,530	0	0	402	0	0	551	0	3,484	4,163	7,149
71	1.1951	0	0	0	0	0	0	232	0	0	0	0	232	278	477
72	1.0000	0	0	14,235	0	0	0	2,207	0	0	0	0	16,442	16,442	28,236
73	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	4.0476	0	0	1,774	668	0	0	0	887	0	0	0	3,329	13,476	23,143
75	3.6290	0	0	34,404	38,325	0	0	0	0	0	0	0	72,729	263,934	453,258
76	1.2143	0	0	0	0	0	0	0	0	0	3,367	0	3,367	4,089	7,022
77	1.0417	0	0	5,703	0	0	0	0	0	0	0	0	5,703	5,941	10,203
78	4.0476	0	0	3,452	0	0	0	0	0	0	0	0	3,452	13,973	23,996
79	4.0476	0	5	55	0	0	0	0	0	0	0	0	60	242	416
80	1.0500	236	0	9,187	450	0	0	3,412	0	0	0	0	13,285	13,950	23,957
81	1.0417	0	0	0	0	0	0	313	3,594	2,217	0	0	6,124	6,380	10,956
82	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	1.1951	0	0	5,740	0	0	0	0	0	0	0	0	5,740	6,860	11,781
84	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	4.0476	0	0	0	617	0	0	0	0	0	0	0	617	2,497	4,288
86	1.1951	0	6	0	184	0	0	93	0	0	0	0	283	338	580
87	1.1951	0	0	35,986	0	0	0	0	0	0	0	0	35,986	43,007	73,857

US EPA ARCHIVE DOCUMENT

TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
88	1.2143	0	0	230	0	0	0	0	0	0	0	0	230	280	481
89	1.1951	0	0	0	5,588	0	0	604	0	0	0	0	6,192	7,400	12,708
90	1.1951	0	0	2,209	11,047	0	0	139	736	0	0	0	14,132	16,889	29,004
91	1.0500	0	0	0	0	0	0	16	0	0	0	0	16	17	29
92	1.0500	0	0	3,230	0	0	0	0	0	0	0	0	3,230	3,391	5,823
93	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	3.6290	0	0	2,536	4,091	0	0	0	1,236	0	0	0	7,863	28,535	49,004
95	4.0476	0	0	0	1,198	0	0	0	0	0	0	0	1,198	4,850	8,329
96	1.1951	0	0	248	8,645	0	0	0	383	0	3,444	0	12,720	15,202	26,107
97	4.0476	0	0	0	2,207	0	0	0	0	0	0	0	2,207	8,933	15,341
98	1.1951	0	0	0	0	0	0	0	0	0	0	6,028	6,028	7,204	12,372
99	1.0000	0	0	57,595	27,559	0	0	0	8,173	0	0	0	93,328	93,328	160,274
100	4.0476	0	0	2,834	32,947	0	0	1,360	9,549	0	6,271	11,787	64,748	262,076	450,067
101	1.2143	0	0	274	0	0	0	0	0	0	0	0	274	333	572
102	1.2143	0	0	0	0	0	0	0	0	0	0	111	111	135	232
103	1.0000	1,656	0	76,581	151,736	0	0	74	12,193	0	0	0	242,240	242,240	416,002
104	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	1.0000	10,720	0	54,721	0	0	0	644	62,724	0	0	0	128,810	128,810	221,207

US EPA ARCHIVE DOCUMENT

TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
106	1.1951	0	0	0	368	8,933	0	0	0	0	0	0	9,301	11,116	19,090
107	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	1.0500	0	0	3,674	3,870	0	0	0	0	0	0	0	7,544	7,922	13,605
110	1.2143	0	0	2,639	0	0	0	0	0	0	0	0	2,639	3,204	5,502
111	1.0500	0	0	34,590	0	0	0	0	15,599	0	0	0	50,188	52,698	90,499
112	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	4.0476	0	0	549	0	0	0	0	0	0	0	0	549	2,222	3,816
114	1.0500	0	0	10,018	0	0	0	0	12,234	0	0	0	22,253	23,365	40,125
115	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	1.0500	0	204	6,792	27,872	0	0	0	0	0	0	0	34,868	36,612	62,874
117	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	1.1951	0	0	0	0	0	0	0	0	0	0	2,093	2,093	2,502	4,297
119	1.0417	0	0	20,697	0	0	0	292	6,899	0	0	1,930	29,818	31,062	53,343
120	1.1951	0	0	0	0	0	0	464	0	0	0	0	464	555	953
121	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
124	1.1951	0	0	2,429	331	0	0	0	442	97	0	0	3,299	3,943	6,771
125	2.1667	0	0	0	8,771	0	0	0	0	0	0	0	8,771	19,005	32,638
126	8.8571	0	0	6,094	19,691	0	570	0	4,034	0	2,378	0	32,767	290,220	498,399
127	8.8571	0	0	0	0	0	0	0	0	0	970	0	970	8,592	14,755
128	1.8571	0	0	4,764	9,152	0	0	0	2,704	0	79	0	16,699	31,011	53,256
129	2.1667	0	0	0	23	0	0	0	0	0	0	0	23	50	86
130	7.6154	0	0	0	0	0	0	0	4,717	0	0	0	4,717	35,921	61,688
131	1.0000	13,708	2,037	73,182	435,909	0	0	0	0	0	0	0	524,836	524,836	901,308
132	1.0000	0	0	0	7,483	0	0	2,328	0	0	0	1,035	10,846	10,846	18,626
133	1.0000	0	0	67,631	1,380	0	0	22	0	0	0	0	69,033	69,033	118,551
134	8.8571	0	0	1,202	1,149	0	0	0	177	0	0	0	2,528	22,390	38,451
135	2.1667	0	0	0	0	0	0	1,932	4,436	0	1,161	0	7,530	16,314	28,016
136	2.1667	0	0	7,096	6,773	0	0	0	0	0	0	0	13,869	30,050	51,605
137	7.6154	0	0	0	0	0	0	5,636	3,845	0	0	0	9,481	72,198	123,987
138	1.8571	0	0	0	4,291	0	0	139	0	0	0	0	4,430	8,228	14,130
139	8.8571	0	0	0	0	0	0	0	0	58	0	0	58	514	883
140	1.8571	397	0	1,753	2,688	0	0	0	0	0	0	0	4,838	8,984	15,428
141	1.0000	0	0	82,313	0	0	0	639	0	0	0	0	82,951	82,951	142,453

US EPA ARCHIVE DOCUMENT

TABLE 1: BASELINE WASTE MANAGEMENT COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Total	Weighted Total	Universe Total
142	1.0000	0	0	69,015	82,818	0	0	3,008	7,665	0	128,820	32,205	323,531	323,531	555,604
143	1.8571	0	0	0	0	0	0	0	0	0	523	0	523	970	1,666
144	1.8571	0	0	49,983	0	0	0	0	1,989	0	0	0	51,972	96,518	165,752
145	2.1667	0	0	460	1,045	0	0	77	0	0	0	1,300	2,882	6,243	10,721
146	7.6154	0	0	0	0	0	0	0	0	0	0	162	162	1,235	2,121
147	8.8571	0	0	0	0	0	0	139	0	0	0	0	139	1,234	2,119
148	2.2500	0	0	6,785	1,660	0	0	261	5,339	0	0	0	14,046	31,605	54,276
149	2.2500	0	0	29,182	0	0	0	383	4,147	0	0	552	34,264	77,093	132,393
150	8.8571	0	0	0	0	0	0	0	0	0	7	0	7	63	108
151	8.8571	0	0	665	0	0	0	0	1,518	0	22	0	2,205	19,527	33,534
Total		**76,805**	**15,454**	**1,280,801**	**1,731,053**	**12,845**	**570**	**104,222**	**252,351**	**2,382**	**216,577**	**84,175**	**3,777,234**	**5,036,606**	**8,649,440**

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
1	3.6290	0	0	0	0	0	0	0	0	0
2	3.6290	0	0	0	0	0	0	0	0	0
3	1.0500	0	0	0	0	0	0	0	0	0
4	3.6290	0	149	0	0	0	0	149	542	931
5	4.0476	0	0	0	0	0	0	0	0	0
6	4.0476	0	2,213	0	0	0	0	2,213	8,959	15,385
7	1.0417	0	32,288	0	0	0	0	32,288	33,635	57,762
8	1.2143	1,888	1,258	270	0	0	4,764	8,180	9,932	17,056
9	1.0500	0	9,131	0	0	0	0	9,131	9,588	16,466
10	3.6290	0	0	0	0	0	3,827	3,827	13,887	23,848
11	1.0000	0	65,625	0	0	0	0	65,625	65,625	112,699
12	1.1951	0	0	0	0	0	0	0	0	0
13	1.1951	0	0	0	0	0	0	0	0	0
14	1.0417	0	0	0	0	0	0	0	0	0
15	3.6290	0	414	0	0	0	0	414	1,502	2,579
16	1.2143	0	0	0	0	0	0	0	0	0
17	4.0476	0	2,266	0	0	0	0	2,266	9,174	15,755
18	1.0417	0	5,323	0	0	0	0	5,323	5,545	9,523
19	1.0417	0	12,996	0	0	0	0	12,996	13,538	23,249

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
20	1.0417	0	2,070	0	0	0	187	2,257	2,351	4,037
21	3.6290	0	3,133	0	0	0	0	3,133	11,370	19,526
22	1.2143	0	427	0	0	0	0	427	519	891
23	1.2143	0	937	0	0	0	0	937	1,137	1,953
24	1.1951	0	645	0	0	0	0	645	770	1,322
25	1.0000	0	0	0	0	0	0	0	0	0
26	3.6290	0	0	0	0	0	0	0	0	0
27	1.1951	0	3,663	0	0	0	0	3,663	4,378	7,518
28	1.2143	0	37,429	0	0	0	0	37,429	45,450	78,052
29	4.0476	0	0	0	0	0	0	0	0	0
30	1.1951	0	345	0	0	0	0	345	412	708
31	1.1951	0	0	0	0	0	0	0	0	0
32	1.0417	0	630	0	0	0	0	630	657	1,128
33	4.0476	0	0	0	0	0	0	0	0	0
34	1.1951	0	0	0	0	0	7,381	7,381	8,821	15,148
35	1.1951	0	3,347	0	0	0	0	3,347	4,000	6,869
36	4.0476	0	0	0	0	0	0	0	0	0
37	1.1951	0	10,984	0	0	0	0	10,984	13,126	22,541
38	1.2143	0	828	0	0	0	0	828	1,005	1,726

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
39	1.0500	0	6,526	0	0	0	0	6,526	6,852	11,767
40	1.0500	0	0	0	0	0	0	0	0	0
41	4.0476	0	28,886	0	0	0	0	28,886	116,920	200,788
42	1.0000	0	831	0	0	0	0	831	831	1,427
43	3.6290	0	0	0	0	0	0	0	0	0
44	4.0476	0	0	0	0	0	0	0	0	0
45	1.0000	0	0	0	0	0	0	0	0	0
46	1.1951	2,425	0	0	0	0	0	2,425	2,898	4,977
47	1.1951	0	19,802	0	0	0	2,551	22,353	26,714	45,876
48	3.6290	0	48,363	0	0	0	0	48,363	175,511	301,408
49	1.1951	0	0	0	0	0	0	0	0	0
50	3.6290	0	0	0	0	0	0	0	0	0
51	1.1951	0	36,582	0	0	0	0	36,582	43,719	75,079
52	1.2143	0	0	0	0	0	0	0	0	0
53	1.1951	0	2,988	0	0	0	0	2,988	3,571	6,133
54	1.0000	0	0	0	0	0	0	0	0	0
55	1.0417	0	1,425,824	0	0	0	0	1,425,824	1,485,281	2,550,695
56	1.0417	0	636,088	0	0	0	0	636,088	662,613	1,137,915
57	1.0500	0	54,489	0	0	0	0	54,489	57,214	98,254

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
58	1.2143	0	20,998	0	0	0	0	20,998	25,498	43,788
59	4.0476	0	1,981	9,061	0	0	0	11,042	44,695	76,755
60	1.0000	6,948	151,185	0	0	0	0	158,133	158,133	271,564
61	1.1951	0	22,995	0	0	0	0	22,995	27,481	47,194
62	1.2143	0	37,036	17,426	0	0	0	54,462	66,133	113,571
63	1.1951	0	19,654	0	0	0	19,794	39,448	47,145	80,963
64	4.0476	0	1,274	968	0	0	215	2,457	9,945	17,079
65	1.0417	0	77,823	0	0	0	0	77,823	81,068	139,219
66	3.6290	0	3,418	0	0	0	0	3,418	12,405	21,303
67	1.0000	0	0	14,447	0	0	0	14,447	14,447	24,810
68	4.0476	0	0	0	0	0	0	0	0	0
69	1.0417	0	33,149	0	0	0	0	33,149	34,532	59,302
70	1.1951	0	3,678	0	0	0	0	3,678	4,396	7,549
71	1.1951	0	17,592	0	0	0	0	17,592	21,024	36,105
72	1.0000	0	0	0	0	0	0	0	0	0
73	1.2143	0	0	0	0	0	0	0	0	0
74	4.0476	0	0	0	0	0	0	0	0	0
75	3.6290	0	0	6,679	0	0	56,771	63,450	230,258	395,425
76	1.2143	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
77	1.0417	0	0	0	0	0	0	0	0	0
78	4.0476	0	1,490	0	0	0	285	1,775	7,183	12,335
79	4.0476	0	0	0	0	0	0	0	0	0
80	1.0500	0	12,277	0	0	0	2,503	14,780	15,519	26,651
81	1.0417	0	80,203	0	0	0	0	80,203	83,548	143,478
82	1.1951	0	0	0	0	0	0	0	0	0
83	1.1951	0	78,449	0	0	0	0	78,449	93,754	161,005
84	1.2143	0	3,408	0	0	0	0	3,408	4,138	7,106
85	4.0476	0	0	0	0	0	0	0	0	0
86	1.1951	0	736	0	0	0	0	736	879	1,510
87	1.1951	0	36,796	0	0	0	0	36,796	43,975	75,519
88	1.2143	0	26,876	6,375	0	0	0	33,251	40,376	69,338
89	1.1951	0	5,588	0	0	0	0	5,588	6,679	11,470
90	1.1951	0	3,208	3,274	0	0	674	7,155	8,551	14,685
91	1.0500	0	18,214	0	0	0	0	18,214	19,125	32,844
92	1.0500	0	942	0	0	0	0	942	989	1,698
93	1.1951	0	34,336	0	0	0	0	34,336	41,035	70,470
94	3.6290	0	3,061	0	0	0	539	3,600	13,065	22,437
95	4.0476	0	7,040	0	0	0	0	7,040	28,496	48,937

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
96	1.1951	0	0	0	0	0	0	0	0	0
97	4.0476	0	0	0	0	0	0	0	0	0
98	1.1951	0	2,693	0	0	0	0	2,693	3,219	5,528
99	1.0000	2,236	185,335	0	0	0	0	187,572	187,572	322,120
100	4.0476	0	123,656	0	0	0	0	123,656	500,510	859,533
101	1.2143	0	30,298	3,459	0	0	0	33,757	40,991	70,394
102	1.2143	0	0	0	0	0	0	0	0	0
103	1.0000	0	0	0	0	0	0	0	0	0
104	1.1951	0	0	0	0	0	0	0	0	0
105	1.0000	0	9,620	0	0	0	0	9,620	9,620	16,521
106	1.1951	0	276	69	0	0	0	345	412	708
107	4.0476	0	0	420	0	0	0	420	1,700	2,919
108	3.6290	0	44,431	0	0	0	0	44,431	161,240	276,900
109	1.0500	0	11,593	0	0	0	0	11,593	12,173	20,905
110	1.2143	0	365	302	0	0	0	667	810	1,391
111	1.0500	0	2,585	6,139	0	1,787	0	10,511	11,037	18,954
112	3.6290	0	112	0	0	0	0	112	405	696
113	4.0476	0	3,293	0	0	0	0	3,293	13,330	22,892
114	1.0500	0	5,096	0	0	0	0	5,096	5,350	9,188

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
115	3.6290	0	184,410	0	0	0	0	184,410	669,225	1,149,270
116	1.0500	0	48,133	0	0	0	0	48,133	50,539	86,791
117	1.1951	0	0	0	0	0	0	0	0	0
118	1.1951	0	0	0	0	0	0	0	0	0
119	1.0417	0	9,263	0	0	0	0	9,263	9,650	16,572
120	1.1951	0	159,581	0	0	0	0	159,581	190,716	327,519
121	4.0476	0	258	0	0	0	0	258	1,044	1,793
122	3.6290	0	2,291	0	0	0	0	2,291	8,312	14,274
123	1.2143	0	6,018	0	0	0	0	6,018	7,308	12,550
124	1.1951	0	14,282	0	0	0	0	14,282	17,068	29,311
125	2.1667	0	20,466	0	0	0	0	20,466	44,343	76,151
126	8.8571	0	29,240	0	0	0	0	29,240	258,978	444,747
127	8.8571	0	0	0	0	0	0	0	0	0
128	1.8571	0	903	2,704	0	0	0	3,606	6,697	11,501
129	2.1667	0	0	0	0	0	0	0	0	0
130	7.6154	0	6,872	0	0	0	0	6,872	52,330	89,867
131	1.0000	67,266	94,657	0	0	0	0	161,923	161,923	278,073
132	1.0000	0	0	0	0	0	0	0	0	0
133	1.0000	0	44,059	0	0	0	0	44,059	44,059	75,663

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TABLE 2: BASELINE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
134	8.8571	0	34,574	966	0	0	0	35,539	314,776	540,569
135	2.1667	0	0	0	0	0	0	0	0	0
136	2.1667	0	5,363	0	0	0	0	5,363	11,620	19,955
137	7.6154	0	0	0	0	0	0	0	0	0
138	1.8571	0	17,168	0	0	0	0	17,168	31,883	54,753
139	8.8571	0	0	0	0	0	0	0	0	0
140	1.8571	0	0	0	0	0	0	0	0	0
141	1.0000	0	278,690	0	0	0	0	278,690	278,690	478,598
142	1.0000	0	243,485	0	0	0	0	243,485	243,485	418,140
143	1.8571	0	0	0	0	0	0	0	0	0
144	1.8571	0	0	0	0	0	0	0	0	0
145	2.1667	0	0	0	0	0	0	0	0	0
146	7.6154	0	0	0	0	0	0	0	0	0
147	8.8571	0	0	0	0	0	0	0	0	0
148	2.2500	0	36,931	0	0	0	0	36,931	83,096	142,702
149	2.2500	0	19,942	0	0	0	0	19,942	44,870	77,056
150	8.8571	0	0	0	0	0	0	0	0	0
151	8.8571	0	0	0	0	0	0	0	0	0
Total		**80,764**	**4,835,829**	**72,558**	**0**	**1,787**	**99,490**	**5,090,428**	**7,511,500**	**12,899,605**

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TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total[2]	Weighted Total	Universe Total
1	3.6290	0	0	1,791	0	0	0	0	0	0	20	0	1,811	6,548	11,25
2	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	1.0500	0	0	4,970	0	624	0	444	0	0	0	0	6,038	6,188	10,63
4	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
6	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
7	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	
8	1.2143	0	0	140	0	0	0	0	804	0	0	0	944	1,146	1,97
9	1.0500	0	13,645	848	20,198	0	0	0	0	0	0	0	34,691	35,849	61,56
10	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	1.0000	0	0	17,386	8,275	0	0	2,161	56,949	0	242,423	0	327,195	198,816	341,43
12	1.1951	0	0	0	329	3,289	0	0	0	0	0	0	3,617	4,323	7,42
13	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
14	1.0417	0	0	0	0	0	0	0	0	0	0	3,169	3,169	2,764	4,75
15	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
16	1.2143	0	0	2,153	0	0	0	0	0	0	0	0	2,153	2,615	4,49
17	4.0476	0	0	179	0	0	0	0	0	0	0	0	179	726	1,25
18	1.0417	0	0	230	0	0	0	621	0	0	0	0	851	676	1,16
19	1.0417	0	0	0	0	0	0	4,096	0	0	1,252	64,187	69,535	40,822	70,11
20	1.0417	0	0	8,669	0	0	0	0	15,340	0	0	0	24,009	21,716	37,29
21	3.6290	0	0	1,446	0	0	0	0	0	0	0	0	1,446	5,248	9,01
22	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
23	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
25	1.0000	0	0	0	0	0	0	2,050	0	0	0	0	2,050	1,383	2,38

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TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total[2]	Weighted Total	Universe Total
26	3.6290	0	0	0	0	0	0	0	0	0	1,330	0	1,330	3,256	5,59
27	1.1951	0	0	0	1,282	0	0	0	0	0	0	14,836	16,118	18,976	32,59
28	1.2143	0	0	12,435	0	0	0	199	0	0	0	0	12,634	15,263	26,21
29	4.0476	0	0	0	0	0	0	0	0	0	33	0	33	91	16
30	1.1951	0	0	0	0	0	0	770	0	0	19,898	0	20,668	13,652	23,44
31	1.1951	0	0	0	0	0	0	11,670	0	0	0	0	11,670	9,409	16,16
32	1.0417	0	0	4,091	335	0	0	0	0	0	0	0	4,427	4,606	7,91
33	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
34	1.1951	0	0	0	0	0	0	272	0	0	12,801	0	13,073	15,356	26,37
35	1.1951	0	0	1,328	1,482	0	0	0	0	0	0	0	2,810	3,358	5,77
36	4.0476	0	0	0	5,175	0	0	0	0	0	0	0	5,175	20,947	35,97
37	1.1951	0	0	1,826	249	0	0	0	0	0	0	0	2,076	2,481	4,26
38	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
39	1.0500	0	0	0	0	0	0	6,650	0	0	0	16,783	23,433	14,366	24,67
40	1.0500	0	0	0	0	0	0	0	1,613	0	0	0	1,613	1,694	2,91
41	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
42	1.0000	0	0	0	1,503	0	0	0	0	0	0	0	1,503	1,484	2,55
43	3.6290	0	0	0	0	0	0	667	549	0	0	0	1,215	2,988	5,13
44	4.0476	0	0	0	0	0	0	0	27,309	0	0	0	27,309	110,537	189,83
45	1.0000	0	0	3,517	0	0	0	3,588	23,823	0	0	0	30,928	22,154	38,05
46	1.1951	0	0	0	2,520	0	0	0	0	0	0	0	2,520	2,973	5,11
47	1.1951	0	0	21,824	0	0	0	1,657	33,501	0	0	0	56,982	49,086	84,30
48	3.6290	0	0	3,647	0	0	0	0	0	0	0	0	3,647	13,236	22,73
49	1.1951	0	0	0	0	0	0	1,995	0	0	0	7,768	9,763	7,870	13,51
50	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	

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TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total[2]	Weighted Total	Universe Total
51	1.1951	0	0	61,012	0	0	0	3,730	0	0	0	0	64,742	75,924	130,38
52	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
53	1.1951	0	0	0	0	0	0	659,995	0	0	182,766	0	842,761	551,910	947,80
54	1.0000	0	0	4,500	0	0	0	0	1,841	0	0	0	6,341	6,341	10,89
55	1.0417	0	0	70,283	712,912	0	0	0	7,647	0	0	0	790,842	823,384	1,414,01
56	1.0417	0	0	17,355	0	0	0	0	0	0	0	0	17,355	18,079	31,05
57	1.0500	0	0	0	0	0	0	404	0	0	0	0	404	286	49
58	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
59	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
60	1.0000	1,247	0	4,739	8,601	0	0	0	0	0	0	0	14,587	14,571	25,02
61	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
62	1.2143	0	0	0	21,946	0	0	0	0	0	0	0	21,946	26,649	45,76
63	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
64	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
65	1.0417	0	0	214,335	0	0	0	0	0	0	0	0	214,335	223,273	383,43
66	3.6290	0	0	0	1,445	0	0	0	0	0	0	0	1,445	5,244	9,01
67	1.0000	50,510	0	21,618	42,499	0	0	4,169	9,578	0	0	0	128,375	126,248	216,81
68	4.0476	0	0	0	0	0	0	0	0	34	166	0	200	541	93
69	1.0417	0	0	7,969	0	0	0	0	0	0	0	0	7,969	8,301	14,26
70	1.1951	0	0	0	2,530	0	0	1,152	0	0	551	0	4,233	4,611	7,92
71	1.1951	0	0	0	0	0	0	665	0	0	0	0	665	536	92
72	1.0000	0	0	14,235	0	0	0	6,319	0	0	0	0	20,554	18,498	31,77
73	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
74	4.0476	0	0	4,910	2,415	0	0	0	2,455	0	0	0	9,780	26,530	45,56
75	3.6290	0	0	34,404	38,325	0	0	0	0	0	0	0	72,729	263,934	453,26

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TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total[2]	Weighted Total	Universe Total
76	1.2143	0	0	0	0	0	0	0	0	0	9,642	0	9,642	7,898	13,56
77	1.0417	0	0	5,703	0	0	0	0	0	0	0	0	5,703	5,941	10,20
78	4.0476	0	0	3,452	0	0	0	0	0	0	0	0	3,452	13,973	24,00
79	4.0476	0	5	55	0	0	0	0	0	0	0	0	60	242	42
80	1.0500	243	0	9,187	462	0	0	3,533	0	0	0	0	13,424	14,022	24,08
81	1.0417	0	0	0	0	0	0	895	36,245	23,110	0	0	60,251	34,572	59,37
82	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
83	1.1951	0	0	5,740	0	0	0	0	0	0	0	0	5,740	6,860	11,78
84	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
85	4.0476	0	0	0	617	0	0	0	0	0	0	0	617	2,497	4,29
86	1.1951	0	17	0	184	0	0	266	0	0	0	0	467	448	77
87	1.1951	0	0	35,986	0	0	0	0	0	0	0	0	35,986	43,007	73,86
88	1.2143	0	0	230	0	0	0	0	0	0	0	0	230	280	48
89	1.1951	0	0	0	5,588	0	0	1,729	0	0	0	0	7,317	8,072	13,86
90	1.1951	0	0	2,209	11,341	0	0	399	736	0	0	0	14,686	17,220	29,57
91	1.0500	0	0	0	0	0	0	17	0	0	0	0	17	17	3
92	1.0500	0	0	3,230	0	0	0	0	0	0	0	0	3,230	3,391	5,82
93	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
94	3.6290	0	0	2,536	4,200	0	0	0	1,236	0	0	0	7,972	28,732	49,34
95	4.0476	0	0	0	1,198	0	0	0	0	0	0	0	1,198	4,850	8,33
96	1.1951	0	0	248	8,645	0	0	0	1,061	0	22,373	0	32,327	26,918	46,23
97	4.0476	0	0	0	2,207	0	0	0	0	0	0	0	2,207	8,933	15,34
98	1.1951	0	0	0	0	0	0	0	0	0	0	62,826	62,826	41,144	70,66
99	1.0000	0	0	57,595	27,559	0	0	0	12,131	0	0	0	97,286	95,307	163,67
100	4.0476	0	0	2,834	32,947	0	0	14,178	89,156	0	65,360	122,851	327,326	793,480	1,362,66

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TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total[2]	Weighted Total	Universe Total
101	1.2143	0	0	274	0	0	0	0	0	0	0	0	274	333	57
102	1.2143	0	0	0	0	0	0	0	0	0	0	319	319	261	45
103	1.0000	1,656	0	76,581	151,736	0	0	199	20,786	0	0	0	250,959	246,600	423,49
104	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
105	1.0000	10,720	0	54,721	0	0	0	1,845	62,724	0	0	0	130,010	129,410	222,24
106	1.1951	0	0	0	368	8,933	0	0	0	0	0	0	9,301	11,116	19,09
107	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
108	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
109	1.0500	0	0	3,674	3,870	0	0	0	0	0	0	0	7,544	7,922	13,60
110	1.2143	0	0	2,639	0	0	0	0	0	0	0	0	2,639	3,204	5,50
111	1.0500	0	0	34,590	0	0	0	0	15,599	0	0	0	50,188	52,698	90,50
112	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
113	4.0476	0	0	549	0	0	0	0	0	0	0	0	549	2,222	3,82
114	1.0500	0	0	10,018	0	0	0	0	12,234	0	0	0	22,253	23,365	40,13
115	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
116	1.0500	0	549	6,792	27,872	0	0	0	0	0	0	0	35,213	36,792	63,18
117	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	
118	1.1951	0	0	0	0	0	0	0	0	0	0	21,818	21,818	14,288	24,54
119	1.0417	0	0	20,697	0	0	0	836	6,899	0	0	20,112	48,545	40,816	70,09
120	1.1951	0	0	0	0	0	0	1,330	0	0	0	0	1,330	1,072	1,84
121	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	
122	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	
123	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	
124	1.1951	0	0	2,429	331	0	0	0	442	351	0	0	3,553	4,095	7,03
125	2.1667	0	0	0	8,771	0	0	0	0	0	0	0	8,771	19,005	32,64

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TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total[2]	Weighted Total	Universe Total
126	8.8571	0	0	6,094	19,691	0	585	0	4,034	0	2,462	0	32,866	290,659	499,15
127	8.8571	0	0	0	0	0	0	0	0	0	2,778	0	2,778	16,596	28,50
128	1.8571	0	0	4,764	9,152	0	0	0	7,482	0	226	0	21,624	35,584	61,11
129	2.1667	0	0	0	84	0	0	0	0	0	0	0	84	116	20
130	7.6154	0	0	0	0	0	0	0	11,442	0	0	0	11,442	61,528	105,66
131	1.0000	14,073	13,957	73,182	435,909	0	0	0	0	0	0	0	537,121	530,978	911,86
132	1.0000	0	0	0	7,602	0	0	6,665	0	0	0	2,966	17,233	14,040	24,11
133	1.0000	0	0	67,631	1,380	0	0	62	0	0	0	0	69,073	69,053	118,59
134	8.8571	0	0	1,202	1,149	0	0	0	490	0	0	0	2,841	23,775	40,83
135	2.1667	0	0	0	0	0	0	20,140	12,274	0	3,325	0	35,739	46,874	80,50
136	2.1667	0	0	7,096	6,773	0	0	0	0	0	0	0	13,869	30,050	51,61
137	7.6154	0	0	0	0	0	0	58,740	10,638	0	0	0	69,378	300,270	515,66
138	1.8571	0	0	0	4,291	0	0	399	0	0	0	0	4,690	8,469	14,54
139	8.8571	0	0	0	0	0	0	0	0	210	0	0	210	1,187	2,04
140	1.8571	397	0	1,753	2,688	0	0	0	0	0	0	0	4,838	8,984	15,43
141	1.0000	0	0	82,313	0	0	0	1,829	0	0	0	0	84,141	83,546	143,47
142	1.0000	0	0	69,015	85,594	0	0	31,351	77,297	0	1,342,635	335,659	1,941,550	1,132,540	1,944,93
143	1.8571	0	0	0	0	0	0	0	0	0	1,496	0	1,496	1,874	3,22
144	1.8571	0	0	49,983	0	0	0	0	2,592	0	0	0	52,576	97,078	166,71
145	2.1667	0	0	460	1,045	0	0	219	0	0	0	3,725	5,450	9,026	15,50
146	7.6154	0	0	0	0	0	0	0	0	0	0	465	465	2,388	4,10
147	8.8571	0	0	0	0	0	0	399	0	0	0	0	399	2,384	4,09
148	2.2500	0	0	6,785	1,660	0	0	748	53,845	0	0	0	63,039	86,722	148,93
149	2.2500	0	0	29,182	0	0	0	1,097	4,147	0	0	6,407	40,833	84,484	145,08
150	8.8571	0	0	0	0	0	0	0	0	0	21	0	21	122	21
151	8.8571	0	0	665	0	0	0	0	1,518	0	63	0	2,246	19,709	33,85

TABLE 3: COMPLIANCE WASTE MANAGEMENT COSTS FOR NON-WASTEWATER (1999$/year)

Facility ID	Weighting[1]	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total [2]	Weighted Total	Universe Total
TOTAL		78,846	28,171	1,283,936	1,736,940	12,845	585	860,150	626,416	23,705	1,911,621	683,891	7,247,107	7,566,504	12,994,10

1 Model facility weighting factor is expressed up to four decimal places

2 Numbers may not add due to rounding

3 Weighted total is unweighted total times 0.5 plus unweighted total for baseline times 0.5 (to account for the wastes that are not hazardous and managed the same as under baseline) and then multiplied by the weighting factor to arrive at the sampling universe

4 Weighted total times extrapolation factor 1.7173 (972/566) to arrive at the industry total

5 The solid waste generated/facility included in the above table are as follows: Hazardous Caustic Cleaning Residual Sludge (HCS), Hazardous Emission Control Dust (HED), Hazardous Off-Specification Production Residual (HOR), Hazardous Solvent Cleaning Residual Sludge (HSS), Hazardous Water Cleaning Residual Sludge (HWS), Nonhazardous Caustic Cleaning Residual Sludge (NCS), Nonhazardous Emission Control Dust (NED), Nonhazardous Off-Specification Production Residual (NOR), Nonhazardous Solvent Cleaning Residual Sludge (NSS), Nonhazardous Water Cleaning Residual Sludge (NWS), Nonhazardous Wastewater Treatment Sludge (NWTS).

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
1	3.6290	0	0	0	0	0	2	2	8	14
2	3.6290	0	0	0	0	0	0	0	0	0
3	1.0500	0	0	0	0	0	308	308	323	555
4	3.6290	0	149	0	0	0	0	149	542	931
5	4.0476	0	0	0	0	0	3	3	11	19
6	4.0476	0	2,213	0	0	0	0	2,213	8,959	15,385
7	1.0417	0	32,288	122	0	0	0	32,410	33,762	57,980
8	1.2143	1,920	1,258	274	0	0	4,844	8,296	10,074	17,300
9	1.0500	0	9,720	0	0	0	0	9,720	10,206	17,527
10	3.6290	0	0	0	0	0	3,891	3,891	14,121	24,250
11	1.0000	0	65,625	0	0	0	41	65,666	65,666	112,769
12	1.1951	0	0	0	0	0	0	0	0	0
13	1.1951	0	0	0	0	0	115	115	137	235
14	1.0417	0	0	0	0	0	146	146	152	261
15	3.6290	0	414	0	0	0	0	414	1,502	2,579
16	1.2143	0	0	0	0	0	0	0	0	0
17	4.0476	0	2,266	0	0	0	0	2,266	9,174	15,755
18	1.0417	0	5,323	0	0	0	793	6,116	6,371	10,941
19	1.0417	0	12,996	0	0	0	0	12,996	13,538	23,249
20	1.0417	0	2,070	0	0	0	416	2,486	2,589	4,446
21	3.6290	0	3,133	0	0	0	0	3,133	11,370	19,526

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
22	1.2143	0	435	0	0	0	0	435	528	907
23	1.2143	0	952	0	0	0	0	952	1,156	1,985
24	1.1951	0	655	0	0	0	0	655	783	1,345
25	1.0000	0	0	0	0	0	73	73	73	125
26	3.6290	0	0	0	0	0	17	17	61	105
27	1.1951	0	3,663	0	0	0	224	3,887	4,646	7,979
28	1.2143	0	37,429	0	0	0	0	37,429	45,450	78,052
29	4.0476	0	0	0	0	0	0	0	0	0
30	1.1951	0	345	0	0	0	0	345	412	708
31	1.1951	0	0	0	0	0	0	0	0	0
32	1.0417	0	641	0	0	0	0	641	668	1,147
33	4.0476	0	0	0	0	0	0	0	0	0
34	1.1951	0	0	0	0	0	7,505	7,505	8,969	15,403
35	1.1951	0	3,347	0	0	0	1	3,348	4,001	6,871
36	4.0476	0	0	0	0	0	0	0	0	0
37	1.1951	0	10,984	0	0	0	0	10,984	13,126	22,541
38	1.2143	0	828	0	0	0	6	834	1,012	1,738
39	1.0500	0	6,526	0	0	0	201	6,728	7,064	12,131
40	1.0500	0	0	0	0	0	63	63	67	115
41	4.0476	0	28,886	0	0	0	42	28,928	117,089	201,079
42	1.0000	0	831	0	0	0	0	831	831	1,427
43	3.6290	0	0	0	0	0	0	0	0	0

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
44	4.0476	0	0	0	0	0	0	0	0	0
45	1.0000	0	0	0	0	0	283	283	283	486
46	1.1951	2,466	0	0	0	0	0	2,466	2,947	5,061
47	1.1951	0	19,802	0	0	0	7,135	26,937	32,192	55,284
48	3.6290	0	48,363	0	0	0	0	48,363	175,511	301,408
49	1.1951	0	0	0	0	0	252	252	301	517
50	3.6290	0	0	0	0	0	0	0	0	0
51	1.1951	0	38,942	0	0	0	93	39,035	46,651	80,114
52	1.2143	0	0	0	0	0	42	42	51	88
53	1.1951	0	2,988	0	0	0	851	3,839	4,588	7,879
54	1.0000	0	0	0	0	0	189	189	189	325
55	1.0417	0	1,425,824	0	0	0	11	1,425,835	1,485,292	2,550,713
56	1.0417	0	636,088	0	0	0	0	636,088	662,613	1,137,915
57	1.0500	0	54,489	0	0	0	0	54,489	57,214	98,254
58	1.2143	0	20,998	0	0	0	0	20,998	25,498	43,788
59	4.0476	0	1,981	9,061	0	0	590	11,632	47,083	80,856
60	1.0000	7,396	151,185	0	0	0	0	158,581	158,581	272,333
61	1.1951	0	22,995	0	0	0	0	22,995	27,481	47,194
62	1.2143	0	37,036	17,426	0	0	0	54,462	66,133	113,571
63	1.1951	0	19,654	0	0	0	19,794	39,448	47,145	80,963
64	4.0476	0	1,274	968	0	0	215	2,457	9,945	17,079
65	1.0417	0	77,823	0	0	0	0	77,823	81,068	139,219

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
66	3.6290	0	3,418	0	0	0	0	3,418	12,405	21,303
67	1.0000	0	0	15,379	0	0	0	15,379	15,379	26,411
68	4.0476	0	0	0	0	0	22	22	87	149
69	1.0417	0	33,149	0	0	0	0	33,149	34,532	59,302
70	1.1951	0	3,678	0	0	0	0	3,678	4,396	7,549
71	1.1951	0	17,592	0	0	0	0	17,592	21,024	36,105
72	1.0000	0	0	0	0	0	424	424	424	728
73	1.2143	0	0	0	0	0	1,175	1,175	1,427	2,451
74	4.0476	0	0	0	0	0	0	0	0	0
75	3.6290	0	0	6,679	0	0	56,771	63,450	230,258	395,425
76	1.2143	0	0	0	0	0	21	21	26	45
77	1.0417	0	0	0	0	0	0	0	0	0
78	4.0476	0	1,490	0	0	0	289	1,780	7,203	12,370
79	4.0476	0	0	0	0	0	0	0	0	0
80	1.0500	0	12,822	0	0	0	3,890	16,712	17,548	30,135
81	1.0417	0	80,203	0	0	0	1,027	81,230	84,618	145,316
82	1.1951	0	0	0	0	0	120	120	143	246
83	1.1951	0	78,449	0	0	0	146	78,594	93,928	161,304
84	1.2143	0	3,465	0	0	0	0	3,465	4,208	7,226
85	4.0476	0	0	0	0	0	0	0	0	0
86	1.1951	0	736	0	0	0	13	748	894	1,535
87	1.1951	0	36,796	0	0	0	0	36,796	43,975	75,519

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
88	1.2143	0	26,876	6,375	0	0	0	33,251	40,376	69,338
89	1.1951	0	5,588	0	0	0	0	5,588	6,679	11,470
90	1.1951	0	3,208	3,329	0	0	685	7,222	8,631	14,822
91	1.0500	0	18,214	0	0	0	77	18,291	19,205	32,981
92	1.0500	0	942	0	0	0	0	942	989	1,698
93	1.1951	0	34,336	0	0	0	21	34,357	41,060	70,513
94	3.6290	0	3,113	0	0	0	548	3,661	13,285	22,815
95	4.0476	0	7,040	0	0	0	0	7,040	28,496	48,937
96	1.1951	0	0	0	0	0	0	0	0	0
97	4.0476	0	0	0	0	0	0	0	0	0
98	1.1951	0	2,739	0	0	0	0	2,739	3,273	5,621
99	1.0000	2,274	185,335	0	0	0	3,940	191,550	191,550	328,952
100	4.0476	0	123,656	0	0	0	2,335	125,991	509,961	875,763
101	1.2143	0	30,298	3,459	0	0	0	33,757	40,991	70,394
102	1.2143	0	0	0	0	0	4	4	5	9
103	1.0000	0	0	0	0	0	104	104	104	179
104	1.1951	0	0	0	0	0	460	460	550	945
105	1.0000	0	9,620	0	0	0	417	10,037	10,037	17,237
106	1.1951	0	276	69	0	0	0	345	412	708
107	4.0476	0	0	420	0	0	0	420	1,700	2,919
108	3.6290	0	44,431	0	0	0	0	44,431	161,240	276,900
109	1.0500	0	11,593	0	0	0	0	11,593	12,173	20,905

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
110	1.2143	0	365	302	0	0	0	667	810	1,391
111	1.0500	0	2,585	6,242	0	1,787	0	10,615	11,145	19,139
112	3.6290	0	112	0	0	0	0	112	405	696
113	4.0476	0	3,293	0	0	0	0	3,293	13,330	22,892
114	1.0500	0	5,096	0	0	0	1,782	6,877	7,221	12,401
115	3.6290	0	184,410	0	0	0	0	184,410	669,225	1,149,270
116	1.0500	0	48,133	0	0	0	0	48,133	50,539	86,791
117	1.1951	0	0	0	0	0	9	9	11	19
118	1.1951	0	0	0	0	0	1,003	1,003	1,199	2,059
119	1.0417	0	9,263	0	0	0	836	10,099	10,520	18,066
120	1.1951	0	159,581	0	0	0	4	159,585	190,720	327,526
121	4.0476	0	258	0	0	0	0	258	1,044	1,793
122	3.6290	0	2,291	0	0	0	0	2,291	8,312	14,274
123	1.2143	0	6,018	0	0	0	0	6,018	7,308	12,550
124	1.1951	0	14,288	0	0	0	0	14,288	17,075	29,323
125	2.1667	0	20,466	0	0	0	0	20,466	44,343	76,151
126	8.8571	0	29,240	0	0	0	0	29,240	258,978	444,747
127	8.8571	0	0	0	0	0	0	0	0	0
128	1.8571	0	903	2,704	0	0	21	3,628	6,737	11,570
129	2.1667	0	0	0	0	0	1	1	2	3
130	7.6154	0	6,872	0	0	0	0	6,872	52,330	89,867
131	1.0000	71,606	94,657	0	0	0	0	166,263	166,263	285,526

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TABLE 4: COMPLIANCE WASTE MANAGEMENT COSTS FOR WASTEWATERS (1999 $)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
132	1.0000	0	0	0	0	0	0	0	0	0
133	1.0000	0	44,059	0	0	0	5	44,064	44,064	75,672
134	8.8571	0	34,574	966	0	0	102	35,641	315,675	542,113
135	2.1667	0	0	0	0	0	8,399	8,399	18,199	31,253
136	2.1667	0	5,363	0	0	0	0	5,363	11,620	19,955
137	7.6154	0	0	0	0	0	1,726	1,726	13,142	22,569
138	1.8571	0	17,168	0	0	0	0	17,168	31,883	54,753
139	8.8571	0	0	0	0	0	0	0	0	0
140	1.8571	0	0	0	0	0	0	0	0	0
141	1.0000	0	278,690	0	0	0	0	278,690	278,690	478,598
142	1.0000	0	243,485	0	0	0	4,652	248,137	248,137	426,129
143	1.8571	0	0	0	0	0	1	1	3	5
144	1.8571	0	0	0	0	0	156	156	289	496
145	2.1667	0	0	0	0	0	0	0	0	0
146	7.6154	0	0	0	0	0	75	75	573	984
147	8.8571	0	0	0	0	0	0	0	0	0
148	2.2500	0	36,931	0	0	0	171	37,102	83,480	143,361
149	2.2500	0	19,942	0	0	0	98	20,040	45,090	77,434
150	8.8571	0	0	0	0	0	9	9	78	134
151	8.8571	0	0	0	0	0	55	55	483	829
Total		**83,202**	**4,837,654**	**73,211**	**0**	**1,787**	**139,337**	**5,140,491**	**7,597,322**	**13,046,991**

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TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
1	3.6290	0	0	0	0	0	0	0	0	0	13	0	13	24	40
2	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1.0500	0	0	0	0	0	0	289	0	0	0	0	289	152	260
4	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1.0500	0	443	0	655	0	0	0	0	0	0	0	1,098	576	990
10	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1.0000	0	0	0	0	0	0	1,356	48,359	0	207,042	0	256,758	128,379	220,470
12	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1.0417	0	0	0	0	0	0	0	0	0	0	1,032	1,032	537	920
15	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	1.0417	0	0	0	0	0	0	404	0	0	0	0	404	211	360
19	1.0417	0	0	0	0	0	0	2,666	0	0	0	58,028	60,694	31,612	54,290
20	1.0417	0	0	0	0	0	0	0	6,323	0	0	0	6,323	3,293	5,660
21	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
22	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	1.0000	0	0	0	0	0	0	1,334	0	0	0	0	1,334	667	1,150
26	3.6290	0	0	0	0	0	0	0	0	0	865	0	865	1,570	2,700
27	1.1951	0	0	0	0	0	0	0	0	0	0	481	481	288	490
28	1.2143	0	0	0	0	0	0	130	0	0	0	0	130	79	140
29	4.0476	0	0	0	0	0	0	0	0	0	22	0	22	44	80
30	1.1951	0	0	0	0	0	0	501	0	0	17,989	0	18,490	11,049	18,970
31	1.1951	0	0	0	0	0	0	7,594	0	0	0	0	7,594	4,538	7,790
32	1.0417	0	0	0	9	0	0	0	0	0	0	0	9	5	10
33	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	1.1951	0	0	0	0	0	0	9	0	0	437	0	446	266	460
35	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	1.0500	0	0	0	0	0	0	4,327	0	0	0	15,173	19,500	10,237	17,580
40	1.0500	0	0	0	0	0	0	0	(0)	0	0	0	(0)	(0)	(0)
41	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	1.0000	0	0	0	39	0	0	0	0	0	0	0	39	19	30
43	3.6290	0	0	0	0	0	0	434	350	0	0	0	784	1,423	2,440

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TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
44	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	1.0000	0	0	0	0	0	0	2,335	15,213	0	0	0	17,547	8,774	15,070
46	1.1951	0	0	0	65	0	0	0	0	0	0	0	65	39	70
47	1.1951	0	0	0	0	0	0	1,078	30,740	0	0	0	31,819	19,013	32,650
48	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	1.1951	0	0	0	0	0	0	1,298	0	0	0	5,058	6,356	3,798	6,520
50	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	1.1951	0	0	0	0	0	0	2,428	0	0	0	0	2,428	1,451	2,490
52	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	1.1951	0	0	0	0	0	0	596,671	0	0	165,231	0	761,902	455,274	781,850
54	1.0000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	1.0417	0	0	0	0	0	0	0	838	0	0	0	838	437	750
56	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	1.0500	0	0	0	0	0	0	263	0	0	0	0	263	138	240
58	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	1.0000	32	0	0	0	0	0	0	0	0	0	0	32	16	30
61	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
66	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	1.0000	1,638	0	0	0	0	0	2,617	0	0	0	0	4,255	2,127	3,650
68	4.0476	0	0	0	0	0	0	0	0	24	108	0	133	268	460
69	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	1.1951	0	0	0	0	0	0	750	0	0	(0)	0	750	448	770
71	1.1951	0	0	0	0	0	0	433	0	0	0	0	433	259	440
72	1.0000	0	0	0	0	0	0	4,112	0	0	0	0	4,112	2,056	3,530
73	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	4.0476	0	0	3,135	1,747	0	0	0	1,568	0	0	0	6,450	13,054	22,420
75	3.6290	0	0	0	(0)	0	0	0	0	0	0	0	(0)	(0)	(0)
76	1.2143	0	0	0	0	0	0	0	0	0	6,275	0	6,275	3,810	6,540
77	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	1.0500	6	0	0	12	0	0	120	0	0	0	0	139	73	130
81	1.0417	0	0	0	0	0	0	583	32,651	20,893	0	0	54,126	28,192	48,410
82	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	1.1951	0	11	0	0	0	0	173	0	0	0	0	184	110	190
87	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
88	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	1.1951	0	0	0	0	0	0	1,125	0	0	0	0	1,125	672	1,150
90	1.1951	0	0	0	294	0	0	260	0	0	0	0	554	331	570
91	1.0500	0	0	0	0	0	0	1	0	0	0	0	1	0	0
92	1.0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	3.6290	0	0	0	109	0	0	0	0	0	0	0	109	198	340
95	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	1.1951	0	0	(0)	0	0	0	0	677	0	18,930	0	19,607	11,716	20,120
97	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	1.1951	0	0	0	0	0	0	0	0	0	0	56,798	56,798	33,940	58,290
99	1.0000	0	0	0	0	0	0	0	3,958	0	0	0	3,958	1,979	3,400
100	4.0476	0	0	0	0	0	0	12,818	79,607	0	59,089	111,064	262,578	531,405	912,590
101	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	1.2143	0	0	0	0	0	0	0	0	0	0	208	208	126	220
103	1.0000	0	0	0	(0)	0	0	125	8,593	0	0	0	8,718	4,359	7,490
104	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	1.0000	0	0	0	0	0	0	1,200	(0)	0	0	0	1,200	600	1,030
106	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
107	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	1.0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
110	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	1.0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	1.0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	1.0500	0	344	0	0	0	0	0	0	0	0	0	344	181	310
117	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	1.1951	0	0	0	0	0	0	0	0	0	0	19,724	19,724	11,786	20,240
119	1.0417	0	0	0	0	0	0	544	0	0	0	18,183	18,726	9,754	16,750
120	1.1951	0	0	0	0	0	0	865	0	0	0	0	865	517	890
121	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	1.1951	0	0	0	0	0	0	0	0	254	0	0	254	152	260
125	2.1667	0	0	0	0	0	0	0	0	0	0	0	0	0	0
126	8.8571	0	0	0	0	0	15	0	0	0	84	0	99	439	750
127	8.8571	0	0	0	0	0	0	0	0	0	1,807	0	1,807	8,005	13,750
128	1.8571	0	0	0	0	0	0	0	4,778	0	147	0	4,925	4,573	7,850
129	2.1667	0	0	0	61	0	0	0	0	0	0	0	61	66	110
130	7.6154	0	0	0	0	0	0	0	6,725	0	0	0	6,725	25,607	43,980
131	1.0000	365	11,920	0	0	0	0	0	0	0	0	0	12,285	6,142	10,550

US EPA ARCHIVE DOCUMENT

TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
132	1.0000	0	0	0	119	0	0	4,337	0	0	0	1,931	6,388	3,194	5,480
133	1.0000	0	0	0	0	0	0	40	0	0	0	0	40	20	30
134	8.8571	0	0	0	0	0	0	0	313	0	0	0	313	1,385	2,380
135	2.1667	0	0	0	0	0	0	18,207	7,838	0	2,164	0	28,209	30,560	52,480
136	2.1667	0	0	0	0	0	0	0	0	0	0	0	0	0	0
137	7.6154	0	0	0	0	0	0	53,104	6,793	0	0	0	59,897	228,071	391,670
138	1.8571	0	0	0	0	0	0	260	0	0	0	0	260	241	410
139	8.8571	0	0	0	0	0	0	0	0	152	0	0	152	673	1,160
140	1.8571	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	1.0000	0	0	0	0	0	0	1,190	0	0	0	0	1,190	595	1,020
142	1.0000	0	0	0	2,776	0	0	28,343	69,632	0	1,213,815	303,454	1,618,019	809,009	1,389,320
143	1.8571	0	0	0	0	0	0	0	0	0	974	0	974	904	1,550
144	1.8571	0	0	0	0	0	0	0	604	0	0	0	604	560	960
145	2.1667	0	0	0	0	0	0	143	0	0	0	2,426	2,568	2,783	4,780
146	7.6154	0	0	0	0	0	0	0	0	0	0	303	303	1,152	1,980
147	8.8571	0	0	0	0	0	0	260	0	0	0	0	260	1,150	1,970
148	2.2500	0	0	0	0	0	0	487	48,506	0	0	0	48,993	55,117	94,650
149	2.2500	0	0	0	0	0	0	714	0	0	0	5,855	6,569	7,390	12,690
150	8.8571	0	0	0	0	0	0	0	0	0	13	0	13	59	100
151	8.8571	0	0	0	0	0	0	0	0	0	41	0	41	182	310
Total		**3,840**	**12,718**	**3,135**	**5,886**	**0**	**15**	**755,928**	**374,065**	**21,323**	**1,695,044**	**599,716**	**3,469,876**	**2,529,899**	**4,344,620**

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TABLE 5: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR NONWASTEWATERS (1999 $)

Facility ID	Weighting	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total

Calculation: The 50 percent hazardous waste estimate is applied to the Unweighted total, which is then multiplied by the weighting factor to get the weighted total. The Universe total is derived by multiplying the universe scaling factor (922/566) to the weighted total. Rounding has occurred in each cell.

US EPA ARCHIVE DOCUMENT

TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
1	3.6290	0	0	0	0	0	2	2	7	10
2	3.6290	0	0	0	0	0	0	0	0	0
3	1.0500	0	0	0	0	0	308	308	258	440
4	3.6290	0	0	0	0	0	0	0	0	0
5	4.0476	0	0	0	0	0	3	3	9	20
6	4.0476	0	0	0	0	0	0	0	0	0
7	1.0417	0	0	122	0	0	0	122	102	170
8	1.2143	32	0	5	0	0	80	117	113	190
9	1.0500	0	589	0	0	0	0	589	495	850
10	3.6290	0	0	0	0	0	64	64	187	320
11	1.0000	0	0	0	0	0	41	41	33	60
12	1.1951	0	0	0	0	0	0	0	0	0
13	1.1951	0	0	0	0	0	115	115	110	190
14	1.0417	0	0	0	0	0	146	146	121	210
15	3.6290	0	0	0	0	0	0	0	0	0
16	1.2143	0	0	0	0	0	0	0	0	0
17	4.0476	0	0	0	0	0	0	0	0	0
18	1.0417	0	0	0	0	0	793	793	661	1,130
19	1.0417	0	(0)	0	0	0	0	(0)	(0)	(0)
20	1.0417	0	0	0	0	0	229	229	191	330
21	3.6290	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
22	1.2143	0	7	0	0	0	0	7	7	10
23	1.2143	0	16	0	0	0	0	16	15	30
24	1.1951	0	11	0	0	0	0	11	10	20
25	1.0000	0	0	0	0	0	73	73	58	100
26	3.6290	0	0	0	0	0	17	17	49	80
27	1.1951	0	0	0	0	0	224	224	214	370
28	1.2143	0	0	0	0	0	0	0	0	0
29	4.0476	0	0	0	0	0	0	0	0	0
30	1.1951	0	0	0	0	0	0	0	0	0
31	1.1951	0	0	0	0	0	0	0	0	0
32	1.0417	0	11	0	0	0	0	11	9	20
33	4.0476	0	0	0	0	0	0	0	0	0
34	1.1951	0	0	0	0	0	124	124	119	200
35	1.1951	0	0	0	0	0	1	1	1	0
36	4.0476	0	0	0	0	0	0	0	0	0
37	1.1951	0	0	0	0	0	0	0	0	0
38	1.2143	0	0	0	0	0	6	6	6	10
39	1.0500	0	0	0	0	0	201	201	169	290
40	1.0500	0	0	0	0	0	63	63	53	90
41	4.0476	0	0	0	0	0	42	42	136	230
42	1.0000	0	0	0	0	0	0	0	0	0
43	3.6290	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
44	4.0476	0	0	0	0	0	0	0	0	0
45	1.0000	0	0	0	0	0	283	283	227	390
46	1.1951	41	0	0	0	0	0	41	39	70
47	1.1951	0	0	0	0	0	4,584	4,584	4,382	7,530
48	3.6290	0	0	0	0	0	0	0	0	0
49	1.1951	0	0	0	0	0	252	252	241	410
50	3.6290	0	0	0	0	0	0	0	0	0
51	1.1951	0	2,360	0	0	0	93	2,453	2,345	4,030
52	1.2143	0	0	0	0	0	42	42	41	70
53	1.1951	0	0	0	0	0	851	851	813	1,400
54	1.0000	0	0	0	0	0	189	189	151	260
55	1.0417	0	0	0	0	0	11	11	9	20
56	1.0417	0	(0)	0	0	0	0	(0)	(0)	(0)
57	1.0500	0	0	0	0	0	0	0	0	0
58	1.2143	0	0	0	0	0	0	0	0	0
59	4.0476	0	0	0	0	0	590	590	1,910	3,280
60	1.0000	448	0	0	0	0	0	448	359	620
61	1.1951	0	0	0	0	0	0	0	0	0
62	1.2143	0	0	0	0	0	0	0	0	0
63	1.1951	0	0	0	0	0	0	0	0	0
64	4.0476	0	0	0	0	0	0	0	0	0
65	1.0417	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
66	3.6290	0	0	0	0	0	0	0	0	0
67	1.0000	0	0	932	0	0	0	932	746	1,280
68	4.0476	0	0	0	0	0	22	22	70	120
69	1.0417	0	0	0	0	0	0	0	0	0
70	1.1951	0	0	0	0	0	0	0	0	0
71	1.1951	0	0	0	0	0	0	0	0	0
72	1.0000	0	0	0	0	0	424	424	339	580
73	1.2143	0	0	0	0	0	1,175	1,175	1,142	1,960
74	4.0476	0	0	0	0	0	0	0	0	0
75	3.6290	0	0	0	0	0	(0)	(0)	0	0
76	1.2143	0	0	0	0	0	21	21	21	40
77	1.0417	0	0	0	0	0	0	0	0	0
78	4.0476	0	0	0	0	0	5	5	16	30
79	4.0476	0	0	0	0	0	0	0	0	0
80	1.0500	0	545	0	0	0	1,387	1,932	1,623	2,790
81	1.0417	0	0	0	0	0	1,027	1,027	856	1,470
82	1.1951	0	0	0	0	0	120	120	114	200
83	1.1951	0	0	0	0	0	146	146	139	240
84	1.2143	0	57	0	0	0	0	57	56	100
85	4.0476	0	0	0	0	0	0	0	0	0
86	1.1951	0	0	0	0	0	13	13	12	20
87	1.1951	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
88	1.2143	0	0	0	0	0	0	0	0	0
89	1.1951	0	0	0	0	0	0	0	0	0
90	1.1951	0	0	55	0	0	11	66	64	110
91	1.0500	0	0	0	0	0	77	77	65	110
92	1.0500	0	0	0	0	0	0	0	0	0
93	1.1951	0	0	0	0	0	21	21	20	30
94	3.6290	0	52	0	0	0	9	61	176	300
95	4.0476	0	0	0	0	0	0	0	0	0
96	1.1951	0	0	0	0	0	0	0	0	0
97	4.0476	0	0	0	0	0	0	0	0	0
98	1.1951	0	45	0	0	0	0	45	43	70
99	1.0000	38	0	0	0	0	3,940	3,978	3,182	5,470
100	4.0476	0	0	0	0	0	2,335	2,335	7,560	12,980
101	1.2143	0	0	0	0	0	0	0	0	0
102	1.2143	0	0	0	0	0	4	4	4	10
103	1.0000	0	0	0	0	0	104	104	83	140
104	1.1951	0	0	0	0	0	460	460	440	760
105	1.0000	0	0	0	0	0	417	417	334	570
106	1.1951	0	0	0	0	0	0	0	0	0
107	4.0476	0	0	0	0	0	0	0	0	0
108	3.6290	0	0	0	0	0	0	0	0	0
109	1.0500	0	0	0	0	0	0	0	0	0

US EPA ARCHIVE DOCUMENT

TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
110	1.2143	0	0	0	0	0	0	0	0	0
111	1.0500	0	0	103	0	0	0	103	87	150
112	3.6290	0	0	0	0	0	0	0	0	0
113	4.0476	0	0	0	0	0	0	0	0	0
114	1.0500	0	0	0	0	0	1,782	1,782	1,497	2,570
115	3.6290	0	0	0	0	0	0	0	0	0
116	1.0500	0	0	0	0	0	0	0	0	0
117	1.1951	0	0	0	0	0	9	9	9	10
118	1.1951	0	0	0	0	0	1,003	1,003	959	1,650
119	1.0417	0	0	0	0	0	836	836	697	1,200
120	1.1951	0	0	0	0	0	4	4	4	10
121	4.0476	0	0	0	0	0	0	0	0	0
122	3.6290	0	0	0	0	0	0	0	0	0
123	1.2143	0	0	0	0	0	0	0	0	0
124	1.1951	0	6	0	0	0	0	6	6	10
125	2.1667	0	0	0	0	0	0	0	0	0
126	8.8571	0	0	0	0	0	0	0	0	0
127	8.8571	0	0	0	0	0	0	0	0	0
128	1.8571	0	0	0	0	0	21	21	32	50
129	2.1667	0	0	0	0	0	1	1	2	0
130	7.6154	0	0	0	0	0	0	0	0	0
131	1.0000	4,340	0	0	0	0	0	4,340	3,472	5,960

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TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
132	1.0000	0	0	0	0	0	0	0	0	0
133	1.0000	0	0	0	0	0	5	5	4	10
134	8.8571	0	0	0	0	0	102	102	719	1,240
135	2.1667	0	0	0	0	0	8,399	8,399	14,559	25,000
136	2.1667	0	0	0	0	0	0	0	0	0
137	7.6154	0	0	0	0	0	1,726	1,726	10,514	18,060
138	1.8571	0	0	0	0	0	0	0	0	0
139	8.8571	0	0	0	0	0	0	0	0	0
140	1.8571	0	0	0	0	0	0	0	0	0
141	1.0000	0	0	0	0	0	0	0	0	0
142	1.0000	0	0	0	0	0	4,652	4,652	3,722	6,390
143	1.8571	0	0	0	0	0	1	1	2	0
144	1.8571	0	0	0	0	0	156	156	231	400
145	2.1667	0	0	0	0	0	0	0	0	0
146	7.6154	0	0	0	0	0	75	75	458	790
147	8.8571	0	0	0	0	0	0	0	0	0
148	2.2500	0	0	0	0	0	171	171	307	530
149	2.2500	0	0	0	0	0	98	98	176	300
150	8.8571	0	0	0	0	0	9	9	63	110
151	8.8571	0	0	0	0	0	55	55	387	660
Total		**4,898**	**3,699**	**1,217**	**0**	**0**	**40,249**	**50,065**	**68,659**	**117,930**

Calculation: The 50 percent hazardous waste estimate is applied to the unweighted total, which is then multiplied by the weighting factor to get

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TABLE 6: INCREMENTAL TREATMENT AND DISPOSAL COSTS FOR WASTEWATERS ($)

Facility ID	Weighting	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total

the weighted total. The Universe total is derived by multiplying the universe scaling factor (922/566) to the weighted total. Rounding has occurred in each cell.

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
1	3.6290	0	0	4	0	0	0	0	0	0	0	0	4	13	22
2	3.6290	0	0	0	0	0	0	0	4	0	0	0	4	13	22
3	1.0500	0	0	10	0	1	0	1	0	0	0	0	12	12	21
4	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	1.0417	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	1.2143	0	0	0	0	0	0	0	1	0	0	0	1	1	2
9	1.0500	0	18	1	27	0	0	0	0	0	0	0	47	49	84
10	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1.0000	0	0	34	16	0	0	3	80	0	328	0	461	461	791
12	1.1951	0	0	0	1	6	0	0	0	0	0	0	7	9	15
13	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1.0417	0	0	0	0	0	0	0	0	0	0	5	5	5	9
15	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	1.2143	0	0	4	0	0	0	0	0	0	0	0	4	5	9
17	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	1	2
18	1.0417	0	0	0	0	0	0	1	0	0	0	0	1	1	2
19	1.0417	0	0	0	0	0	0	6	0	0	2	87	95	99	170

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
20	1.0417	0	0	17	0	0	0	0	17	0	0	0	34	36	62
21	3.6290	0	0	3	0	0	0	0	0	0	0	0	3	10	17
22	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	1.2143	0	0	1	0	0	0	0	0	0	0	0	1	1	2
24	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	1.0000	0	0	0	0	0	0	3	0	0	0	0	3	3	5
26	3.6290	0	0	0	0	0	0	0	0	0	2	0	2	7	12
27	1.1951	0	0	0	3	0	0	0	0	0	0	20	23	27	46
28	1.2143	0	0	25	0	0	0	0	0	0	0	0	25	30	51
29	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	1.1951	0	0	0	0	0	0	1	0	0	27	0	28	33	57
31	1.1951	0	0	0	0	0	0	16	0	0	0	0	16	19	33
32	1.0417	0	0	5	0	0	0	0	0	0	0	0	5	5	9
33	4.0476	0	0	0	0	0	0	0	9	0	0	0	9	35	60
34	1.1951	0	0	0	0	0	0	0	0	0	17	0	18	21	36
35	1.1951	0	0	3	3	0	0	0	0	0	0	0	6	7	12
36	4.0476	0	0	0	10	0	0	0	0	0	0	0	10	41	70
37	1.1951	0	0	4	0	0	0	0	0	0	0	0	4	5	9
38	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	1.0500	0	0	0	0	0	0	9	0	0	0	23	32	33	57

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
40	1.0500	0	0	0	0	0	0	0	2	0	0	0	2	2	3
41	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	1.0000	0	0	0	2	0	0	0	0	0	0	0	2	2	3
43	3.6290	0	0	0	0	0	0	1	1	0	0	0	2	6	10
44	4.0476	0	0	0	0	0	0	0	54	0	0	0	54	218	374
45	1.0000	0	0	7	0	0	0	5	26	0	0	0	38	38	65
46	1.1951	0	0	0	3	0	0	0	0	0	0	0	3	3	5
47	1.1951	0	0	43	0	0	0	2	47	0	0	0	92	110	189
48	3.6290	0	0	7	0	0	0	0	0	0	0	0	7	26	45
49	1.1951	0	0	0	0	0	0	3	0	0	0	11	14	17	29
50	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	1.1951	0	0	85	0	0	0	5	0	0	0	0	90	108	185
52	1.2143	0	0	0	0	0	0	0	6	0	0	0	6	7	12
53	1.1951	0	0	0	0	0	0	892	0	0	247	0	1,139	1,361	2,335
54	1.0000	0	0	5	0	0	0	0	2	0	0	0	7	7	12
55	1.0417	0	0	139	1,406	0	0	0	12	0	0	0	1,557	1,622	2,783
56	1.0417	0	0	34	0	0	0	0	0	0	0	0	34	36	62
57	1.0500	0	0	0	0	0	0	1	0	0	0	0	1	1	2
58	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
60	1.0000	1	0	6	17	0	0	0	0	0	0	0	25	25	43
61	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	1.2143	0	0	0	43	0	0	0	0	0	0	0	43	53	91
63	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	1.0417	0	0	423	0	0	0	0	0	0	0	0	423	440	755
66	3.6290	0	0	0	3	0	0	0	0	0	0	0	3	10	17
67	1.0000	68	0	43	84	0	0	6	19	0	0	0	219	219	376
68	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	1	2
69	1.0417	0	0	16	0	0	0	0	0	0	0	0	16	16	27
70	1.1951	0	0	0	5	0	0	2	0	0	1	0	8	9	15
71	1.1951	0	0	0	0	0	0	1	0	0	0	0	1	1	2
72	1.0000	0	0	20	0	0	0	9	0	0	0	0	29	29	50
73	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	4.0476	0	0	5	3	0	0	0	3	0	0	0	11	44	75
75	3.6290	0	0	68	76	0	0	0	0	0	0	0	143	521	894
76	1.2143	0	0	0	0	0	0	0	0	0	13	0	13	16	27
77	1.0417	0	0	11	0	0	0	0	0	0	0	0	11	12	21
78	4.0476	0	0	5	0	0	0	0	0	0	0	0	5	20	34
79	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
80	1.0500	0	0	17	0	0	0	5	0	0	0	0	22	24	41
81	1.0417	0	0	0	0	0	0	1	51	31	0	0	83	87	149
82	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	1.1951	0	0	11	0	0	0	0	0	0	0	0	11	14	24
84	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	4.0476	0	0	0	1	0	0	0	0	0	0	0	2	7	12
86	1.1951	0	0	0	0	0	0	0	0	0	0	0	1	1	2
87	1.1951	0	0	71	0	0	0	0	0	0	0	0	71	85	146
88	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	1	2
89	1.1951	0	0	0	11	0	0	2	0	0	0	0	13	16	27
90	1.1951	0	0	2	12	0	0	1	1	0	0	0	16	19	33
91	1.0500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	1.0500	0	0	6	0	0	0	0	0	0	0	0	6	7	12
93	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	3.6290	0	0	3	5	0	0	0	1	0	0	0	9	32	55
95	4.0476	0	0	0	2	0	0	0	0	0	0	0	2	10	17
96	1.1951	0	0	0	17	0	0	0	1	0	30	0	49	59	101
97	4.0476	0	0	0	4	0	0	0	0	0	0	0	4	18	31
98	1.1951	0	0	0	0	0	0	0	0	0	0	85	85	101	173
99	1.0000	0	0	114	54	0	0	0	14	0	0	0	182	182	312

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
100	4.0476	0	0	6	65	0	0	19	124	0	88	166	468	1,894	3,249
101	1.2143	0	0	1	0	0	0	0	0	0	0	0	1	1	2
102	1.2143	0	0	0	0	0	0	0	0	0	0	0	0	1	2
103	1.0000	3	0	151	299	0	0	0	29	0	0	0	483	483	829
104	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	1.0000	9	0	108	0	0	0	3	124	0	0	0	243	243	417
106	1.1951	0	0	0	1	18	0	0	0	0	0	0	18	22	38
107	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	1.0500	0	0	7	8	0	0	0	0	0	0	0	15	16	27
110	1.2143	0	0	5	0	0	0	0	0	0	0	0	5	6	10
111	1.0500	0	0	62	0	0	0	0	31	0	0	0	93	98	168
112	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
113	4.0476	0	0	1	0	0	0	0	0	0	0	0	1	4	7
114	1.0500	0	0	20	0	0	0	0	14	0	0	0	33	35	60
115	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
116	1.0500	0	1	13	55	0	0	0	0	0	0	0	69	73	125
117	1.1951	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	1.1951	0	0	0	0	0	0	0	0	0	0	29	29	35	60
119	1.0417	0	0	41	0	0	0	1	14	0	0	27	83	86	148

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
120	1.1951	0	0	0	0	0	0	2	0	0	0	0	2	2	3
121	4.0476	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	3.6290	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	1.2143	0	0	0	0	0	0	0	21	0	0	0	21	26	45
124	1.1951	0	0	5	1	0	0	0	1	0	0	0	7	8	14
125	2.1667	0	0	0	17	0	0	0	0	0	0	0	17	37	63
126	8.8571	0	0	12	39	0	1	0	4	0	3	0	59	525	901
127	8.8571	0	0	0	0	0	0	0	0	0	4	0	4	34	58
128	1.8571	0	0	9	18	0	0	0	8	0	0	0	36	67	115
129	2.1667	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	7.6154	0	0	0	0	0	0	0	13	0	0	0	13	103	177
131	1.0000	15	19	102	860	0	0	0	0	0	0	0	996	996	1,709
132	1.0000	0	0	0	11	0	0	9	0	0	0	4	24	24	41
133	1.0000	0	0	94	3	0	0	0	0	0	0	0	97	97	166
134	8.8571	0	0	2	2	0	0	0	1	0	0	0	5	46	79
135	2.1667	0	0	0	0	0	0	27	14	0	5	0	45	98	168
136	2.1667	0	0	14	13	0	0	0	0	0	0	0	27	59	101
137	7.6154	0	0	0	0	0	0	79	12	0	0	0	91	694	1,191
138	1.8571	0	0	0	8	0	0	1	0	0	0	0	9	17	29
139	8.8571	0	0	0	0	0	0	0	0	0	0	0	0	2	3

Table 7a: Representative Facility Waste Generation
– Nonwastewaters --
(Metric Tons)

Waste Generation Facility ID	Weighting Factor	HCS	HED	HOR	HSS	HWS	NCS	NED	NOR	NSS	NWS	NWTS	Unweighted Total	Weighted Total	Universe Total
140	1.8571	1	0	3	5	0	0	0	0	0	0	0	10	18	31
141	1.0000	0	0	162	0	0	0	2	0	0	0	0	165	165	283
142	1.0000	0	0	96	116	0	0	42	108	0	1,814	454	2,630	2,630	4,512
143	1.8571	0	0	0	0	0	0	0	0	0	2	0	2	4	7
144	1.8571	0	0	99	0	0	0	0	3	0	0	0	101	188	323
145	2.1667	0	0	1	2	0	0	0	10	0	0	5	18	40	69
146	7.6154	0	0	0	0	0	0	0	0	0	0	1	1	5	9
147	8.8571	0	0	0	0	0	0	1	0	0	0	0	1	5	9
148	2.2500	0	0	13	3	0	0	1	75	0	0	0	93	209	359
149	2.2500	0	0	58	0	0	0	1	8	0	0	9	77	172	295
150	8.8571	0	0	0	0	0	0	0	0	0	0	0	0	0	0
151	8.8571	0	0	1	0	0	0	0	3	0	0	0	4	39	67
Total		**98**	**38**	**2,341**	**3,336**	**25**	**1**	**1,163**	**965**	**32**	**2,585**	**927**	**11,510**	**15,932**	**27,354**

***Note*: Rounding has occurred in each cell for presentation convenience and simplicity. This may result in total figures that do not appear to sum. For example: The exact figures for Facility 9 are 18.44 metric tons of HED plus 0.94 tons of HOR plus 27.29 tons of HSS for an unweighted total of 46.67. This figure was multiplied by the weighting factor of 1.05, resulting in 49.00; this number is then scaled to the paint industry universe using the scaling factor (1.7173), resulting in a universe total of 84.15 metric tons. The aggregate effect of our rounding results in a very slight OVERSTATEMENT of the waste quantity. However, the Universe Total number has been adjusted to reflect the actual total, as presented in Chapter 4.**

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
1	3.6290	0	0	0	0	0	1	1	4	7
2	3.6290	0	0	0	0	0	0	0	0	0
3	1.0500	0	0	0	0	0	139	139	145	249
4	3.6290	0	0	0	0	0	0	0	1	2
5	4.0476	0	0	0	0	0	1	1	5	9
6	4.0476	0	4	0	0	0	0	4	18	31
7	1.0417	0	64	55	0	0	0	119	124	213
8	1.2143	3	2	0	0	0	8	14	17	29
9	1.0500	0	59	0	0	0	0	59	62	106
10	3.6290	0	0	0	0	0	6	6	23	39
11	1.0000	0	129	0	0	0	18	148	148	254
12	1.1951	0	0	0	0	0	0	0	0	0
13	1.1951	0	0	0	0	0	52	52	62	106
14	1.0417	0	0	0	0	0	66	66	68	117
15	3.6290	0	1	0	0	0	0	1	3	5
16	1.2143	0	0	0	0	0	0	0	0	0
17	4.0476	0	4	0	0	0	0	4	18	31
18	1.0417	0	10	0	0	0	357	368	383	657
19	1.0417	0	26	0	0	0	0	26	27	46

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
20	1.0417	0	4	0	0	0	32	36	37	63
21	3.6290	0	6	0	0	0	0	6	22	38
22	1.2143	0	1	0	0	0	0	1	1	2
23	1.2143	0	2	0	23	0	0	24	29	50
24	1.1951	0	1	0	0	0	0	1	1	2
25	1.0000	0	0	0	0	0	33	33	33	57
26	3.6290	0	0	0	0	0	8	8	27	46
27	1.1951	0	7	0	0	0	101	108	129	221
28	1.2143	0	74	0	0	0	0	74	90	154
29	4.0476	0	0	0	0	0	0	0	0	0
30	1.1951	0	1	0	0	0	0	1	1	2
31	1.1951	0	0	0	0	0	0	0	0	0
32	1.0417	0	1	0	0	0	0	1	1	2
33	4.0476	0	0	0	0	0	0	0	0	0
34	1.1951	0	0	0	0	0	12	12	15	26
35	1.1951	0	7	0	0	0	1	7	9	15
36	4.0476	0	0	0	0	0	0	0	0	0
37	1.1951	0	22	0	0	0	0	22	26	45
38	1.2143	0	2	0	0	0	3	4	5	9
39	1.0500	0	13	0	0	0	91	104	109	187

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
40	1.0500	0	0	0	0	0	29	29	30	51
41	4.0476	0	57	0	0	0	19	76	307	527
42	1.0000	0	2	0	0	0	0	2	2	3
43	3.6290	0	0	0	0	0	0	0	0	0
44	4.0476	0	0	0	0	0	0	0	0	0
45	1.0000	0	0	0	33	0	128	161	161	276
46	1.1951	4	0	0	0	0	0	4	5	9
47	1.1951	0	39	0	0	0	43	82	98	168
48	3.6290	0	95	0	0	0	0	95	346	594
49	1.1951	0	0	0	0	0	113	113	135	232
50	3.6290	0	22	0	0	0	0	22	81	139
51	1.1951	0	236	0	0	0	42	278	332	570
52	1.2143	0	0	0	0	0	19	19	23	39
53	1.1951	0	6	0	0	0	383	389	465	798
54	1.0000	0	0	0	0	0	85	85	85	146
55	1.0417	0	2,812	0	0	0	5	2,817	2,935	5,035
56	1.0417	0	1,255	0	0	0	0	1,255	1,307	2,242
57	1.0500	0	107	0	0	0	0	107	113	194
58	1.2143	0	41	0	0	0	0	41	50	86
59	4.0476	0	4	18	0	0	266	288	1,164	1,997

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
60	1.0000	45	298	0	0	0	0	343	343	588
61	1.1951	0	45	0	0	0	0	45	54	93
62	1.2143	0	73	34	0	0	0	107	130	223
63	1.1951	0	39	0	0	0	39	78	93	160
64	4.0476	0	3	2	0	0	0	5	20	34
65	1.0417	0	153	0	0	0	0	153	160	274
66	3.6290	0	7	0	0	0	0	7	24	41
67	1.0000	0	0	93	0	0	0	93	93	160
68	4.0476	0	0	0	0	0	10	10	39	67
69	1.0417	0	65	0	0	0	0	65	68	117
70	1.1951	0	7	0	0	0	0	7	9	15
71	1.1951	0	35	0	0	0	0	35	41	70
72	1.0000	0	0	0	0	0	191	191	191	328
73	1.2143	0	0	0	0	0	529	529	643	1,103
74	4.0476	0	0	0	0	0	0	0	0	0
75	3.6290	0	0	13	0	0	112	125	454	779
76	1.2143	0	0	0	0	0	10	10	12	21
77	1.0417	0	0	0	0	0	0	0	0	0
78	4.0476	0	3	0	0	0	0	3	14	24
79	4.0476	0	0	0	0	0	0	0	0	0

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
80	1.0500	0	59	0	0	0	4	63	66	113
81	1.0417	0	158	0	0	0	463	621	647	1,110
82	1.1951	0	0	0	0	0	54	54	64	110
83	1.1951	0	155	0	0	0	66	220	263	451
84	1.2143	0	6	0	0	0	0	6	7	12
85	4.0476	0	0	0	0	0	0	0	0	0
86	1.1951	0	1	0	0	0	6	7	9	15
87	1.1951	0	73	0	0	0	0	73	87	149
88	1.2143	0	53	13	0	0	0	66	80	137
89	1.1951	0	11	0	0	0	0	11	13	22
90	1.1951	0	6	6	0	0	1	13	16	27
91	1.0500	0	36	0	5	0	35	75	79	136
92	1.0500	0	2	0	0	0	0	2	2	3
93	1.1951	0	68	0	0	0	10	77	92	158
94	3.6290	0	5	0	0	0	1	6	22	38
95	4.0476	0	14	0	0	0	0	14	56	96
96	1.1951	0	0	0	0	0	0	0	0	0
97	4.0476	0	0	0	0	0	0	0	0	0
98	1.1951	0	5	0	0	0	0	5	5	9
99	1.0000	4	366	0	0	0	1,775	2,144	2,144	3,678

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
100	4.0476	0	244	0	0	0	1,052	1,296	5,244	8,996
101	1.2143	0	60	7	0	0	0	67	81	139
102	1.2143	0	0	0	0	0	2	2	2	3
103	1.0000	0	0	0	0	0	47	47	47	81
104	1.1951	0	0	0	0	0	207	207	248	425
105	1.0000	34	19	0	0	0	188	241	241	413
106	1.1951	0	1	0	0	0	0	1	1	2
107	4.0476	0	0	1	0	0	0	1	3	5
108	3.6290	0	88	0	0	0	0	88	318	546
109	1.0500	0	23	0	0	0	0	23	24	41
110	1.2143	0	1	1	0	0	0	1	2	3
111	1.0500	0	5	10	0	4	0	19	20	34
112	3.6290	0	0	0	0	0	0	0	1	2
113	4.0476	0	6	0	0	0	0	6	26	45
114	1.0500	0	10	0	0	0	803	813	853	1,463
115	3.6290	0	364	0	0	0	0	364	1,320	2,265
116	1.0500	0	95	0	0	0	0	95	100	172
117	1.1951	0	0	0	0	0	4	4	5	9
118	1.1951	0	0	0	0	0	452	452	540	926
119	1.0417	0	18	0	0	0	376	395	411	705

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
120	1.1951	0	315	0	0	0	2	316	378	648
121	4.0476	0	1	0	0	0	0	1	2	3
122	3.6290	0	5	0	0	0	0	5	16	27
123	1.2143	0	12	0	0	0	0	12	14	24
124	1.1951	0	28	0	0	0	0	28	34	58
125	2.1667	0	40	0	0	0	0	40	87	149
126	8.8571	0	58	0	0	0	0	58	511	877
127	8.8571	0	0	0	0	0	0	0	0	0
128	1.8571	0	2	5	0	0	10	17	31	53
129	2.1667	0	1	0	0	0	0	1	2	3
130	7.6154	0	14	0	0	0	0	14	103	177
131	1.0000	434	187	0	0	0	0	621	621	1,065
132	1.0000	0	0	0	0	0	0	0	0	0
133	1.0000	0	87	0	0	0	2	89	89	153
134	8.8571	0	68	2	0	0	46	116	1,026	1,760
135	2.1667	0	0	0	0	0	3,783	3,783	8,198	14,064
136	2.1667	0	11	0	0	0	0	11	23	39
137	7.6154	0	0	0	0	0	777	777	5,920	10,156
138	1.8571	0	34	0	0	0	0	34	63	108
139	8.8571	0	0	0	0	0	0	0	0	0

TABLE 7B: FACILITY WASTE GENERATION
– WASTEWATERS --
(METRIC TONS)

Waste Generation Facility ID	Weighting Factor	HCL	HSL	HWL	NCL	NSL	NWL	Unweighted Total	Weighted Total	Universe Total
140	1.8571	0	0	0	0	0	0	0	0	0
141	1.0000	0	550	0	0	0	0	550	550	944
142	1.0000	0	480	0	0	0	2,096	2,576	2,576	4,419
143	1.8571	0	0	0	0	0	1	1	1	2
144	1.8571	0	0	0	0	0	70	70	130	223
145	2.1667	0	8	0	0	0	0	8	17	29
146	7.6154	0	0	0	0	0	34	34	258	443
147	8.8571	0	0	0	0	0	0	0	0	0
148	2.2500	0	73	0	0	0	77	150	337	578
149	2.2500	0	39	0	0	0	44	83	188	323
150	8.8571	0	0	0	0	0	4	4	35	60
151	8.8571	0	0	0	0	0	25	25	218	374
Total		**524**	**9,805**	**260**	**61**	**4**	**15,465**	**26,118**	**46,237**	**79,409**

***Note*: Rounding has occurred in each cell for convenience and simplicity of presentation. This may result in total figures that do not appear to sum. (See explanatory note under Table 7a above for example).**

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Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
1	3.6290	600	600	0	0	0
2	3.6290	0	0	0	0	0
3	1.0500	600	1,200	600	630	1,080
4	3.6290	600	600	0	0	0
5	4.0476	0	0	0	0	0
6	4.0476	600	600	0	0	0
7	1.0417	3,723	3,723	0	0	0
8	1.2143	600	1,200	600	730	1,250
9	1.0500	3,801	3,801	0	0	0
10	3.6290	600	600	0	0	0
11	1.0000	17,144	21,245	4,101	4,100	7,030
12	1.1951	600	600	0	0	0
13	1.1951	0	0	0	0	0
14	1.0417	0	0	0	0	0
15	3.6290	600	600	0	0	0
16	1.2143	600	600	0	0	0
17	4.0476	600	600	0	0	0
18	1.0417	600	1,200	600	630	1,080
19	1.0417	1,200	4,336	3,136	3,270	5,610
20	1.0417	1,200	1,200	0	0	0
21	3.6290	600	600	0	0	0
22	1.2143	600	600	0	0	0
23	1.2143	600	1,200	600	730	1,250
24	1.1951	600	600	0	0	0

US EPA ARCHIVE DOCUMENT

Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
25	1.0000	0	1,200	1,200	1,200	2,060
26	3.6290	0	600	600	2,180	3,740
27	1.1951	600	1,200	600	720	1,240
28	1.2143	3,541	3,550	10	10	20
29	4.0476	0	0	0	0	0
30	1.1951	600	1,200	600	720	1,240
31	1.1951	0	1,200	1,200	1,430	2,450
32	1.0417	600	600	0	0	0
33	4.0476	0	0	0	0	0
34	1.1951	600	1,200	600	720	1,240
35	1.1951	1,200	1,200	0	0	0
36	4.0476	600	600	0	0	0
37	1.1951	1,200	1,200	0	0	0
38	1.2143	600	600	0	0	0
39	1.0500	1,200	1,606	406	430	740
40	1.0500	600	1,200	600	630	1,080
41	4.0476	2,051	2,051	0	0	0
42	1.0000	600	600	0	0	0
43	3.6290	0	600	600	2,180	3,740
44	4.0476	1,939	1,939	0	0	0
45	1.0000	600	1,377	777	780	1,340
46	1.1951	600	600	0	0	0
47	1.1951	5,297	6,278	982	1,170	2,010
48	3.6290	3,693	3,693	0	0	0

US EPA ARCHIVE DOCUMENT

Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
49	1.1951	0	1,200	1,200	1,430	2,450
50	3.6290	0	0	0	0	0
51	1.1951	11,564	11,747	183	220	380
52	1.2143	0	0	0	0	0
53	1.1951	600	41,211	40,611	48,530	83,260
54	1.0000	600	1,200	600	600	1,030
55	1.0417	157,141	157,141	0	0	0
56	1.0417	46,398	46,398	0	0	0
57	1.0500	3,869	3,889	20	20	30
58	1.2143	1,491	1,491	0	0	0
59	4.0476	1,200	1,200	0	0	0
60	1.0000	13,233	13,233	0	0	0
61	1.1951	1,633	1,633	0	0	0
62	1.2143	5,425	5,425	0	0	0
63	1.1951	2,801	2,801	0	0	0
64	4.0476	600	600	0	0	0
65	1.0417	20,745	20,745	0	0	0
66	3.6290	600	600	0	0	0
67	1.0000	11,193	11,250	57	60	100
68	4.0476	0	0	0	0	0
69	1.0417	2,920	2,920	0	0	0
70	1.1951	1,200	1,200	0	0	0
71	1.1951	1,249	1,282	33	40	70
72	1.0000	1,200	1,200	0	0	0

US EPA ARCHIVE DOCUMENT

Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
73	1.2143	0	0	0	0	0
74	4.0476	0	600	600	2,430	4,170
75	3.6290	9,669	9,669	0	0	0
76	1.2143	0	1,200	1,200	1,460	2,500
77	1.0417	600	600	0	0	0
78	4.0476	600	600	0	0	0
79	4.0476	0	0	0	0	0
80	1.0500	2,977	3,066	90	90	150
81	1.0417	5,695	8,686	2,991	3,120	5,350
82	1.1951	0	0	0	0	0
83	1.1951	5,978	5,978	0	0	0
84	1.2143	600	600	0	0	0
85	4.0476	600	600	0	0	0
86	1.1951	600	600	0	0	0
87	1.1951	5,168	5,168	0	0	0
88	1.2143	2,377	2,377	0	0	0
89	1.1951	1,200	1,200	0	0	0
90	1.1951	1,200	1,200	0	0	0
91	1.0500	1,294	1,294	0	0	0
92	1.0500	600	600	0	0	0
93	1.1951	2,438	2,438	0	0	0
94	3.6290	1,200	1,200	0	0	0
95	4.0476	1,200	1,200	0	0	0
96	1.1951	1,200	1,765	565	680	1,170

US EPA ARCHIVE DOCUMENT

Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
97	4.0476	600	600	0	0	0
98	1.1951	600	3,220	2,620	3,130	5,370
99	1.0000	19,747	19,847	100	100	170
100	4.0476	11,321	25,622	14,301	57,880	99,300
101	1.2143	2,416	2,416	0	0	0
102	1.2143	0	600	600	730	1,250
103	1.0000	16,337	16,339	3	0	0
104	1.1951	0	0	0	0	0
105	1.0000	10,149	10,240	91	90	150
106	1.1951	1,200	1,200	0	0	0
107	4.0476	600	600	0	0	0
108	3.6290	3,155	3,155	0	0	0
109	1.0500	1,359	1,359	0	0	0
110	1.2143	600	600	0	0	0
111	1.0500	4,029	4,029	0	0	0
112	3.6290	0	0	0	0	0
113	4.0476	600	600	0	0	0
114	1.0500	1,561	1,561	0	0	0
115	3.6290	13,094	13,094	0	0	0
116	1.0500	5,899	5,906	7	10	20
117	1.1951	0	0	0	0	0
118	1.1951	0	1,200	1,200	1,430	2,450
119	1.0417	2,617	3,637	1,019	1,060	1,820
120	1.1951	11,331	11,397	65	80	140

US EPA ARCHIVE DOCUMENT

Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
121	4.0476	600	600	0	0	0
122	3.6290	600	600	0	0	0
123	1.2143	600	1,200	600	730	1,250
124	1.1951	1,238	1,252	14	20	30
125	2.1667	2,076	2,076	0	0	0
126	8.8571	4,212	4,212	0	0	0
127	8.8571	0	600	600	5,310	9,110
128	1.8571	1,244	1,554	310	580	1,000
129	2.1667	0	0	0	0	0
130	7.6154	1,200	1,200	0	0	0
131	1.0000	58,013	58,202	189	190	330
132	1.0000	600	1,200	600	600	1,030
133	1.0000	6,627	6,630	3	0	0
134	8.8571	2,690	2,710	20	180	310
135	2.1667	0	1,633	1,633	3,540	6,070
136	2.1667	1,366	1,366	0	0	0
137	7.6154	0	3,282	3,282	24,990	42,870
138	1.8571	1,524	1,543	20	40	70
139	8.8571	0	0	0	0	0
140	1.8571	600	600	0	0	0
141	1.0000	25,633	25,723	90	90	150
142	1.0000	24,923	111,981	87,058	87,060	149,360
143	1.8571	0	600	600	1,110	1,900
144	1.8571	3,549	3,549	0	0	0
145	2.1667	600	1,200	600	1,300	2,230

Table 8: Estimated Transportation Costs
(1999 dollars)

Facility ID	Statistical Weighting Factor	TRANSPORTATION COSTS			Weighted Total	Universe Total
		Costs Baseline	Compliance	Incremental		
146	7.6154	0	1,200	1,200	9,140	15,680
147	8.8571	0	600	600	5,310	9,110
148	2.2500	3,222	5,966	2,744	6,170	10,580
149	2.2500	4,119	4,173	54	120	210
150	8.8571	0	0	0	0	0
151	8.8571	600	1,200	600	5,310	9,110
Totals		**646,100**	**832,881**	**186,785**	**297,240**	**509,930**

Note: Rounding has occurred in the totals columns for simplicity of presentation.

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Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
1	8	2,960	15	0	0	2,600	2,615	0.09%
2	12	4,440	0	0	0	2,600	2,600	0.06%
3	80	29,600	597	600	3,365	2,600	7,162	0.02%
4	7	2,590	0	0	0	2,600	2,600	0.10%
5	16	5,920	3	0	0	2,600	2,603	0.04%
6	12	4,440	0	0	0	2,600	2,600	0.06%
7	100	37,000	122	0	3,365	2,600	6,087	0.02%
8	44	16,280	117	600	0	2,600	3,317	0.02%
9	100	37,000	1,687	0	2,808	2,600	7,095	0.02%
10	20	7,400	64	0	0	2,600	2,664	0.04%
11	200	74,000	256,799	4,101	6,173	2,600	269,673	0.36%
12	22	8,140	0	0	0	2,600	2,600	0.03%
13	45	16,650	115	0	0	2,600	2,715	0.02%
14	200	74,000	1,178	0	0	2,600	3,778	0.01%
15	10	3,700	0	0	0	2,600	2,600	0.07%
16	25	9,250	0	0	0	2,600	2,600	0.03%
17	NA	NA	0	0	0	2,600	2,600	NA
18	60	22,200	1,197	600	3,365	2,600	7,762	0.03%
19	60	22,200	60,694	3,136	2,808	2,600	69,238	0.31%
20	125	46,250	6,552	0	0	2,600	9,152	0.02%
21	24	8,880	0	0	0	2,600	2,600	0.03%

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Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
22	40	14,800	7	0	0	2,600	2,607	0.02%
23	14	5,180	16	600	0	2,600	3,216	0.06%
24	24	8,880	11	0	0	2,600	2,611	0.03%
25	70	25,900	1,407	1,200	0	2,600	5,207	0.02%
26	4	1,480	882	600	0	2,600	4,082	0.28%
27	42	15,540	705	600	3,365	2,600	7,270	0.05%
28	25	9,250	130	10	0	2,600	2,740	0.03%
29	10	3,700	22	0	0	2,600	2,622	0.07%
30	40	14,800	18,490	600	0	2,600	21,690	0.15%
31	30	11,100	7,594	1,200	0	2,600	11,394	0.10%
32	35	12,950	20	0	0	2,600	2,620	0.02%
33	20	7,400	0	0	0	2,600	2,600	0.04%
34	29	10,730	570	600	0	2,600	3,770	0.04%
35	20	7,400	1	0	0	2,600	2,601	0.04%
36	21	7,770	0	0	0	2,600	2,600	0.03%
37	32	11,840	0	0	0	2,600	2,600	0.02%
38	8	2,960	6	0	0	2,600	2,606	0.09%
39	140	51,800	19,701	406	3,365	2,600	26,072	0.05%
40	45	16,650	63	600	0	2,600	3,263	0.02%
41	8	2,960	42	0	0	2,600	2,642	0.09%
42	36	13,320	39	0	0	2,600	2,639	0.02%
43	18	6,660	784	600	0	2,600	3,984	0.06%

US EPA ARCHIVE DOCUMENT

Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
44	100	37,000	0	0	2,808	2,600	5,408	0.01%
45	175	64,750	17,830	777	3,365	2,600	24,572	0.04%
46	42	15,540	106	0	0	2,600	2,706	0.02%
47	NA	NA	36,403	982	2,808	2,600	42,793	NA
48	14	5,180	0	(0)	0	2,600	2,600	0.05%
49	55	20,350	6,608	1,200	3,365	2,600	13,773	0.07%
50	6	2,220	0	0	0	2,600	2,600	0.12%
51	40	14,800	4,881	183	6,173	2,600	13,837	0.09%
52	20	7,400	42	0	0	2,600	2,642	0.04%
53	54	19,980	762,753	40,611	6,173	2,600	812,137	4.06%
54	50	18,500	189	600	0	2,600	3,389	0.02%
55	304	112,480	849	0	6,173	2,600	9,622	0.01%
56	128	47,360	0	(0)	3,365	2,600	5,965	0.01%
57	40	14,800	263	20	3,365	2,600	6,248	0.04%
58	25	9,250	0	0	0	2,600	2,600	0.03%
59	25	9,250	590	0	3,365	2,600	6,555	0.07%
60	150	55,500	480	0	3,365	2,600	6,445	0.01%
61	40	14,800	0	0	0	2,600	2,600	0.02%
62	66	24,420	0	0	6,173	2,600	8,773	0.04%
63	10	3,700	0	(0)	0	2,600	2,600	0.07%
64	23	8,510	0	0	0	2,600	2,600	0.03%
65	350	129,500	0	0	6,173	2,600	8,773	0.01%

US EPA ARCHIVE DOCUMENT

Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
66	16	5,920	0	0	0	2,600	2,600	0.04%
67	125	46,250	5,187	57	2,808	2,600	10,652	0.02%
68	10	3,700	155	0	0	2,600	2,755	0.07%
69	24	8,880	0	0	0	2,600	2,600	0.03%
70	40	14,800	750	0	0	2,600	3,350	0.02%
71	36	13,320	433	33	0	2,600	3,066	0.02%
72	65	24,050	4,536	0	3,365	2,600	10,501	0.04%
73	80	29,600	1,175	0	3,365	2,600	7,140	0.02%
74	10	3,700	6,450	600	0	2,600	9,650	0.26%
75	72	26,640	0	0	6,173	2,600	8,773	0.03%
76	15	5,550	6,296	1,200	0	2,600	10,096	0.18%
77	115	42,550	0	0	0	2,600	2,600	0.01%
78	23	8,510	5	0	0	2,600	2,605	0.03%
79	NA	NA	0	0	0	2,600	2,600	NA
80	85	31,450	2,071	90	0	2,600	4,761	0.02%
81	100	37,000	55,153	2,991	6,173	2,600	66,917	0.18%
82	40	14,800	120	0	0	2,600	2,720	0.02%
83	90	33,300	146	(0)	3,365	2,600	6,111	0.02%
84	25	9,250	57	0	0	2,600	2,657	0.03%
85	1	370	0	0	0	2,600	2,600	0.70%
86	18	6,660	197	0	0	2,600	2,797	0.04%
87	110	40,700	0	0	2,808	2,600	5,408	0.01%

US EPA ARCHIVE DOCUMENT

Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
88	22	8,140	0	(0)	0	2,600	2,600	0.03%
89	27	9,990	1,125	0	0	2,600	3,725	0.04%
90	52	19,240	620	0	0	2,600	3,220	0.02%
91	40	14,800	78	(0)	0	2,600	2,678	0.02%
92	165	61,050	0	0	0	2,600	2,600	0.00%
93	50	18,500	21	0	0	2,600	2,621	0.01%
94	9	3,330	170	0	0	2,600	2,770	0.08%
95	21	7,770	0	0	0	2,600	2,600	0.03%
96	100	37,000	19,607	565	2,808	2,600	25,580	0.07%
97	18	6,660	0	0	0	2,600	2,600	0.04%
98	35	12,950	56,843	2,620	2,808	2,600	64,871	0.50%
99	224	82,880	7,936	100	6,173	2,600	16,809	0.02%
100	NA	NA	264,913	14,301	6,173	2,600	287,987	NA
101	48	17,760	0	0	0	2,600	2,600	0.01%
102	4	1,480	212	600	0	2,600	3,412	0.23%
103	140	51,800	8,822	3	2,808	2,600	14,233	0.03%
104	15	5,550	460	0	3,365	2,600	6,425	0.12%
105	200	74,000	1,617	91	6,173	2,600	10,481	0.01%
106	24	8,880	0	0	0	2,600	2,600	0.03%
107	8	2,960	0	0	0	2,600	2,600	0.09%
108	40	14,800	0	0	0	2,600	2,600	0.02%
109	50	18,500	0	0	0	2,600	2,600	0.01%

US EPA ARCHIVE DOCUMENT

Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
110	17	6,290	0	0	0	2,600	2,600	0.04%
111	120	44,400	103	0	2,808	2,600	5,511	0.01%
112	5	1,850	0	0	0	2,600	2,600	0.14%
113	NA	NA	0	0	0	2,600	2,600	NA
114	150	55,500	1,782	(0)	3,365	2,600	7,747	0.01%
115	16	5,920	0	(0)	3,365	2,600	5,965	0.10%
116	160	59,200	344	7	2,808	2,600	5,759	0.01%
117	37	13,690	9	0	0	2,600	2,609	0.02%
118	2	740	20,727	1,200	3,365	2,600	27,892	3.77%
119	85	31,450	19,562	1,019	6,173	2,600	29,354	0.09%
120	70	25,900	869	65	3,365	2,600	6,899	0.03%
121	5	1,850	0	0	0	2,600	2,600	0.14%
122	NA	NA	0	0	0	2,600	2,600	NA
123	50	18,500	0	600	0	2,600	3,200	0.02%
124	75	27,750	260	14	0	2,600	2,874	0.01%
125	3	1,110	0	0	0	2,600	2,600	0.23%
126	60	22,200	99	(0)	2,808	2,600	5,507	0.02%
127	12	4,440	1,807	600	0	2,600	5,007	0.11%
128	30	11,100	4,946	310	0	2,600	7,856	0.07%
129	15	5,550	62	0	0	2,600	2,662	0.05%
130	31	11,470	6,725	0	0	2,600	9,325	0.08%
131	400	148,000	16,625	189	6,173	2,600	25,587	0.02%

US EPA ARCHIVE DOCUMENT

Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
132	95	35,150	6,388	600	0	2,600	9,588	0.03%
133	190	70,300	45	3	2,808	2,600	5,456	0.01%
134	20	7,400	415	20	3,365	2,600	6,400	0.09%
135	60	22,200	36,608	1,633	6,173	2,600	47,014	0.21%
136	24	8,880	0	(0)	0	2,600	2,600	0.03%
137	125	46,250	61,623	3,282	6,173	2,600	73,678	0.16%
138	45	16,650	260	20	0	2,600	2,880	0.02%
139	8	2,960	152	0	0	2,600	2,752	0.09%
140	70	25,900	0	0	0	2,600	2,600	0.01%
141	260	96,200	1,190	90	6,173	2,600	10,053	0.01%
142	350	129,500	1,622,671	87,058	6,173	2,600	1,718,502	1.33%
143	32	11,840	975	600	0	2,600	4,175	0.04%
144	20	7,400	760	0	2,808	2,600	6,168	0.08%
145	4	1,480	2,568	600	0	2,600	5,768	0.39%
146	3	1,110	378	1,200	0	2,600	4,178	0.38%
147	27	9,990	260	600	0	2,600	3,460	0.03%
148	100	37,000	49,164	2,744	6,173	2,600	60,681	0.16%
149	110	40,700	6,667	54	2,808	2,600	12,129	0.03%

US EPA ARCHIVE DOCUMENT

Table 9: Model Facility Incremental Cost Impacts and Aggregate Unweighted Industry Average
Proposed Listing Approach

Facility ID	Employment	Estimated Gross Annual Sales ($1000)	Treatment and Disposal Costs	Transportation Costs	Analytical Costs	Administrative Costs	Total Incremental Costs	Total Incremental Costs as Percent of Gross Sales
			Unweighted, Unscaled - Dollars					
150	5	1,850	22	0	0	2,600	2,622	0.14%
151	29	10,730	96	600	0	2,600	3,296	0.03%
Total		**3,296,700**	**3,519,941**	**186,785**	**220,534**	**392,600**	**4,319,860**	**0.12%**

Note: Rounding has occurred in cells.

These figures represent model facilities only, and are unweighted and unscaled. These costs are weighted on a facility by facility basis to arrive at the total weighted cost. This weighted cost is then adjusted by our estimate of the percent of waste subject to rule requirements (50 percent solids and 80 percent of the liquids are assumed hazardous based on constituent prevalence, as reported in the survey). The adjusted weighted aggregate total is then scaled (using 972/566) to arrive at the Universe total.

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Table 10: Model Facilities Costs and Aggregate Industry Costs for the Agency's Proposed Listing Approach

Facility ID	Weighting Factor	Transportation Costs	Analytical Costs	Administrative Costs	Total Administrative, Analytical, and Transportation Costs	Weighted Total	UNIVERSE TOTAL
		----------1999 dollars----------					
1	3.6290	0	0	2,600	2,600	9,435	16,204
2	3.6290	0	0	2,600	2,600	9,435	16,204
3	1.0500	600	3,365	2,600	6,565	6,893	11,838
4	3.6290	0	0	2,600	2,600	9,435	16,204
5	4.0476	0	0	2,600	2,600	10,524	18,073
6	4.0476	0	0	2,600	2,600	10,524	18,073
7	1.0417	0	3,365	2,600	5,965	6,214	10,671
8	1.2143	600	0	2,600	3,200	3,886	6,673
9	1.0500	0	2,808	2,600	5,408	5,678	9,752
10	3.6290	0	0	2,600	2,600	9,435	16,204
11	1.0000	4,101	6,173	2,600	12,874	12,874	22,109
12	1.1951	0	0	2,600	2,600	3,107	5,336
13	1.1951	0	0	2,600	2,600	3,107	5,336
14	1.0417	0	0	2,600	2,600	2,708	4,651
15	3.6290	0	0	2,600	2,600	9,435	16,204
16	1.2143	0	0	2,600	2,600	3,157	5,422
17	4.0476	0	0	2,600	2,600	10,524	18,073
18	1.0417	600	3,365	2,600	6,565	6,839	11,744
19	1.0417	3,136	2,808	2,600	8,544	8,900	15,285
20	1.0417	0	0	2,600	2,600	2,708	4,651
21	3.6290	0	0	2,600	2,600	9,435	16,204
22	1.2143	0	0	2,600	2,600	3,157	5,422
23	1.2143	600	0	2,600	3,200	3,886	6,673
24	1.1951	0	0	2,600	2,600	3,107	5,336
25	1.0000	1,200	0	2,600	3,800	3,800	6,526
26	3.6290	600	0	2,600	3,200	11,613	19,943
27	1.1951	600	3,365	2,600	6,565	7,846	13,474
28	1.2143	10	0	2,600	2,610	3,169	5,443
29	4.0476	0	0	2,600	2,600	10,524	18,073

US EPA ARCHIVE DOCUMENT

30	1.1951	600	0	2,600	3,200	3,824	6,568
31	1.1951	1,200	0	2,600	3,800	4,541	7,799
32	1.0417	0	0	2,600	2,600	2,708	4,651
33	4.0476	0	0	2,600	2,600	10,524	18,073
34	1.1951	600	0	2,600	3,200	3,824	6,568
35	1.1951	0	0	2,600	2,600	3,107	5,336
36	4.0476	0	0	2,600	2,600	10,524	18,073
37	1.1951	0	0	2,600	2,600	3,107	5,336
38	1.2143	0	0	2,600	2,600	3,157	5,422
39	1.0500	406	3,365	2,600	6,371	6,690	11,488
40	1.0500	600	0	2,600	3,200	3,360	5,770
41	4.0476	0	0	2,600	2,600	10,524	18,073
42	1.0000	0	0	2,600	2,600	2,600	4,465
43	3.6290	600	0	2,600	3,200	11,613	19,943
44	4.0476	0	2,808	2,600	5,408	21,889	37,591
45	1.0000	777	3,365	2,600	6,742	6,742	11,578
46	1.1951	0	0	2,600	2,600	3,107	5,336
47	1.1951	982	2,808	2,600	6,390	7,637	13,115
48	3.6290	0	0	2,600	2,600	9,435	16,204
49	1.1951	1,200	3,365	2,600	7,165	8,563	14,705
50	3.6290	0	0	2,600	2,600	9,435	16,204
51	1.1951	183	6,173	2,600	8,956	10,703	18,381
52	1.2143	0	0	2,600	2,600	3,157	5,422
53	1.1951	40,611	6,173	2,600	49,384	59,019	101,354
54	1.0000	600	0	2,600	3,200	3,200	5,495
55	1.0417	0	6,173	2,600	8,773	9,139	15,694
56	1.0417	0	3,365	2,600	5,965	6,214	10,671
57	1.0500	20	3,365	2,600	5,985	6,284	10,792
58	1.2143	0	0	2,600	2,600	3,157	5,422
59	4.0476	0	3,365	2,600	5,965	24,144	41,463
60	1.0000	0	3,365	2,600	5,965	5,965	10,244
61	1.1951	0	0	2,600	2,600	3,107	5,336
62	1.2143	0	6,173	2,600	8,773	10,653	18,295
63	1.1951	0	0	2,600	2,600	3,107	5,336
64	4.0476	0	0	2,600	2,600	10,524	18,073
65	1.0417	0	6,173	2,600	8,773	9,139	15,694

US EPA ARCHIVE DOCUMENT

66	3.6290	0	0	2,600	2,600	9,435	16,204
67	1.0000	57	2,808	2,600	5,465	5,465	9,385
68	4.0476	0	0	2,600	2,600	10,524	18,073
69	1.0417	0	0	2,600	2,600	2,708	4,651
70	1.1951	0	0	2,600	2,600	3,107	5,336
71	1.1951	33	0	2,600	2,633	3,147	5,404
72	1.0000	0	3,365	2,600	5,965	5,965	10,244
73	1.2143	0	3,365	2,600	5,965	7,243	12,439
74	4.0476	600	0	2,600	3,200	12,952	22,243
75	3.6290	0	6,173	2,600	8,773	31,837	54,675
76	1.2143	1,200	0	2,600	3,800	4,614	7,924
77	1.0417	0	0	2,600	2,600	2,708	4,651
78	4.0476	0	0	2,600	2,600	10,524	18,073
79	4.0476	0	0	2,600	2,600	10,524	18,073
80	1.0500	90	0	2,600	2,690	2,825	4,851
81	1.0417	2,991	6,173	2,600	11,764	12,255	21,045
82	1.1951	0	0	2,600	2,600	3,107	5,336
83	1.1951	0	3,365	2,600	5,965	7,129	12,242
84	1.2143	0	0	2,600	2,600	3,157	5,422
85	4.0476	0	0	2,600	2,600	10,524	18,073
86	1.1951	0	0	2,600	2,600	3,107	5,336
87	1.1951	0	2,808	2,600	5,408	6,463	11,099
88	1.2143	0	0	2,600	2,600	3,157	5,422
89	1.1951	0	0	2,600	2,600	3,107	5,336
90	1.1951	0	0	2,600	2,600	3,107	5,336
91	1.0500	0	0	2,600	2,600	2,730	4,688
92	1.0500	0	0	2,600	2,600	2,730	4,688
93	1.1951	0	0	2,600	2,600	3,107	5,336
94	3.6290	0	0	2,600	2,600	9,435	16,204
95	4.0476	0	0	2,600	2,600	10,524	18,073
96	1.1951	565	2,808	2,600	5,973	7,138	12,259
97	4.0476	0	0	2,600	2,600	10,524	18,073
98	1.1951	2,620	2,808	2,600	8,028	9,594	16,476
99	1.0000	100	6,173	2,600	8,873	8,873	15,238
100	4.0476	14,301	6,173	2,600	23,074	93,394	160,387
101	1.2143	0	0	2,600	2,600	3,157	5,422

US EPA ARCHIVE DOCUMENT

102	1.2143	600	0	2,600	3,200	3,886	6,673
103	1.0000	3	2,808	2,600	5,411	5,411	9,292
104	1.1951	0	3,365	2,600	5,965	7,129	12,242
105	1.0000	91	6,173	2,600	8,864	8,864	15,222
106	1.1951	0	0	2,600	2,600	3,107	5,336
107	4.0476	0	0	2,600	2,600	10,524	18,073
108	3.6290	0	0	2,600	2,600	9,435	16,204
109	1.0500	0	0	2,600	2,600	2,730	4,688
110	1.2143	0	0	2,600	2,600	3,157	5,422
111	1.0500	0	2,808	2,600	5,408	5,678	9,752
112	3.6290	0	0	2,600	2,600	9,435	16,204
113	4.0476	0	0	2,600	2,600	10,524	18,073
114	1.0500	0	3,365	2,600	5,965	6,263	10,756
115	3.6290	0	3,365	2,600	5,965	21,647	37,175
116	1.0500	7	2,808	2,600	5,415	5,686	9,764
117	1.1951	0	0	2,600	2,600	3,107	5,336
118	1.1951	1,200	3,365	2,600	7,165	8,563	14,705
119	1.0417	1,019	6,173	2,600	9,792	10,200	17,517
120	1.1951	65	3,365	2,600	6,030	7,206	12,376
121	4.0476	0	0	2,600	2,600	10,524	18,073
122	3.6290	0	0	2,600	2,600	9,435	16,204
123	1.2143	600	0	2,600	3,200	3,886	6,673
124	1.1951	14	0	2,600	2,614	3,124	5,365
125	2.1667	0	0	2,600	2,600	5,633	9,674
126	8.8571	0	2,808	2,600	5,408	47,899	82,258
127	8.8571	600	0	2,600	3,200	28,343	48,673
128	1.8571	310	0	2,600	2,910	5,404	9,281
129	2.1667	0	0	2,600	2,600	5,633	9,674
130	7.6154	0	0	2,600	2,600	19,800	34,003
131	1.0000	189	6,173	2,600	8,962	8,962	15,391
132	1.0000	600	0	2,600	3,200	3,200	5,495
133	1.0000	3	2,808	2,600	5,411	5,411	9,292
134	8.8571	20	3,365	2,600	5,985	53,010	91,034
135	2.1667	1,633	6,173	2,600	10,406	22,547	38,720
136	2.1667	0	0	2,600	2,600	5,633	9,674
137	7.6154	3,282	6,173	2,600	12,055	91,804	157,656

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138	1.8571	20	0	2,600	2,620	4,866	8,356
139	8.8571	0	0	2,600	2,600	23,028	39,547
140	1.8571	0	0	2,600	2,600	4,828	8,292
141	1.0000	90	6,173	2,600	8,863	8,863	15,221
142	1.0000	87,058	6,173	2,600	95,831	95,831	164,572
143	1.8571	600	0	2,600	3,200	5,943	10,206
144	1.8571	0	2,808	2,600	5,408	10,043	17,247
145	2.1667	600	0	2,600	3,200	6,933	11,907
146	7.6154	1,200	0	2,600	3,800	28,939	49,697
147	8.8571	600	0	2,600	3,200	28,343	48,673
148	2.2500	2,744	6,173	2,600	11,517	25,913	44,501
149	2.2500	54	2,808	2,600	5,462	12,290	21,105
150	8.8571	0	0	2,600	2,600	23,028	39,547
151	8.8571	600	0	2,600	3,200	28,343	48,673
TOTAL		**186,785**	**220,534**	**392,600**	**799,919**	**1,635,677**	**2,808,971**