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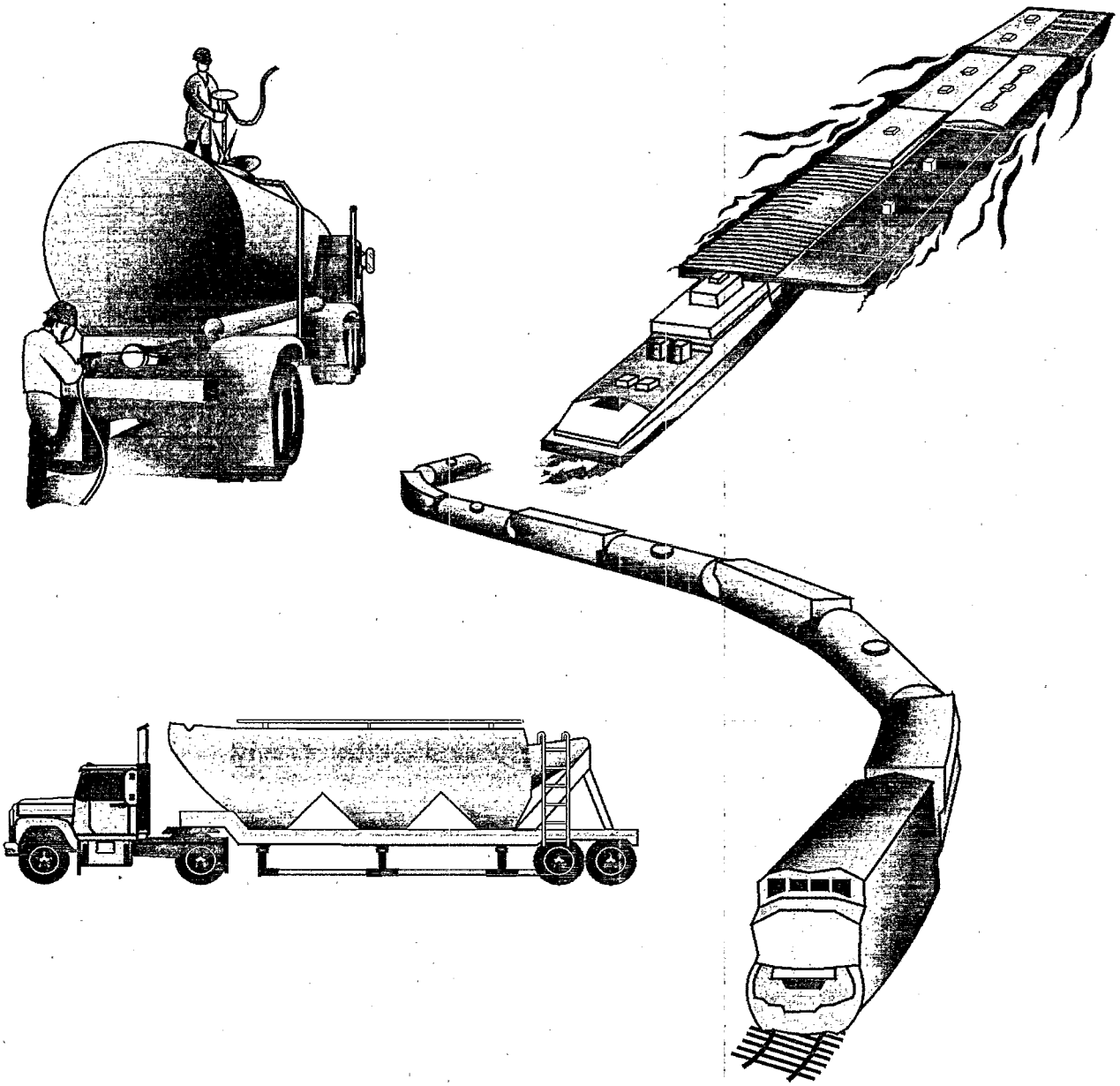

COST-EFFECTIVENESS ANALYSIS OF FINAL EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS FOR THE TRANSPORTATION EQUIPMENT CLEANING INDUSTRY POINT SOURCE CATEGORY

FINAL REPORT

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SECTION 1

INTRODUCTION

This cost-effectiveness (CE) analysis presents an evaluation of the technical efficiency of pollutant control options for the Final Effluent Limitations Guidelines and Standards (Final Rule) for the Transportation Equipment Cleaning Industry based on Best Available Technology Economically Achievable (BAT) and Pretreatment Standards for Existing Sources (PSES). BAT standards set effluent limitations on toxic and nonconventional pollutants for direct dischargers prior to wastewater discharge directly into a water body such as a stream, river, lake, estuary, or ocean. Indirect dischargers send wastewater to publicly owned treatment works (POTW) for further treatment prior to discharge to U.S. surface waters; PSES set limitations for indirect dischargers on toxic and nonconventional pollutants which pass through a POTW.

For the proposed regulation, the U.S. Environmental Protection Agency (EPA) divided the Transportation Equipment Cleaning (TEC) industry into 11 subcategories on the basis of the commodity transported and the mode of transportation:

- Truck Chemical (TT/CHEM)
- Rail Chemical (RT/CHEM)
- Barge Chemical and Petroleum (TB/CHEM)
- Truck Petroleum (TT/PETR)
- Rail Petroleum (RT/PETR)
- Truck Food (TT/FOOD)
- Rail Food (RT/FOOD)
- Barge Food (TB/FOOD)
- Truck Hopper (TH/HOPPER)
- Rail Hopper (RH/HOPPER)
- Barge Hopper (BH/HOPPER)

During and following proposal, EPA determined that a number of the subcategories listed above either did not require regulation or could be combined into one subcategory. All hopper subcategories were found to have insignificant pollutant loadings and, as proposed, will not be regulated by the Final Rule. EPA also determined that the chemical and petroleum subcategories for both truck and rail subcategories could be combined. Additionally, EPA combined all food subcategories into one subcategory. These changes mean that only the following subcategories will be regulated under the Final Rule:

- Truck Chemical and Petroleum (TT/CHEM&PETR), both direct and indirect dischargers.
- Rail Chemical and Petroleum (RT/CHEM&PETR),both direct and indirect dischargers.
- Barge Chemical and Petroleum (BT/CHEM&PETR), both direct and indirect dischargers.
- Truck, Rail, and Barge Food (FOOD), direct dischargers only.

The remainder of this analysis will focus on the costs and pollutant loadings for regulated facilities. No costs and pollutant loadings for facilities in the HOPPER subcategory will be included in the discussions that follow. Furthermore, the selected options for the FOOD subcategory are unchanged, and no comments were received on those options. Therefore no revisions have been made to the analysis of the FOOD subcategory since proposal, and the CE analysis of the FOOD subcategory will not be discussed further in this document. Readers interested in this analysis can refer to the *Cost-Effectiveness Analysis of Proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry Point Source Category* (U.S. EPA, 1998).

In this CE analysis, EPA compares the total pretax annualized cost of each regulatory option to the corresponding effectiveness of that option in reducing the discharge of pollutants. EPA evaluates the effectiveness of each option in terms of costs per pound of pollutant removed, weighted by the relative toxicity of the pollutant. EPA also provides the rationale for using this measure, which is referred to as pound equivalents removed.

The CE analysis is based on two surveys conducted by EPA. The first, called the screener survey, listed 16 questions and was sent to 3,267 industry participants that might be affected by the rule (U.S. EPA, 1993). From the results of the screener survey, EPA identified 734 facilities with TEC

operations that might be affected by the rule. These facilities formed the universe from which a stratified sample was drawn for the second survey, a detailed questionnaire (U.S. EPA, 1995).

In general, EPA estimated cost-effectiveness and economic impacts for subcategories and discharge status using data from the detailed questionnaire. Cost-effectiveness is also estimated for subcategories where certain types of dischargers are represented only by screener data. Unless otherwise specified in the text, however, cost-effectiveness is estimated on the results of the detailed questionnaire.

Section 2 discusses EPA's cost-effectiveness methodology and identifies the pollutants included in the analysis. This section also presents EPA's toxic weighting factors for each pollutant and discusses POTW removal factors for indirect dischargers. Section 3 describes the options evaluated for each subcategory. Section 4 presents the results of the cost-effectiveness analysis. In Section 5, cost-effectiveness values for final TEC industry options are compared to cost-effectiveness values for other promulgated rules. Section 6 discusses the two-part cost-reasonableness test for BCT options. Appendix A presents data on pollutants, pollutant removals, and pound equivalents removed. Appendix B presents data on pollutants discharged at baseline.

SECTION 2

METHODOLOGY

The cost-effectiveness of the TEC Industry Guidelines and Standards is evaluated as the incremental annualized cost of a pollution control option in an industry or industry subcategory per incremental pound equivalent of pollutant (i.e., pound of pollutant adjusted for toxicity) removed by that control option. EPA uses the cost-effectiveness analysis primarily to compare the removal efficiencies of regulatory options under consideration for a rule. A secondary and less effective use is to compare the cost-effectiveness of the options for the TEC Industry Effluent Limitations Guidelines and Standards to that of effluent limitation guidelines and standards for other industries.

EPA ranks pollution control options in order of increasing pound equivalents removed in order to identify the point at which increased removal of pollutants is no longer cost-effective. Generally, EPA determines this to be where the marginal cost per pound equivalent removed increases sharply; that is, where relatively few incremental pounds are removed for steady increases in cost. Figure 2-1 shows this point as Point A, where the cost-effectiveness curve becomes nearly vertical. Increases in removals beyond Point A come only at relatively high unit costs, which, in many cases, EPA may determine exceeds the relative benefit to society.

To develop a cost-effectiveness study, the following number of steps must be taken to define the analysis or generate data used for calculating values:

- Determine the pollutants effectively removed from the wastewater
- Estimate the relative toxic weights – the adjustments to pounds of pollutants to reflect toxicity of the pollutants effectively removed
- Estimate the POTW removal factors – the adjustments to pounds of pollutants to reflect the ability of a POTW to remove specified pollutants
- Define the regulatory pollution control options
- Calculate pollutant removals for each pollution control option
- Determine the annualized cost of each pollution control option

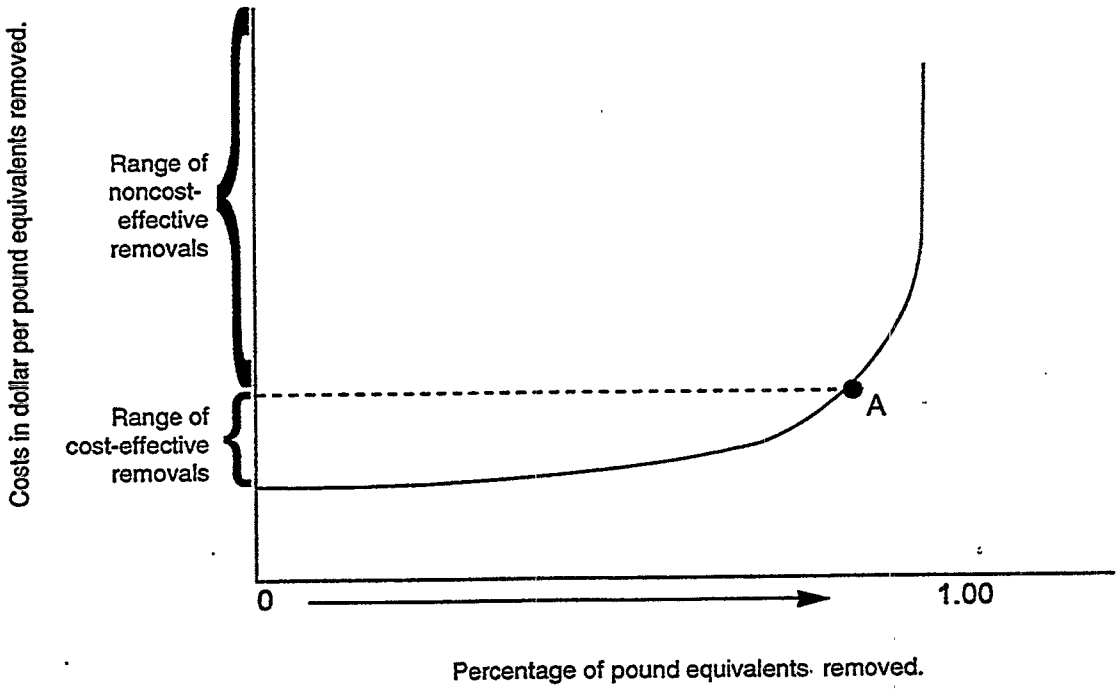

Figure 2-1. Cost effectiveness

Once cost-effectiveness values are calculated, various regulatory options under consideration can be compared. The following seven sections discuss each of the six preliminary steps and the cost-effectiveness calculation and comparison methodologies.

2.1 SELECTION OF POLLUTANTS EFFECTIVELY REMOVED

EPA considers several factors in selecting pollutants for regulation, including toxicity, frequency of occurrence in wastestream effluent, and amount of pollutant in the wastestream. The list of pollutants considered, therefore, differs by subcategory. Table 2-1 is the list of the pollutants effectively removed in the TT/CHEM&PETR and RT/CHEM&PETR subcategories; no priority or nonconventional pollutants are removed in the TB/CHEM&PETR subcategory, and the analysis of FOOD and HOPPER subcategories was not revised.

2.2 TOXIC WEIGHTING FACTORS

Cost-effectiveness analyses account for differences in toxicity among the pollutants using toxic weighting factors. Accounting for these differences is necessary because the potentially harmful effects on human and aquatic life are specific to the pollutant. For example, a pound of zinc in an effluent stream has a significantly different, less harmful effect than a pound of PCBs. Toxic weighting factors for pollutants are derived using ambient water quality criteria and toxicity values. For most industries, toxic weighting factors are developed from chronic freshwater aquatic criteria. In cases where a human health criterion has also been established for the consumption of fish, the sum of both the human and aquatic criteria are used to derive toxic weighting factors. The factors are standardized by relating them to a "benchmark" toxicity value, which was based on the toxicity of copper when the methodology was developed.[1] Table 2-1 presents the toxic weighting factors used for the regulated pollutants in this cost-effectiveness analysis.

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[1] Although the water quality criterion has been revised (to 9.0 µg/l), all cost-effectiveness analyses for effluent guideline regulations continue to use the former criterion of 5.6 µg/l as a benchmark so that cost-effectiveness values can continue to be compared to those for other effluent guidelines. Where copper is present in the effluent, the revised higher criterion for copper results in a toxic weighting factor for copper of 0.63 rather than 1.0.

TABLE 2-1

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

CAS Number	Pollutant Name	Toxic Weighting Factor	POTW Removal Factor	Subcategory TT/CHEM &PETR	Subcategory RT/CHEM &PETR
CONVENTIONALS					
C002	5-Day Biochemical Oxygen Demand	UNK	UNK	X	X
C036	Oil and Grease	UNK	UNK	X	X
C009	Total Suspended Solids	UNK	UNK	X	X
NONCONVENTIONALS					
59473040	Adsorbable Organic Halides (AOX)	UNK	UNK	X	X
7664417	Ammonia as Nitrogen	1.8E-03	61%	X	X
C004	Chemical Oxygen Demand (COD)	UNK	UNK	X	X
16887006	Chloride	2.4E-05	UNK	X	X
16984488	Fluoride	3.5E-02	39%	X	X
C005	Nitrate/Nitrite	UNK	UNK	X	X
U014	Surfactants (MBAS)	UNK	UNK	X	X
C010	Total Dissolved Solids	UNK	UNK	X	X
C012	Total Organic Carbon (TOC)	UNK	UNK	X	X
C037	Total Petroleum Hydrocarbons (TPH)	UNK	UNK	X	X
C020	Total Phenols	UNK	UNK	X	X
14265442	Total Phosphorus	UNK	UNK	X	X
VOLATILES					
67641	Acetone	5.0E-06	16%	X	X
71432	Benzene	1.8E-02	5%	X	
67663	Chloroform	2.1E-03	27%	X	
107062	Dichloroethane, 1,2-	6.2E-03	11%	X	
100414	Ethylbenzene	1.4E-03	6%	X	X
78933	Methyl ethyl ketone	2.5E-05	8%	X	X
108101	Methyl isobutyl ketone	1.3E-04	12%	X	
75092	Methylene Chloride	4.2E-04	46%	X	
127184	Tetrachloroethylene	1.3E-02	15%	X	
108883	Toluene	5.6E-03	4%	X	
71556	Trichloroethane, 1,1,1-	4.5E-03	10%	X	
79016	Trichloroethylene	6.4E-03	13%	X	
108383	Xylene, m-	1.5E-03	35%	X	X
136777612	Xylene, o+p-	4.7E-03	5%	X	X
SEMIVOLATILES					
120127	Anthracene	2.5E+00	4%		X
65850	Benzoic acid	3.3E-04	19%	X	X
100516	Benzyl alcohol	5.6E-03	22%	X	
117817	Bis (2-ethylhexyl) phthalate	9.5E-02	40%	X	

TABLE 2-1 (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

CAS Number	Pollutant Name	Toxic Weighting Factor	POTW Removal Factor	Subcategory TT/CHEM &PETR	Subcategory RT/CHEM &PETR
SEMIVOLATILES (continued)					
86748	Carbazole	2.7E-01	100%		X
95578	Chlorophenol, 2-	3.3E-02	38%	X	
95487	Cresol, o-	2.7E-03	47%	X	
106445	Cresol, p-	4.0E-03	28%	X	X
99876	Cymene, p-	2.4E-02	1%	X	
124185	Decane, n-	4.3E-03	91%	X	
95807	Diaminotoluene, 2,4-	1.8E-01	100%		X
95501	Dichlorobenzene, 1,2-	1.1E-02	11%	X	
67710	Dimethyl sulfone	UNK	UNK	X	X
117840	Di-n-octyl phthalate	2.2E-01	32%	X	
629970	Docosane, n-	8.2E-05	12%	X	X
112403	Dodecane, n-	4.3E-03	5%	X	X
112958	Eicosane, n-	4.3E-03	8%	X	X
206440	Fluoranthene	8.0E-01	58%		X
630013	Hexacosane, n-	8.2E-05	29%	X	X
544763	Hexadecane, n-	4.3E-03	29%	X	X
142621	Hexanoic Acid	3.7E-04	16%		X
2027170	Isopropylnaphthalene, 2-	7.2E-02	72%	X	
91576	Methylnaphthalene, 2-	8.0E-02	72%	X	
832699	Methylphenanthrene, 1-	1.0E-01	5%		X
91203	Naphthalene	1.5E-02	5%	X	X
630024	Octacosane, n-	8.2E-05	29%		X
593453	Octadecane, n-	4.3E-03	29%	X	X
85018	Phenanthrene	2.9E-01	5%		X
108952	Phenol	2.8E-02	5%	X	X
129000	Pyrene	1.1E-01	5%		X
100425	Styrene	1.4E-02	6%	X	X
98555	Terpineol, alpha-	1.1E-03	5%	X	
646311	Tetracosane, n-	8.2E-05	29%	X	X
629594	Tetradecane, n-	4.3E-03	29%	X	X
638686	Triacontane, n-	8.2E-05	29%	X	X
88062	Trichlorophenol, 2,4,6-	4.4E-01	UNK	X	
PESTICIDES					
30560191	Acephate	4.6E-02	100%		X
86500	Azinphos methyl	2.8E+01	26%	X	
1861401	Benefluralin	1.9E-01	100%		X
319846	BHC, alpha-	4.3E+01	15%		X
319857	BHC, beta-	1.2E+01	11%	X	X
319868	BHC, delta-	3.5E-02	53%		X
58899	BHC, gamma-	4.7E+01	25%	X	

TABLE 2-1 (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

CAS Number	Pollutant Name	Toxic Weighting Factor	POTW Removal Factor	Subcategory TT/CHEM &PETR	Subcategory RT/CHEM &PETR
PESTICIDES (continued)					
5103742	Chlordane, gamma-	1.6E+03	50%		X
1861321	Dacthal (DCPA)	3.4E-02	16%		X
2303164	Diallate	4.5E-01	100%	X	X
60571	Dieldrin	5.7E+04	14%		X
1031078	Endosulfan sulfate	1.0E+02	42%	X	X
7421934	Endrin Aldehyde	1.6E+02	100%	X	
21609905	Leptophos	1.1E+01	100%	X	
82688	Pentachloronitrobenzene	7.4E-01	100%	X	X
1918167	Propachlor	3.3E-01	100%		X
139402	Propazine	3.5E-03	100%		X
5902512	Terbacil	1.0E-03	100%		X
5915413	Terbuthylazine	3.5E-02	100%		X
HERBICIDES					
94757	2,4-D	3.0E-03	51%	X	
75990	Dalapon	5.1E-03	100%	X	
94826	2,4-DB (Butoxon)	3.6E-02	100%	X	X
1918009	Dicamba	1.5E-02	100%		X
120365	Dichloroprop	9.3E-02	100%		X
88857	Dinoseb	9.0E-01	100%	X	X
94746	MCPA	1.6E-02	100%	X	
7085190	MCPP	1.8E-03	100%		X
93765	2,4,5-T	2.8E-01	44%	X	X
93721	2,4,5-TP	1.8E-01	56%	X	X
DIOXINS and FURANS					
35822469	1234678-HPCDD	4.2E+06	17%	X	
67562394	1234678-HPCDF	6.7E+05	17%	X	
3268879	OCDD	4.2E+05	21%	X	X
39001020	OCDF	6.7E+04	17%		X
METALS					
7429905	Aluminum	6.4E-02	9%	X	X
7440382	Arsenic	3.5E+00	57%		X
7440393	Barium	2.0E-03	25%		X
7440428	Boron	1.8E-01	80%	X	X
7440439	Cadmium	2.6E+00	10%	X	
7440702	Calcium	2.8E-05	91%	X	X
7440473	Chromium	7.6E-02	20%	X	X

TABLE 2-1 (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

CAS Number	Pollutant Name	Toxic Weighting Factor	POTW Removal Factor	Subcategory TT/CHEM &PETR	Subcategory RT/CHEM &PETR
METALS (continued)					
7440508	Copper	6.3E-01	16%	X	X
7439896	Iron	5.6E-03	18%	X	X
7439954	Magnesium	8.7E-04	86%	X	X
7439965	Manganese	7.0E-02	67%	X	X
7439976	Mercury	1.2E+02	10%	X	
7439987	Molybdenum	2.0E-01	81%	X	
7440020	Nickel	1.1E-01	49%	X	
7723140	Phosphorus	UNK	31%	X	X
7440097	Potassium	1.1E-03	80%	X	X
7440213	Silicon	UNK	73%	X	X
7440235	Sodium	5.5E-06	45%	X	X
7440246	Strontium	UNK	88%	X	
7704349	Sulfur	5.6E-06	88%	X	X
7440315	Tin	3.0E-01	55%	X	
7440326	Titanium	2.9E-02	8%	X	X
7440666	Zinc	4.7E-02	20%	X	X

References: Toxic Weighting Factors: Versar, Inc., 2000.
Final POTW Removal Factors: Memorandum in the Rulemaking Record.

Examples of the effects of different aquatic and human health criteria on freshwater toxic weighting factors are presented in Table 2-2. As shown in this table, the toxic weighting factor is the sum of two criteria-weighted ratios: the former benchmark copper criterion divided by the human health criterion for the particular pollutant and the former benchmark copper criterion divided by the aquatic chronic criterion. For example, using the values reported in Table 2-2, 4 pounds of the benchmark chemical (copper) pose the same relative hazard in freshwater as one pound of cadmium because cadmium has a freshwater toxic weight 4 times greater than the toxic weight of copper (2.6 divided by 0.63 equals 4.13).

2.3 POTW REMOVAL FACTORS

Calculating pound equivalents for direct dischargers differs from calculating for indirect dischargers because of the ability of POTWs to remove certain pollutants. The POTW removal factors are used as follows: If a facility is discharging 100 pounds of chromium in its effluent stream to a POTW and the POTW has a 80 percent removal efficiency for chromium, then the chromium discharged to surface waters is only 20 pounds (1 minus 0.8 equals 0.2). If the regulation reduces chromium discharged in the effluent stream to the POTW by 50 pounds, then the amount discharged to surface waters is calculated as 50 pounds multiplied by the POTW removal factor (50 pounds times 0.2 equals 10 pounds). The cost-effectiveness calculations then reflect the fact that the actual reduction of pollutant discharged to surface water is not 50 pounds (the change in the amount discharged to the POTW), but 10 pounds (the change in the amount actually discharged to surface water). A pollutant discharge that is unaffected by the POTW has a removal factor of 1. Table 2-1 presents the POTW removal factors for pollutants included in this analysis.

2.4 POLLUTANT REMOVALS AND POUND-EQUIVALENT CALCULATIONS

The pollutant loadings have been calculated for each facility under each regulatory pollution control option for comparison with baseline (i.e., current practice) loadings. Pollutant removals are calculated simply as the difference between current and post-treatment discharges. These pollutant removals are converted into pound equivalents for the cost-effectiveness analysis. For direct dischargers, removals in pound equivalents are calculated as:

TABLE 2-2

EXAMPLES OF TOXIC WEIGHTING FACTORS BASED ON COPPER FRESHWATER CHRONIC CRITERIA

Pollutant	Human Health Criteria (µg/l)	Aquatic Chronic Criteria (µg/l)	Weighting Calculation	Toxic Weighting Factor
Copper*	1,200	9.0	5.6/1,200 + 5.6/9.0	0.63
Cadmium	84	2.2	5.6/84 + 5.6/2.2	2.6
Naphthalene	21,000	370	5.6/21,000 + 5.6/370	0.015

* The water quality criterion has been revised (to 9.0 µg/l). Formerly, the weighting factor calculation led to a result of 0.47 as a toxic weighting factor for copper.

Notes: Human health and aquatic chronic criteria are maximum contamination thresholds. Units for criteria are micrograms of pollutant per liter of water.

Source: Versar, Inc., 2000.

$$\text{Removals}_{pe} = \text{Removals}_{pounds} \times \text{Toxic weighting factor}$$

For indirect dischargers, removals in pound equivalents are calculated as:

$$\text{Removals}_{pe} = \text{Removals}_{pounds} \times \text{Toxic weighting factor} \times \text{POTW removal factor}$$

Total removals for each option are then calculated by adding up the removals of all pollutants included in the cost-effectiveness analysis for a given subcategory. Total pollutant and pound-equivalent removals estimated for each option that has both costs and loads associated with it are presented by subcategory in Appendix A.

2.5 ANNUALIZED COSTS OF COMPLIANCE

Annualized costs of compliance have been developed for each regulatory pollution control option (see the Economic Analysis (U.S. EPA, 2000b). In brief, the annualized cost considers the capital investment needed to purchase and install new equipment, the annual cost of operating and maintaining the equipment, and the cost of money needed to finance the investment. The annualized costs presented in Section 4 represent the pretax costs to the TEC industry.[2]

2.6 CALCULATION OF THE COST-EFFECTIVENESS VALUES

Cost-effectiveness ratios are calculated separately for direct and indirect dischargers and by subcategory. Within each of these many groupings, the pollution control options are ranked in ascending order of pound equivalents removed. The incremental cost-effectiveness value for a particular control option is calculated as the ratio of the incremental annual cost to the incremental pound equivalents removed. The incremental effectiveness may be viewed primarily in comparison to the baseline scenario

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[2] This report discusses only three of the regulated subcategories in detail. See Section Four for more information.

and to other regulatory pollution control options. Cost-effectiveness values are reported in units of dollars per pound equivalent of pollutant removed.

For the purpose of comparing cost-effectiveness values of options under review to those of other promulgated rules, compliance costs used in the cost-effectiveness analysis are adjusted to 1981 dollars using *Engineering News Record*'s Construction Cost Index (CCI). This adjustment factor is calculated as follows:

$$\text{Adjustment factor} = 1981\ \text{CCI}/1994\ \text{CCI} = 3{,}535/5{,}408 = 0.654$$

The equation used to calculate incremental cost-effectiveness is:

$$CE_k = \frac{ATC_k - ATC_{k-1}}{PE_k - PE_{k-1}}$$

where:

CE_k=	Cost-effectiveness of Option k
ATC_k=	Total annualized treatment cost under Option k
PE_k=	Pound equivalents removed by Option k

Cost-effectiveness measures the incremental unit cost of pollutant removal of Option k (in pound equivalents) in comparison to Option k-1. The numerator of the equation, ATC_k minus ATC_{k-1}, is simply the incremental annualized treatment cost in moving from Option k-1 (an option that removes fewer pound equivalents of pollutants) to Option k (an option that removes more pound equivalents of pollutants). Similarly, the denominator is the incremental removals achieved in going from Option k-1 to k.

2.7 COMPARISON OF COST-EFFECTIVENESS VALUES

Because the options are ranked in ascending order of pound equivalents of pollutants removed, any pollution control option that has higher costs but lower removals than another option can be

immediately identified (the cost-effectiveness value for the next option becomes negative). When negative values are computed for Option k, Option k-1 is considered "dominated" (having a higher cost and lower removals than Option k). Option k-1 is then removed from cost-effectiveness calculations, and all cost-effectiveness values within a regulatory grouping are then recalculated without the dominated option. This process continues until all dominated options are eliminated. The remaining options can then be presented as viable in terms of their incremental cost-effectiveness values for regulatory consideration.

SECTION 3

POLLUTION CONTROL OPTIONS

EPA may subcategorize an industry to establish effluent limitations guidelines and standards based on untreated wastewater characteristics, commodity transported, mode of transportation, or other factors. Section 3.1 summarizes the technology options for the six TEC subcategories for which EPA revised the options presented at proposal.[3] In addition to commodity transported and mode of transportation, facilities are also identified by discharge status: direct or indirect. BAT applies to direct dischargers; PSES applies to indirect dischargers. Additional pollutants may be controlled or reduced by BAT and PSES, but are not part of the cost-effectiveness analysis because (1) a toxic weighting factor is not available for the pollutant, or (2) reliable estimates of pollutant removals are not available.

The Development Document (U.S. EPA, 2000a) presents a detailed description of the TEC industry subcategories and pollution control options for each subcategory. Table 3-1 outlines the technology options for each of the six subcategories analyzed in this report. EPA developed between one and three technology options for each subcategory based on incremental technology additions to a wastewater treatment train. Each succeeding option builds on the previous option. The incremental or differentiating technology for a succeeding option is in italics.

[3] Because no revisions were made to the analysis for the FOOD subcategory after proposal, technology options for FOOD are not presented in this document. Readers interested in options for this subcategory can refer to the *Cost-Effectiveness Analysis of Proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry Point Source Category* (U.S. EPA, 1998).

TABLE 3-1

TECHNOLOGY OPTIONS FOR TEC INDUSTRY SUBCATEGORIES

Option	Description
TT/CHEM&PETR Direct	
1	Equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, biological treatment, and sludge dewatering
2	Equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, biological treatment, *activated carbon adsorption*, and sludge dewatering
TT/CHEM&PETR Indirect	
A	Equalization, and oil/water separation
1	Equalization, oil/water separation, *chemical oxidation, neutralization, coagulation, clarification*, and *sludge dewatering*
2	Equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, *activated carbon adsorption*, and sludge dewatering
RT/CHEM&PETR Direct	
1	Oil/water separation, equalization, biological treatment, and sludge dewatering
2	Oil/water separation, equalization, *dissolved air flotation (with flocculation and pH adjustment)*, biological treatment, and sludge dewatering
3	Oil/water separation, equalization, dissolved air flotation (with flocculation and pH adjustment), biological treatment, *organo-clay/activated carbon adsorption,* and sludge dewatering
RT/CHEM&PETR Indirect	
1	Oil/water separation
2	Oil/water separation, *equalization, dissolved air flotation (with flocculation and pH adjustment),* and *sludge dewatering*
3	Oil/water separation, equalization, dissolved air flotation (with flocculation and pH adjustment), *organo-clay/activated carbon adsorption*, and sludge dewatering

TABLE 3-1 (continued)

Option	Description
TB/CHEM&PETR Direct	
1	Oil/water separation, dissolved air flotation, filter press, biological treatment, and sludge dewatering
2	Oil/water separation, dissolved air flotation, filter press, biological treatment, *reverse osmosis*, and sludge dewatering
TB/CHEM&PETR Indirect	
1	Oil/water separation, dissolved air flotation, and in-line filter press
2	Oil/water separation, dissolved air flotation, in-line filter press, *biological treatment (with chemically assisted clarification)*, and *sludge dewatering*
3	Oil/water separation, dissolved air flotation, in-line filter press, biological treatment (with chemically assisted clarification), *reverse osmosis*, and sludge dewatering

Note: EPA developed options based on incremental technology additions to a treatment train. Each option builds upon the previous option. Technologies incremental to the previous option are shown in italics to help the reader identify the distinguishing characteristics of an option.

SECTION 4

RESULTS OF COST-EFFECTIVENESS ANALYSIS

For the Final Rule, EPA revised its estimated cost-effectiveness (CE) ratios for dischargers in six TEC industry subcategories:

- TT/CHEM&PETR Direct
- TT/CHEM&PETR Indirect
- RT/CHEM&PETR Direct
- RT/CHEM&PETR Indirect
- TB/CHEM&PETR Direct
- TB/CHEM&PETR Indirect

This section presents the revised ratios for these six subcategories. (Section 3 outlines technology options for each subcategory.) Revised CE ratios were not calculated for either the FOOD or HOPPER subcategories because neither BAT nor PSES limitations are set for those subcategories. For further information on FOOD and HOPPER CE, please see the *Cost-Effectiveness Analysis of Proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry Point Source Category* (U.S. EPA, 1998).

Costs are presented on a pretax basis in 1981 dollars; costs are estimated in 1994 dollars and deflated to 1981 dollars to facilitate comparison with effluent guidelines of other industries. Compliance costs include monthly monitoring costs for indirect dischargers and a combination of monthly/weekly monitoring costs for direct dischargers. The CE ratios are expressed on an incremental and average basis. Average CE is equal to total option costs divided by total option removals. Although the decision on the relative cost-effectiveness of an option is based on the incremental CE ratio, average CE also provides useful information about removal efficiencies.

If EPA estimates that a subcategory incurs zero compliance costs for an option, CE is zero regardless of removals. If EPA estimates that zero priority or nonconventional pollutants are removed, then the CE for the option is undefined. The following subcategories had CE ratios that were either undefined or zero:

- TT/CHEM&PETR, direct dischargers; EPA estimated zero compliance costs, so all CE ratios are zero.
- TB/CHEM&PETR, direct dischargers; EPA estimated zero removals of priority and nonconventional pollutants, so all CE ratios are undefined.
- TB/CHEM&PETR, indirect dischargers; EPA estimated zero removals of priority and nonconventional pollutants, so all CE ratios are undefined.

These subcategories will not be discussed further in this section.

4.1 TRUCK CHEMICAL & PETROLEUM INDIRECT

Table 4-1 presents the results of the CE analysis for indirect dischargers. There are three technology options for TT/ CHEM&PETR indirect dischargers (see Table 3-1). The incremental CE ratio ranges from $3,179/pe under Option A, to $372/pe under Option 1, to $1,199/pe under Option 2. Option 1 is the selected option for indirect dischargers in the TT/ CHEM&PETR subcategory.

4.2 RAIL CHEMICAL & PETROLEUM DIRECT

All RT/CHEM&PETR facilities in the detailed questionnaire database are indirect dischargers; however, one direct discharger was identified in the screener questionnaire data. Table 4-2 presents the results of the CE analysis for direct dischargers, based on the unweighted data, from this one facility. Because data are available for only one facility, cost and load data are not disclosed. There are three technology options for RT/CHEM&PETR direct dischargers (see Table 3-1). The incremental CE ratio for Option 1 is undefined; the incremental CE ratio for Option 2 is $323/pe and $1,381/pe for Option 3. Option 2 is the selected option for direct dischargers in the RT/CHEM&PETR subcategory.

TABLE 4-1

INCREMENTAL COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS TT/CHEM&PETR INDIRECT SUBCATEGORY

Technology Option	Total Annual		Incremental		Incremental Cost Effectiveness ($1981/PE)	Average Cost Effectiveness ($1981/PE)
	Annualized Cost ($1981)	Pound Equivalents (PE) Removed	Annualized Cost ($1981)	Pound Equivalents (PE) Removed		
Baseline	NA	0	NA	NA	NA	NA
Option A	$4,812,708	1,514	$4,812,708	1,514	$3,179	$3,179
Option 1	$8,598,276	11,690	$3,785,568	10,176	$372	$736
Option 2	$19,641,648	20,903	$11,043,372	9,213	$1,199	$940

TABLE 4-2

INCREMENTAL COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS RT/CHEM&PETR DIRECT SUBCATEGORY

Technology Option	Total Annual		Incremental		Incremental Cost Effectiveness ($1981/PE)	Average Cost Effectiveness ($1981/PE)
	Annualized Cost ($1981)	Pound Equivalents (PE) Removed	Annualized Cost ($1981)	Pound Equivalents (PE) Removed		
Baseline	NA	0.0	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	UNDEFINED	UNDEFINED
Option 2	ND	ND	ND	ND	$323	$371
Option 3	ND	ND	ND	ND	$1,381	$492

ND: Not disclosed due to business confidentiality.

4.3 RAIL CHEMICAL & PETROLEUM INDIRECT

Table 4-3 presents the results of the CE analysis for indirect dischargers in the RT/CHEM&PETR subcategory. There are three technology options for RT/CHEM&PETR indirect dischargers (see Table 3-1). The incremental CE ratio ranges from $82/pe under Option 1, to $492/pe under Option 2, to $1,138/pe under Option 3. Option 2 is the selected option for indirect dischargers in the RT/CHEM&PETR subcategory.

TABLE 4-3

INCREMENTAL COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS RT/CHEM&PETR INDIRECT SUBCATEGORY

Technology Option	Total Annual		Incremental		Incremental Cost Effectiveness ($1981/PE)	Average Cost Effectiveness ($1981/PE)
	Annualized Cost ($1981)	Pound Equivalents (PE) Removed	Annualized Cost ($1981)	Pound Equivalents (PE) Removed		
Baseline	NA	0	NA	NA	NA	NA
Option 1	$535,873	6,555	$535,873	6,555	$82	$82
Option 2	$899,896	7,295	$364,023	740	$492	$123
Option 3	$1,478,117	7,803	$578,221	508	$1,138	$189

SECTION 5

COMPARISON OF COST-EFFECTIVENESS VALUES WITH PROMULGATED RULES

In addition to subcategory-specific cost-effectiveness ratios, this analysis also includes cost-effectiveness ratios for BAT and PSES for the TEC industry as a whole. EPA calculates the cost-effectiveness ratio for the entire industry using two factors: the incremental annualized cost and incremental removals for the proposed options for each subcategory. The incremental values are totaled to provide the cost-effectiveness ratio for the industry. The selected options are:

- TT/CHEM&PETR Direct: Option 2
- TT/CHEM&PETR Indirect: Option 1
- RT/CHEM&PETR Direct: Option 2
- RT/CHEM&PETR Indirect: Option 2
- TB/CHEM&PETR Direct: Option 1
- TB/CHEM&PETR Indirect: Option 2

Tables 5-1 and 5-2 illustrate the process for calculating the industry cost-effectiveness for BAT and PSES, respectively.

Table 5-1 presents the incremental cost-effectiveness of proposed pollution control options for direct dischargers in the TEC industry. Incremental CE for direct dischargers in both the Truck Chemical & Petroleum and Barge Chemical & Petroleum subcategories is undefined due to zero incremental pollutant removals under the selected option. Direct discharging facilities in the Barge Chemical & Petroleum subcategory incur incremental costs under the selected option, but only to control conventional pollutants (i.e., BPT not BAT). EPA selected BPT for the subcategory then set BAT equal to BPT. Therefore these costs are not included in the incremental CE calculation of Table 5-1. The incremental CE resulting from the selected options for direct dischargers in the Truck Chemical & Petroleum and Rail Chemical & Petroleum subcategories is $323/pe.

TABLE 5-1

INCREMENTAL COST-EFFECTIVENESS OF POLLUTANT CONTROL OPTIONS TRANSPORTATION EQUIPMENT CLEANING INDUSTRY DIRECT DISCHARGERS

Subcategory	Incremental Pre-tax Annualized Cost ($1981)	Incremental PE Removed	Incremental Cost-Effectiveness ($/PE)
TT/CHEM&PETR	ND	ND	UNDEFINED
RT/CHEM&PETR	ND	ND	$323
TB/CHEM&PETR	NA	NA	NA
Industry Total	ND	ND	$323

ND: Not disclosed due to business confidentiality.
NA: Not Applicable; BAT = BPT.
Note: Incremental costs and removals are calculated from the selected option and preceding option in the subcategory cost-effectiveness analysis.

TABLE 5-2

INCREMENTAL COST-EFFECTIVENESS OF POLLUTANT CONTROL OPTIONS TRANSPORTATION EQUIPMENT CLEANING INDUSTRY INDIRECT DISCHARGERS

Subcategory	Incremental Pre-tax Annualized Cost ($1981)	Incremental PE Removed	Incremental Cost-Effectiveness ($/PE)
TT/CHEM&PETR	$3,785,568	10,176	$372
RT/CHEM&PETR	$364,023	740	$492
TB/CHEM&PETR*	$0	0	UNDEFINED
Industry Total	$4,149,591	10,916	$380

*Incremental monitoring costs are zero.
Note: Incremental costs and removals are calculated from the selected option and preceding option in the subcategory cost-effectiveness analysis.

Table 5-2 presents the incremental cost-effectiveness of selected pollution control options for indirect dischargers in the TEC industry. Incremental CE for indirect dischargers in Barge Chemical & Petroleum is undefined because the subcategory has zero incremental pollutant removals and incurs zero incremental monitoring costs under the selected option. The incremental industry cost-effectiveness resulting from the selected options for indirect dischargers in the Truck Chemical & Petroleum, Rail Chemical & Petroleum, and Barge Chemical & Petroleum subcategories is $380/pe.

Tables 5-3 and 5-4 present the cost-effectiveness values for effluent limitations guidelines and standards in other industries for direct dischargers under BAT and indirect dischargers under PSES. The numbers presented for this rulemaking are pretax costs, whereas many of the numbers presented for other effluent guidelines are posttax costs—that is, the actual costs faced by the firms, not just the total cost of the equipment (which is subsidized by reductions in taxable income). Thus, direct comparisons between this rulemaking and others cannot be made easily. An equivalent posttax cost-effectiveness, however, is approximately 60 to 70 percent of pretax cost-effectiveness. Appendix B contains the supporting information for baseline discharges.

TABLE 5-3

INDUSTRY COMPARISON OF BAT COST-EFFECTIVENESS
FOR DIRECT DISCHARGERS
(Toxic and Nonconventional Pollutants Only; Copper-Based Weights[a]; $ 1981)

Industry	PE Currently Discharged (thousands)	PE Remaining at Selected Option (thousands)	Cost-Effectiveness of Selected Option(s) ($/PE removed)
Aluminum Forming	1,340	90	121
Battery Manufacturing	4,126	5	2
Canmaking	12	0.2	10
Centralized Waste Treatment[c]	3,372	1,261-1,267	5-7
Coal Mining	BAT=BPT	BAT=BPT	BAT=BPT
Coil Coating	2,289	9	49
Copper Forming	70	8	27
Electronics I	9	3	404
Electronics II	NA	NA	NA
Foundries	2,308	39	84
Inorganic Chemicals I	32,503	1,290	<1
Inorganic Chemicals II	605	27	6
Iron & Steel	40,746	1,040	2
Leather Tanning	259	112	BAT=BPT
Metal Finishing	3,305	3,268	12
Metal Products and Machinery[c]	140	70	50
Nonferrous Metals Forming	34	2	69
Nonferrous Metals Mfg I	6,653	313	4
Nonferrous Metals Mfg II	1,004	12	6
Oil and Gas: Offshore[b] *Coastal*—Produced Water/TWC Drilling Waste	3,809 951 BAT = Current Practice	2,328 239 BAT = Current Practice	33 35 BAT = Current Practice
Organic Chemicals	54,225	9,735	5
Pesticides	2,461	371	14
Pharmaceuticals[c] A/C B/D	897 90	47 0.5	47 96
Plastics Molding & Forming	44	41	BAT=BPT
Porcelain Enameling	1,086	63	6
Petroleum Refining	BAT=BPT	BAT=BPT	BAT=BPT
Pulp & Paper[c]	61,713	2,628	39
Textile Mills	BAT=BPT	BAT=BPT	BAT=BPT
TEC: TB/CHEM&PETR **TT & RT/CHEM&PETR**	**BAT=BPT** **1**	**BAT=BPT** **ND**	**BAT=BPT** **323**

[a]Although toxic weighting factors for priority pollutants varied across these rules, this table reflects the cost-effectiveness at the time of regulation.
[b]Produced water only; for produced sand and drilling fluids and drill cuttings, BAT=NSPS.
ND: Nondisclosed due to business confidentiality.

TABLE 5-4

INDUSTRY COMPARISON OF PSES COST-EFFECTIVENESS
FOR INDIRECT DISCHARGERS
(Toxic and Nonconventional Pollutants Only; Copper-Based Weights[a]; $ 1981)

Industry[b]	PE Currently Discharged (To Surface Waters) (thousands)	PE Discharged at Selected Option (To Surface Waters) (thousands)	Cost-Effectiveness of Selected Option(s) Beyond BPT ($/PE removed)
Aluminum Forming	1,602	18	155
Battery Manufacturing	1,152	5	15
Canmaking	252	5	38
Centralized Waste Treatment[c]	689	328-330	70-110
Coal Mining	NA	NA	NA[c]
Coil Coating	2,503	10	10
Copper Forming	934	4	10
Electronics I	75	35	14
Electronics II	260	24	14
Foundries	2,136	18	116
Inorganic Chemicals I	3,971	3,004	9
Inorganic Chemicals II	4,760	6	<1
Iron & Steel	5,599	1,404	6
Leather Tanning	16,830	1,899	111
Metal Finishing	11,680	755	10
Metal Products and Machinery[c]	1,115	234	127
Nonferrous Metals Forming	189	5	90
Nonferrous Metals Mfg I	3,187	19	15
Nonferrous Metals Mfg II	38	0.41	12
Organic Chemicals	5,210	72	34
Pesticide Manufacturing	257	19	18
Pesticide Formulating	7,746	112	<3
Pharmaceuticals[c]	340	63	1
Plastics Molding & Forming	NA	NA	NA
Porcelain Enameling	1,565	96	14
Pulp & Paper[c]	9,539	103	65
Transportation Equipment Cleaning	**38**	**19**	**380**

[a]Although toxic weighting factors for priority pollutants varied across these rules, this table reflects the cost-effectiveness at the time of regulation.
[b]No known indirect dischargers at this time for offshore oil and gas and coastal oil and gas.
[c]Proposed.

SECTION 6

COST-REASONABLENESS OF CONVENTIONAL POLLUTANTS REMOVED

6.1 BCT COST-REASONABLENESS TEST

EPA evaluates the cost-reasonableness of control technologies for conventional pollutants for direct dischargers using the Best Conventional Pollutant Control Technology (BCT) cost test. After setting Best Practicable Control Technology (BPT), EPA uses the BCT cost test to evaluate whether it can set BCT at a more stringent level. The test evaluates the cost-reasonableness of BCT options compared to BPT options. Like BPT, BCT applies only to direct dischargers.

The test is composed of two parts, the POTW test and the industry cost-effectiveness test. A pollution control technology must pass both parts in order to pass the test. If it does not pass, then BCT limitations are set at a level equal to BPT limitations. This is also done if there are no candidate technologies for BCT at a more stringent level than BPT. In the latter case, the BCT cost test is not performed.

6.1.1 POTW Test

The POTW test compares the incremental cost of removals incurred by switching from BPT to BCT against the cost of upgrading POTWs from secondary to advanced secondary treatment. In order to pass this test, the incremental cost for the TEC industry to comply with BCT (measured in dollars per pound of conventional pollutants removed) must be less than the cost of upgrading POTWs to achieve similar removals. This benchmark cost for POTWs is set at $0.56 in 1994 dollars. Cost per pound of conventional pollutant removals is calculated as:

$$\text{Cost per Pound} = \text{Pretax Annualized Cost} / \text{Pounds Removed}$$

To pass this part of the test, the TEC industry cost per pound removed must be less than $0.56.

6.1.2 Industry Ratio Test

The industry cost-effectiveness test compares the rate of cost increase for an industry to move from BPT to BCT to the rate of cost increase for POTWs to upgrade from secondary to advanced secondary treatment. To pass this test, the rate of cost increase for the industry must be less than the rate of cost increase associated with upgrading POTWs. This rate is benchmarked at 1.29. In effect, this part of the test requires that the cost of removals must increase by less than 29% in moving from BPT to BCT. The industry cost-effectiveness is calculated as the ratio of the incremental cost of BCT to the incremental cost of BPT (which is incremental from the baseline level of treatment):

Industry Cost-Effectiveness = BCT Incremental Cost per Pound / BPT Incremental Cost per Pound

6.2 SUBCATEGORY BCT TESTS

Table 6-1 presents the cost-reasonableness of BCT options for direct dischargers in the RT/CHEM&PETR subcategory. All costs are presented in 1994 dollars. The table presents figures based on a combination of monthly and weekly monitoring. EPA selected Option 2 as the basis for BPT; Option 3 failed the BCT cost test because the incremental cost per pound of conventional pollutant removals exceeds $0.56.

The BCT cost test is not applicable to direct dischargers in the TT/CHEM&PETR and TB/CHEM&PETR subcategories:

- TT/CHEM&PETR direct dischargers: estimated compliance costs are zero under both options; zero incremental conventional pollutant removals expected under Option 2.
- TB/CHEM&PETR direct dischargers: Option 1 is selected for BPT; zero incremental conventional pollutant removals expected under Option 2, thus the BCT cost test is undefined for Option 2.

TABLE 6-1

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
DIRECT DISCHARGERS

	Total Annual			Incremental				
Technology Option	Pretax Annualized Cost ($1994)	Pounds Removed	Cost per Pound ($1994/lb)	Pretax Annualized Cost ($1994)	Pounds Removed	Cost per Pound ($1994/lb)	BCT Cost Test	Industry Cost-Effectiveness Test
Option 1	ND	ND	UNDEFINED	ND	ND	UNDEFINED	NA	NA
Option 2	ND	ND	$2,448	ND	ND	$2,133	NA	NA
Option 3	ND	ND	$884	ND	ND	$392	FAIL	0.18

NA: Not applicable because Option 2 = BPT.

ND: Not disclosed due to business confidentiality.

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound

Two-part BCT Cost Test:

(a) BCT $1994 Incremental Cost per Pound < $0.56

(b) Industry Cost-Effectiveness < 1.29

SECTION 7

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APPENDIX A

SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: POUND EQUIVALENTS REMOVED FOR TT/CHEM&PETR INDIRECT AND RT/CHEM&PETR INDIRECT

TABLE A-1

PRIORITY AND NONCONVENTIONAL POLLUTANT REMOVALS UNDER SELECTED OPTIONS INDUSTRY TOTALS

Subcategory	Pounds			Pound Equivalents (PEs)		
	Direct	Indirect	Total	Direct	Indirect	Total
TT/CHEM&PETR	ND	1,392,420	ND	ND	11,690	ND
RT/CHEM&PETR	ND	956,062	ND	ND	7,295	ND
TB/CHEM&PETR	0	0	0	0	0	0
Industry Total	ND	2,348,482	ND	ND	18,985	ND

* Pollutants directly discharged are unweighted because direct dischargers were identified only in the screener questionnaire.

ND: Not disclosed due to business confidentiality.

NA: Not applicable.

TABLE A-2

POLLUTANT REMOVALS
TRUCK CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Grams Removed			Conversion Factors			Pound Equivalents (PE) Removed		
	Option A	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option A	Option 1	Option 2
Adsorbable Organic Halides (AOX)	590,889	6,648,073	8,267,784	2.21E-03	UNK	UNK	0.0	0.0	0.0
Ammonia as Nitrogen	45,576,217	45,576,217	128,679,236	2.21E-03	1.8E-03	61%	110.6	110.6	312.3
5-Day Biochemical Oxygen Demand	798,806,651	4,147,813,790	4,147,813,790	2.21E-03	UNK	UNK	0.0	0.0	0.0
Chemical Oxygen Demand (COD)	710,352,964	7,822,858,835	10,919,736,348	2.21E-03	UNK	UNK	0.0	0.0	0.0
Chloride	4,975,059	4,975,059	682,248,837	2.21E-03	2.4E-05	UNK	0.0	0.0	0.0
Fluoride	6,418,517	19,158,437	35,384,557	2.21E-03	3.5E-02	39%	193.6	577.9	1,067.4
Nitrate/Nitrite	15,304	257,013	4,248,053	2.21E-03	UNK	UNK	0.0	0.0	0.0
Surfactants (MBAS)	4,685,574	20,578,755	37,962,044	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Dissolved Solids	33,165,752	33,165,752	4,547,781,156	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Organic Carbon (TOC)	112,897,181	693,817,730	3,615,893,382	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Petroleum Hydrocarbons (TPH)	253,896,096	255,014,443	255,014,443	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Phenols	24,159	1,834,157	2,715,989	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Phosphorus	2,231,810	35,808,147	45,804,897	2.21E-03	UNK	UNK	0.0	0.0	0.0
Oil and Grease	2,827,102,168	2,835,993,028	2,835,993,028	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Suspended Solids	604,681,625	2,252,660,214	2,351,508,030	2.21E-03	UNK	UNK	0.0	0.0	0.0
Acetone	266,675	15,196,032	67,549,900	2.21E-03	5.0E-06	16%	0.0	0.0	0.1
Benzene	430	50,403	51,929	2.21E-03	1.8E-02	5%	0.0	0.1	0.1
Chloroform	10,941	82,445	122,061	2.21E-03	2.1E-03	27%	0.0	0.1	0.2
1,2-Dichloroethane	6,429	830,748	1,080,235	2.21E-03	6.2E-03	11%	0.0	1.3	1.6
Ethylbenzene	34,998	763,713	832,892	2.21E-03	1.4E-03	6%	0.0	0.1	0.2
Methyl ethyl ketone	47,295	2,283,902	14,242,357	2.21E-03	2.5E-05	8%	0.0	0.0	0.1
Methyl isobutyl ketone	17,218	1,691,800	4,294,472	2.21E-03	1.3E-04	12%	0.0	0.1	0.1
Methylene chloride	3,105,244	11,451,813	26,433,612	2.21E-03	4.2E-04	46%	1.3	4.9	11.3
Tetrachloroethylene	2,287,404	2,321,144	2,321,144	2.21E-03	1.3E-02	15%	9.9	10.0	10.0
Toluene	20,859	2,491,659	3,681,059	2.21E-03	5.6E-03	4%	0.0	1.2	1.8
1,1,1-Trichloroethane	8,143	1,134,976	1,338,835	2.21E-03	4.5E-03	10%	0.0	1.1	1.3
Trichloroethylene	263	25,327	26,241	2.21E-03	6.4E-03	13%	0.0	0.0	0.0
m-Xylene	21,771	3,326,599	3,627,088	2.21E-03	1.5E-03	35%	0.0	3.9	4.2
o+p-Xylene	11,206	1,699,774	1,877,457	2.21E-03	4.7E-03	5%	0.0	0.9	1.0
alpha-Terpineol	15,094	275,823	598,999	2.21E-03	1.1E-03	5%	0.0	0.0	0.1
Benzoic acid	213,956	7,248,087	47,536,659	2.21E-03	3.3E-04	19%	0.0	1.0	6.6
Benzyl alcohol	103,660	481,210	491,296	2.21E-03	5.6E-03	22%	0.3	1.3	1.3
bis (2-Ethylhexyl) phthalate	71,922	913,900	927,252	2.21E-03	9.5E-02	40%	6.0	76.7	77.9
2-Chlorophenol	13,013	97,608	101,402	2.21E-03	3.3E-02	38%	0.4	2.7	2.8
o-Cresol	854	117,944	118,716	2.21E-03	2.7E-03	47%	0.0	0.3	0.3
p-Cresol	631	17,853	206,774	2.21E-03	4.0E-03	28%	0.0	0.0	0.5
p-Cymene	4,037	85,440	97,546	2.21E-03	2.4E-02	1%	0.0	0.0	0.1
n-Decane	3,952	607,836	607,836	2.21E-03	4.3E-03	91%	0.0	5.3	5.3
1,2-Dichlorobenzene	1,138	163,291	163,291	2.21E-03	1.1E-02	11%	0.0	0.4	0.4
Dimethyl sulfone	5,212,788	13,946,741	13,946,741	2.21E-03	UNK	UNK	0.0	0.0	0.0
Di-n-octyl phthalate	1,921	287,088	287,088	2.21E-03	2.2E-01	32%	0.3	44.7	44.7
n-Docosane	70,632	188,612	188,612	2.21E-03	8.2E-05	12%	0.0	0.0	0.0
n-Dodecane	12,504	1,958,352	1,958,352	2.21E-03	4.3E-03	5%	0.0	0.9	0.9
n-Eicosane	179,652	525,198	565,870	2.21E-03	4.3E-03	8%	0.1	0.4	0.4
n-Hexacosane	75,522	258,085	258,085	2.21E-03	8.2E-05	29%	0.0	0.0	0.0
n-Hexadecane	748,069	1,364,254	1,364,254	2.21E-03	4.3E-03	29%	2.1	3.8	3.8
2-Isopropylnaphthalene	110,401	331,881	331,881	2.21E-03	7.2E-02	72%	12.6	38.0	38.0
2-Methylnaphthalene	76,776	125,869	125,869	2.21E-03	8.0E-02	72%	9.8	16.0	16.0
Naphthalene	122,207	541,358	564,741	2.21E-03	1.5E-02	5%	0.2	0.9	0.9
n-Octadecane	274,602	719,686	719,686	2.21E-03	4.3E-03	29%	0.8	2.0	2.0
Phenol	364,675	633,653	1,535,315	2.21E-03	2.8E-02	5%	1.1	2.0	4.8
Styrene	740,916	4,852,728	6,773,134	2.21E-03	1.4E-02	6%	1.4	9.0	12.6
n-Tetracosane	126,987	328,728	328,728	2.21E-03	8.2E-05	29%	0.0	0.0	0.0

TABLE A-2 (continued)

POLLUTANT REMOVALS
TRUCK CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Grams Removed			Conversion Factors			Pound Equivalents (PE) Removed		
	Option A	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option A	Option 1	Option 2
n-Tetradecane	529,638	929,432	929,432	2.21E-03	4.3E-03	29%	1.5	2.6	2.6
n-Triacontane	77,731	384,985	384,985	2.21E-03	8.2E-05	29%	0.0	0.0	0.0
2,4,6-Trichlorophenol	73,677	164,094	331,162	2.21E-03	4.4E-01	UNK	0.0	0.0	0.0
Azinphos methyl	50	6,123	6,123	2.21E-03	2.8E+01	26%	0.8	98.5	98.5
Leptophos	71	8,027	8,027	2.21E-03	1.1E+01	100%	1.7	195.1	195.1
Beta-BHC	5	621	621	2.21E-03	1.2E+01	11%	0.0	1.8	1.8
Gamma-BHC	2	2	328	2.21E-03	4.7E+01	25%	0.1	0.1	8.5
Diallate	193	26,082	33,225	2.21E-03	4.5E-01	100%	0.2	25.9	33.0
Endosulfan Sulfate	3	58	58	2.21E-03	1.0E+02	42%	0.3	5.4	5.4
Endrin Aldehyde	39	39	39	2.21E-03	1.6E+02	100%	13.6	13.6	13.6
Pentachloronitrobenzene	86	13,498	13,498	2.21E-03	7.4E-01	100%	0.1	22.1	22.1
2,4-D	25	1,499	1,499	2.21E-03	3.0E-03	51%	0.0	0.0	0.0
Dalapon	8	8	2,098	2.21E-03	5.1E-03	100%	0.0	0.0	0.0
2,4-DB (Butoxon)	57	4,228	11,140	2.21E-03	3.6E-02	100%	0.0	0.3	0.9
Dinoseb	19	858	858	2.21E-03	9.0E-01	100%	0.0	1.7	1.7
MCPA	906,241	978,853	1,080,472	2.21E-03	1.6E-02	100%	32.0	34.6	38.2
2,4,5-T	10	1,241	1,423	2.21E-03	2.8E-01	44%	0.0	0.3	0.4
2,4,5-TP	6	628	628	2.21E-03	1.8E-01	56%	0.0	0.1	0.1
1234678-HPCDD	0	1	1	2.21E-03	4.2E+06	17%	15.8	2,224.9	2,224.9
1234678-HPCDF	0	0	0	2.21E-03	6.7E+05	17%	0.0	60.4	60.4
OCDD	0	13	13	2.21E-03	4.2E+05	21%	11.7	2,504.7	2,504.7
Aluminum	5,565,643	11,172,310	12,086,152	2.21E-03	6.4E-02	9%	70.8	142.2	153.9
Boron	29,835	1,596,428	9,089,771	2.21E-03	1.8E-01	80%	9.5	508.0	2,892.7
Cadmium	2,503	19,770	20,238	2.21E-03	2.6E+00	10%	1.4	11.4	11.6
Calcium	10,178,954	108,258,088	237,901,413	2.21E-03	2.8E-05	91%	0.6	6.1	13.4
Chromium	465,753	3,497,303	3,511,771	2.21E-03	7.6E-02	20%	15.6	117.5	118.0
Copper	191,301	361,345	414,463	2.21E-03	6.3E-01	16%	42.6	80.5	92.3
Iron	18,102,171	34,287,118	36,143,109	2.21E-03	5.6E-03	18%	40.3	76.4	80.5
Magnesium	41,651,066	96,335,172	96,835,531	2.21E-03	8.7E-04	86%	68.9	159.3	160.1
Manganese	440,028	597,886	597,886	2.21E-03	7.0E-02	67%	45.6	62.0	62.0
Mercury	18	2,477	2,482	2.21E-03	1.2E+02	10%	0.5	65.7	65.8
Molybdenum	11,028	36,954	36,954	2.21E-03	2.0E-01	81%	3.9	13.2	13.2
Nickel	49,394	170,523	282,502	2.21E-03	1.1E-01	49%	5.9	20.3	33.7
Phosphorus	23,692,682	83,142,295	94,374,663	2.21E-03	UNK	31%	0.0	0.0	0.0
Potassium	213,116	7,936,420	7,936,420	2.21E-03	1.1E-03	80%	0.4	15.4	15.4
Silicon	4,790,600	19,127,561	21,013,882	2.21E-03	UNK	73%	0.0	0.0	0.0
Sodium	7,309,475	94,547,651	985,893,681	2.21E-03	5.5E-06	45%	0.0	0.5	5.4
Strontium	307,422	860,253	860,253	2.21E-03	UNK	88%	0.0	0.0	0.0
Sulfur	3,311,298	3,311,298	385,216,498	2.21E-03	5.6E-06	88%	0.0	0.0	4.2
Tin	2,110,273	11,730,482	28,283,190	2.21E-03	3.0E-01	55%	769.5	4,277.5	10,313.5
Titanium	183,944	338,815	356,488	2.21E-03	2.9E-02	8%	0.9	1.7	1.8
Zinc	419,991	1,072,485	1,072,485	2.21E-03	4.7E-02	20%	8.7	22.3	22.3
Total	5,540,419,106	18,736,504,135	31,751,064,446				1,514	11,690	20,903

Note 1: Pound equivalent removals are rounded to the nearest 0.1 pounds.
Note 2: Chemicals for which no TWF or POTW removal factor is available (designated by "UNK") are entered as having zero pound equivalents removed.

TABLE A-3

POLLUTANT REMOVALS
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Grams Removed			Conversion Factors			Pound Equivalents (PE) Removed		
				Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor			
	Option 1	Option 2	Option 3				Option 1	Option 2	Option 3
Adsorbable Organic Halides (AOX)	62,921	70,487	156,451	2.21E-03	UNK	UNK	0.0	0.0	0.0
Ammonia as Nitrogen	51,605	51,605	1,250,046	2.21E-03	1.8E-03	61%	0.1	0.1	3.0
5-Day Biochemical Oxygen Demand	10,326,486	86,921,420	130,344,246	2.21E-03	UNK	UNK	0.0	0.0	0.0
Chemical Oxygen Demand (COD)	581,631,968	665,398,106	676,180,211	2.21E-03	UNK	UNK	0.0	0.0	0.0
Chloride	83,674,966	118,277,995	118,277,995	2.21E-03	2.4E-05	UNK	0.0	0.0	0.0
Fluoride	19,999	115,806	482,877	2.21E-03	3.5E-02	39%	0.6	3.5	14.6
Nitrate/Nitrite	341,560	341,560	973,656	2.21E-03	UNK	UNK	0.0	0.0	0.0
Surfactants (MBAS)	48,438	303,149	463,344	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Dissolved Solids	586,739,367	804,720,987	1,099,039,915	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Organic Carbon (TOC)	77,122,891	108,149,955	120,714,991	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Petroleum Hydrocarbons (TPH)	43,197,025	45,151,123	45,151,123	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Phenols	68,028	85,130	162,508	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Phosphorus	1,999,055	2,686,503	2,934,450	2.21E-03	UNK	UNK	0.0	0.0	0.0
Oil and Grease	191,514,645	196,220,906	196,964,299	2.21E-03	UNK	UNK	0.0	0.0	0.0
Total Suspended Solids	103,984,354	152,231,066	161,483,517	2.21E-03	UNK	UNK	0.0	0.0	0.0
Acetone	164,950	164,950	207,013	2.21E-03	5.0E-06	16%	0.0	0.0	0.0
Ethylbenzene	777	5,549	19,340	2.21E-03	1.4E-03	6%	0.0	0.0	0.0
Methyl ethyl ketone	10,487	10,487	94,957	2.21E-03	2.5E-05	8%	0.0	0.0	0.0
m-Xylene	2,512	15,104	46,099	2.21E-03	1.5E-03	35%	0.0	0.0	0.1
o+p-Xylene	1,172	7,212	31,925	2.21E-03	4.7E-03	5%	0.0	0.0	0.0
Anthracene	24,150	26,005	26,005	2.21E-03	2.5E+00	4%	5.3	5.7	5.7
Benzoic acid	228,543	228,543	742,910	2.21E-03	3.3E-04	19%	0.0	0.0	0.1
Carbazole	15,669	16,060	20,379	2.21E-03	2.7E-01	100%	9.3	9.6	12.2
p-Cresol	80	80	11,608	2.21E-03	4.0E-03	28%	0.0	0.0	0.0
2,4-Diaminotoluene	3,649	13,795	463,699	2.21E-03	1.8E-01	100%	1.5	5.5	184.5
Dimethyl sulfone	9,504	9,862	9,862	2.21E-03	UNK	UNK	0.0	0.0	0.0
n-Docosane	58,236	59,160	59,160	2.21E-03	8.2E-05	12%	0.0	0.0	0.0
n-Dodecane	92,790	97,431	97,431	2.21E-03	4.3E-03	5%	0.0	0.0	0.0
n-Eicosane	243,344	246,560	246,560	2.21E-03	4.3E-03	8%	0.2	0.2	0.2
Fluoranthene	23,046	23,404	23,404	2.21E-03	8.0E-01	58%	23.6	24.0	24.0
n-Hexacosane	30,789	31,086	31,086	2.21E-03	8.2E-05	29%	0.0	0.0	0.0
n-Hexadecane	471,065	472,123	472,123	2.21E-03	4.3E-03	29%	1.3	1.3	1.3
Hexanoic Acid	13,142	127,436	127,436	2.21E-03	3.7E-04	16%	0.0	0.0	0.0
1-Methylphenanthrene	19,356	19,449	19,449	2.21E-03	1.0E-01	5%	0.2	0.2	0.2
Naphthalene	13,624	17,627	20,393	2.21E-03	1.5E-02	5%	0.0	0.0	0.0
n-Octacosane	18,535	18,948	18,948	2.21E-03	8.2E-05	29%	0.0	0.0	0.0
n-Octadecane	285,183	287,724	287,724	2.21E-03	4.3E-03	29%	0.8	0.8	0.8
Phenanthrene	51,473	53,143	53,360	2.21E-03	2.9E-01	5%	1.6	1.7	1.7
Phenol	34,491	51,512	137,642	2.21E-03	2.8E-02	5%	0.1	0.2	0.4
Pyrene	17,867	18,153	18,153	2.21E-03	1.1E-01	5%	0.2	0.2	0.2
Styrene	45,512	45,572	45,572	2.21E-03	1.4E-02	6%	0.1	0.1	0.1
n-Tetracosane	50,851	51,998	51,998	2.21E-03	8.2E-05	29%	0.0	0.0	0.0
n-Tetradecane	326,289	328,953	328,953	2.21E-03	4.3E-03	29%	0.9	0.9	0.9
n-Triacontane	20,017	20,607	20,607	2.21E-03	8.2E-05	29%	0.0	0.0	0.0
Acephate	24,176	34,395	196,352	2.21E-03	4.6E-02	100%	2.5	3.5	20.0
Benefluralin	344	509	588	2.21E-03	1.9E-01	100%	0.1	0.2	0.2

TABLE A-3 (continued)

POLLUTANT REMOVALS
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Grams Removed			Conversion Factors			Pound Equivalents (PE) Removed		
	Option 1	Option 2	Option 3	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2	Option 3
Alpha-BHC	2	15	16	2.21E-03	4.3E+01	15%	0.0	0.2	0.2
Beta-BHC	5,857	5,858	5,859	2.21E-03	1.2E+01	11%	17.1	17.1	17.1
Delta-BHC	82	85	85	2.21E-03	3.5E-02	53%	0.0	0.0	0.0
Gamma-Chlordane	2	10	11	2.21E-03	1.6E+03	50%	3.0	17.8	19.7
Dacthal (DCPA)	75	78	80	2.21E-03	3.4E-02	16%	0.0	0.0	0.0
Diallate	53,958	69,977	69,977	2.21E-03	4.5E-01	100%	53.7	69.6	69.6
Dieldrin	351	370	380	2.21E-03	5.7E+04	14%	6,181.7	6,518.7	6,707.2
Endosulfan Sulfate	45	50	54	2.21E-03	1.0E+02	42%	4.1	4.7	5.1
Pentachloronitrobenzene	7	33	89	2.21E-03	7.4E-01	100%	0.0	0.1	0.1
Propachlor	2,722	2,722	2,722	2.21E-03	3.3E-01	100%	2.0	2.0	2.0
Propazine	2,262	2,262	2,569	2.21E-03	3.5E-03	100%	0.0	0.0	0.0
Terbacil	4,291	4,291	4,291	2.21E-03	1.0E-03	100%	0.0	0.0	0.0
Terbuthylazine	8,334	68,864	528,518	2.21E-03	3.5E-02	100%	0.6	5.3	40.9
2,4-DB (Butoxon)	869	10,179	12,723	2.21E-03	3.6E-02	100%	0.1	0.8	1.0
Dicamba	4,394	49,423	49,457	2.21E-03	1.5E-02	100%	0.1	1.6	1.6
Dichloroprop	9,772	13,131	15,201	2.21E-03	9.3E-02	100%	2.0	2.7	3.1
Dinoseb	4,779	7,158	7,158	2.21E-03	9.0E-01	100%	9.5	14.2	14.2
MCPP	633,994	3,495,117	4,025,548	2.21E-03	1.8E-03	100%	2.5	13.9	16.0
2,4,5-T	1,860	2,754	2,839	2.21E-03	2.8E-01	44%	0.5	0.7	0.8
2,4,5-TP	147	1,149	1,149	2.21E-03	1.8E-01	56%	0.0	0.3	0.3
OCDD	0	1	1	2.21E-03	4.2E+05	21%	25.3	290.4	290.4
OCDF	0	0	0	2.21E-03	6.7E+04	17%	0.5	5.8	5.8
Aluminum	2,081,699	2,260,659	2,994,441	2.21E-03	6.4E-02	9%	26.5	28.8	38.1
Arsenic	4,708	5,784	8,431	2.21E-03	3.5E+00	57%	20.8	25.5	37.2
Barium	34,395	101,911	101,911	2.21E-03	2.0E-03	25%	0.0	0.1	0.1
Boron	120,726	155,412	210,571	2.21E-03	1.8E-01	80%	38.4	49.5	67.0
Calcium	2,217,701	2,297,864	2,297,864	2.21E-03	2.8E-05	91%	0.1	0.1	0.1
Chromium	20,781	35,349	35,349	2.21E-03	7.6E-02	20%	0.7	1.2	1.2
Copper	4,690	15,193	15,193	2.21E-03	6.3E-01	16%	1.0	3.4	3.4
Iron	177,799	1,779,707	1,803,425	2.21E-03	5.6E-03	18%	0.4	4.0	4.0
Magnesium	818,905	865,359	865,359	2.21E-03	8.7E-04	86%	1.4	1.4	1.4
Manganese	70,292	90,959	90,959	2.21E-03	7.0E-02	67%	7.3	9.4	9.4
Phosphorus	2,006,366	2,856,511	3,010,107	2.21E-03	UNK	31%	0.0	0.0	0.0
Potassium	53,241,248	73,884,295	87,675,244	2.21E-03	1.1E-03	80%	103.5	143.7	170.5
Silicon	61,318	492,416	492,416	2.21E-03	UNK	73%	0.0	0.0	0.0
Sodium	134,558,681	180,259,266	190,612,109	2.21E-03	5.5E-06	45%	0.7	1.0	1.0
Sulfur	31,765,756	42,659,059	54,375,109	2.21E-03	5.6E-06	88%	0.3	0.5	0.6
Titanium	22,707	29,332	29,332	2.21E-03	2.9E-02	8%	0.1	0.2	0.2
Zinc	99,693	135,604	135,604	2.21E-03	4.7E-02	20%	2.1	2.8	2.8
Total	1,911,126,197	2,494,887,438	2,907,992,512				6,555	7,295	7,803

Note 1: Pound equivalent removals are rounded to the nearest 0.1 pounds.
Note 2: Chemicals for which no TWF or POTW removal factor is available (designated by "UNK") are entered as having zero pound equivalents removed.

APPENDIX B

SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: BASELINE POLLUTANT DISCHARGES IN POUNDS AND POUND EQUIVALENTS

TABLE B-1

BASELINE POLLUTANT DISCHARGES
TRUCK CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Pound Equivalent Discharge at Baseline
Adsorbable Organic Halides (AOX)	9,619,158	2.21E-03	UNK	UNK	0.0
Ammonia as Nitrogen	332,138,353	2.21E-03	1.8E-03	61%	806.0
5-Day Biochemical Oxygen Demand	4,505,323,981	2.21E-03	UNK	UNK	0.0
Chemical Oxygen Demand (COD)	13,197,262,918	2.21E-03	UNK	UNK	0.0
Chloride	2,057,319,842	2.21E-03	2.4E-05	UNK	0.0
Fluoride	54,761,604	2.21E-03	3.5E-02	39%	1,652.0
Nitrate/Nitrite	5,945,789	2.21E-03	UNK	UNK	0.0
Surfactants (MBAS)	40,397,710	2.21E-03	UNK	UNK	0.0
Total Dissolved Solids	13,713,818,491	2.21E-03	UNK	UNK	0.0
Total Organic Carbon (TOC)	4,137,729,951	2.21E-03	UNK	UNK	0.0
Total Petroleum Hydrocarbons (TPH)	282,261,808	2.21E-03	UNK	UNK	0.0
Total Phenols	5,842,482	2.21E-03	UNK	UNK	0.0
Total Phosphorus	56,634,709	2.21E-03	UNK	UNK	0.0
Oil and Grease	2,913,400,314	2.21E-03	UNK	UNK	0.0
Total Suspended Solids	2,409,561,509	2.21E-03	UNK	UNK	0.0
Acetone	85,714,689	2.21E-03	5.0E-06	16%	0.2
Benzene	76,699	2.21E-03	1.8E-02	5%	0.2
Chloroform	160,680	2.21E-03	2.1E-03	27%	0.2
1,2-Dichloroethane	1,110,356	2.21E-03	6.2E-03	11%	1.7
Ethylbenzene	857,662	2.21E-03	1.4E-03	6%	0.2
Methyl ethyl ketone	15,867,561	2.21E-03	2.5E-05	8%	0.1
Methyl isobutyl ketone	5,043,559	2.21E-03	1.3E-04	12%	0.2
Methylene chloride	29,287,288	2.21E-03	4.2E-04	46%	12.5
Tetrachloroethylene	2,345,915	2.21E-03	1.3E-02	15%	10.1
Toluene	3,705,829	2.21E-03	5.6E-03	4%	1.8
1,1,1-Trichloroethane	1,363,779	2.21E-03	4.5E-03	10%	1.4
Trichloroethylene	51,014	2.21E-03	6.4E-03	13%	0.1
m-Xylene	3,651,858	2.21E-03	1.5E-03	35%	4.2
o+p-Xylene	1,902,227	2.21E-03	4.7E-03	5%	1.0
alpha-Terpineol	623,769	2.21E-03	1.1E-03	5%	0.1
Benzoic acid	76,783,616	2.21E-03	3.3E-04	19%	10.6
Benzyl alcohol	529,240	2.21E-03	5.6E-03	22%	1.4
bis (2-Ethylhexyl) phthalate	952,022	2.21E-03	9.5E-02	40%	80.0
2-Chlorophenol	126,172	2.21E-03	3.3E-02	38%	3.5
o-Cresol	143,486	2.21E-03	2.7E-03	47%	0.4
p-Cresol	232,422	2.21E-03	4.0E-03	28%	0.6
p-Cymene	122,319	2.21E-03	2.4E-02	1%	0.1
n-Decane	632,606	2.21E-03	4.3E-03	91%	5.5
1,2-Dichlorobenzene	188,061	2.21E-03	1.1E-02	11%	0.5
Dimethyl sulfone	13,971,511	2.21E-03	UNK	UNK	0.0
Di-n-octyl phthalate	311,859	2.21E-03	2.2E-01	32%	48.5
n-Docosane	213,382	2.21E-03	8.2E-05	12%	0.0
n-Dodecane	1,983,123	2.21E-03	4.3E-03	5%	0.9
n-Eicosane	590,640	2.21E-03	4.3E-03	8%	0.4
n-Hexacosane	282,855	2.21E-03	8.2E-05	29%	0.0
n-Hexadecane	1,389,024	2.21E-03	4.3E-03	29%	3.8
2-Isopropylnaphthalene	356,651	2.21E-03	7.2E-02	72%	40.9
2-Methylnaphthalene	150,639	2.21E-03	8.0E-02	72%	19.2
Naphthalene	589,511	2.21E-03	1.5E-02	5%	1.0
n-Octadecane	744,456	2.21E-03	4.3E-03	29%	2.1
Phenol	4,827,430	2.21E-03	2.8E-02	5%	14.9
Styrene	6,839,669	2.21E-03	1.4E-02	6%	12.7
n-Tetracosane	353,499	2.21E-03	8.2E-05	29%	0.0

TABLE B-1 (continued)

BASELINE POLLUTANT DISCHARGES
TRUCK CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Pound Equivalent Discharge at Baseline
n-Tetradecane	954,202	2.21E-03	4.3E-03	29%	2.6
n-Triacontane	409,755	2.21E-03	8.2E-05	29%	0.0
2,4,6-Trichlorophenol	519,558	2.21E-03	4.4E-01	UNK	0.0
Azinphos methyl	8,782	2.21E-03	2.8E+01	26%	141.3
Leptophos	12,981	2.21E-03	1.1E+01	100%	315.6
Beta-BHC	859	2.21E-03	1.2E+01	11%	2.5
Gamma-BHC	798	2.21E-03	4.7E+01	25%	20.7
Diallate	39,318	2.21E-03	4.5E-01	100%	39.1
Endosulfan Sulfate	1,194	2.21E-03	1.0E+02	42%	110.8
Endrin Aldehyde	15,888	2.21E-03	1.6E+02	100%	5,617.8
Pentachloronitrobenzene	13,513	2.21E-03	7.4E-01	100%	22.1
2,4-D	8,261	2.21E-03	3.0E-03	51%	0.0
Dalapon	3,223	2.21E-03	5.1E-03	100%	0.0
2,4-DB (Butoxon)	17,640	2.21E-03	3.6E-02	100%	1.4
Dinoseb	6,699	2.21E-03	9.0E-01	100%	13.3
MCPA	1,337,352	2.21E-03	1.6E-02	100%	47.3
2,4,5-T	1,734	2.21E-03	2.8E-01	44%	0.5
2,4,5-TP	1,432	2.21E-03	1.8E-01	56%	0.3
1234678-HPCDD	2	2.21E-03	4.2E+06	17%	2,416.1
1234678-HPCDF	0	2.21E-03	6.7E+05	17%	105.5
OCDD	13	2.21E-03	4.2E+05	21%	2,549.3
Aluminum	12,334,667	2.21E-03	6.4E-02	9%	157.0
Boron	9,764,762	2.21E-03	1.8E-01	80%	3,107.5
Cadmium	44,286	2.21E-03	2.6E+00	10%	25.4
Calcium	773,095,652	2.21E-03	2.8E-05	91%	43.5
Chromium	3,545,530	2.21E-03	7.6E-02	20%	119.1
Copper	551,233	2.21E-03	6.3E-01	16%	122.8
Iron	36,607,107	2.21E-03	5.6E-03	18%	81.5
Magnesium	122,454,716	2.21E-03	8.7E-04	86%	202.5
Manganese	855,402	2.21E-03	7.0E-02	67%	88.7
Mercury	2,977	2.21E-03	1.2E+02	10%	79.0
Molybdenum	240,523	2.21E-03	2.0E-01	81%	86.1
Nickel	679,519	2.21E-03	1.1E-01	49%	80.9
Phosphorus	118,800,604	2.21E-03	UNK	31%	0.0
Potassium	79,811,321	2.21E-03	1.1E-03	80%	155.2
Silicon	28,110,043	2.21E-03	UNK	73%	0.0
Sodium	2,880,003,995	2.21E-03	5.5E-06	45%	15.8
Strontium	5,959,067	2.21E-03	UNK	88%	0.0
Sulfur	1,367,258,441	2.21E-03	5.6E-06	88%	14.9
Tin	31,204,256	2.21E-03	3.0E-01	55%	11,378.6
Titanium	380,057	2.21E-03	2.9E-02	8%	1.9
Zinc	1,122,025	2.21E-03	4.7E-02	20%	23.3
Total	49,462,275,088				29,929

Note 1: Pound equivalent baseline discharges are rounded to the nearest 0.1 pounds.
Note 2: Chemicals for which no TWF or POTW removal factor is available (designated by "UNK") are entered as having zero pound equivalent baseline discharges.
For excluded facilities baseline loads approximate 0.0 pe and were therefore not included in the analysis.

TABLE B-2

BASELINE POLLUTANT DISCHARGES
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Conversion Factors: Toxic Weighting Factor	Conversion Factors: POTW Removal Factor	Pound Equivalent Discharge at Baseline
Adsorbable Organic Halides (AOX)	401,120	2.21E-03	UNK	UNK	0.0
Ammonia as Nitrogen	8,611,896	2.21E-03	1.8E-03	61%	20.9
5-Day Biochemical Oxygen Demand	448,778,305	2.21E-03	UNK	UNK	0.0
Chemical Oxygen Demand (COD)	1,204,503,320	2.21E-03	UNK	UNK	0.0
Chloride	393,062,048	2.21E-03	2.4E-05	UNK	0.0
Fluoride	636,565	2.21E-03	3.5E-02	39%	19.2
Nitrate/Nitrite	1,715,683	2.21E-03	UNK	UNK	0.0
Surfactants (MBAS)	611,216	2.21E-03	UNK	UNK	0.0
Total Dissolved Solids	2,536,008,797	2.21E-03	UNK	UNK	0.0
Total Organic Carbon (TOC)	317,567,223	2.21E-03	UNK	UNK	0.0
Total Petroleum Hydrocarbons (TPH	46,268,551	2.21E-03	UNK	UNK	0.0
Total Phenols	181,737	2.21E-03	UNK	UNK	0.0
Total Phosphorus	3,092,974	2.21E-03	UNK	UNK	0.0
Oil and Grease	199,937,870	2.21E-03	UNK	UNK	0.0
Total Suspended Solids	163,555,222	2.21E-03	UNK	UNK	0.0
Acetone	465,397	2.21E-03	5.0E-06	16%	0.0
Ethylbenzene	21,426	2.21E-03	1.4E-03	6%	0.0
Methyl ethyl ketone	106,800	2.21E-03	2.5E-05	8%	0.0
m-Xylene	48,185	2.21E-03	1.5E-03	35%	0.1
o+p-Xylene	34,011	2.21E-03	4.7E-03	5%	0.0
Anthracene	28,136	2.21E-03	2.5E+00	4%	6.2
Benzoic acid	759,635	2.21E-03	3.3E-04	19%	0.1
Carbazole	25,250	2.21E-03	2.7E-01	100%	15.1
p-Cresol	13,694	2.21E-03	4.0E-03	28%	0.0
2,4-Diaminotoluene	484,353	2.21E-03	1.8E-01	100%	192.7
Dimethyl sulfone	14,987	2.21E-03	UNK	UNK	0.0
n-Docosane	61,328	2.21E-03	8.2E-05	12%	0.0
n-Dodecane	99,517	2.21E-03	4.3E-03	5%	0.0
n-Eicosane	248,647	2.21E-03	4.3E-03	8%	0.2
Fluoranthene	25,642	2.21E-03	8.0E-01	58%	26.3
n-Hexacosane	33,392	2.21E-03	8.2E-05	29%	0.0
n-Hexadecane	474,233	2.21E-03	4.3E-03	29%	1.3
Hexanoic Acid	540,796	2.21E-03	3.7E-04	16%	0.1
1-Methylphenanthrene	21,535	2.21E-03	1.0E-01	5%	0.2
Naphthalene	22,655	2.21E-03	1.5E-02	5%	0.0
n-Octacosane	21,040	2.21E-03	8.2E-05	29%	0.0
n-Octadecane	289,810	2.21E-03	4.3E-03	29%	0.8
Phenanthrene	55,558	2.21E-03	2.9E-01	5%	1.8
Phenol	139,728	2.21E-03	2.8E-02	5%	0.4
Pyrene	20,375	2.21E-03	1.1E-01	5%	0.2
Styrene	47,658	2.21E-03	1.4E-02	6%	0.1
n-Tetracosane	54,160	2.21E-03	8.2E-05	29%	0.0
n-Tetradecane	331,040	2.21E-03	4.3E-03	29%	0.9
n-Triacontane	22,774	2.21E-03	8.2E-05	29%	0.0
Acephate	205,827	2.21E-03	4.6E-02	100%	20.9
Benefluralin	602	2.21E-03	1.9E-01	100%	0.3

TABLE B-2 (continued)

BASELINE POLLUTANT DISCHARGES
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical Name	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Conversion Factors: Toxic Weighting Factor	Conversion Factors: POTW Removal Factor	Pound Equivalent Discharge at Baseline
Alpha-BHC	24	2.21E-03	4.3E+01	15%	0.3
Beta-BHC	5,862	2.21E-03	1.2E+01	11%	17.1
Delta-BHC	108	2.21E-03	3.5E-02	53%	0.0
Gamma-Chlordane	13	2.21E-03	1.6E+03	50%	23.2
Dacthal (DCPA)	85	2.21E-03	3.4E-02	16%	0.0
Diallate	80,259	2.21E-03	4.5E-01	100%	79.8
Dieldrin	383	2.21E-03	5.7E+04	14%	6,751.7
Endosulfan Sulfate	63	2.21E-03	1.0E+02	42%	5.8
Pentachloronitrobenzene	94	2.21E-03	7.4E-01	100%	0.2
Propachlor	2,901	2.21E-03	3.3E-01	100%	2.1
Propazine	3,286	2.21E-03	3.5E-03	100%	0.0
Terbacil	4,709	2.21E-03	1.0E-03	100%	0.0
Terbuthylazine	529,562	2.21E-03	3.5E-02	100%	41.0
2,4-DB (Butoxon)	14,079	2.21E-03	3.6E-02	100%	1.1
Dicamba	49,669	2.21E-03	1.5E-02	100%	1.6
Dichloroprop	15,930	2.21E-03	9.3E-02	100%	3.3
Dinoseb	7,513	2.21E-03	9.0E-01	100%	14.9
MCPP	4,053,465	2.21E-03	1.8E-03	100%	16.1
2,4,5-T	3,027	2.21E-03	2.8E-01	44%	0.8
2,4,5-TP	1,284	2.21E-03	1.8E-01	56%	0.3
OCDD	2	2.21E-03	4.2E+05	21%	296.9
OCDF	0	2.21E-03	6.7E+04	17%	6.5
Aluminum	3,015,304	2.21E-03	6.4E-02	9%	38.4
Arsenic	14,322	2.21E-03	3.5E+00	57%	63.1
Barium	143,637	2.21E-03	2.0E-03	25%	0.2
Boron	615,072	2.21E-03	1.8E-01	80%	195.7
Calcium	13,089,008	2.21E-03	2.8E-05	91%	0.7
Chromium	37,435	2.21E-03	7.6E-02	20%	1.3
Copper	20,409	2.21E-03	6.3E-01	16%	4.5
Iron	1,824,288	2.21E-03	5.6E-03	18%	4.1
Magnesium	5,330,338	2.21E-03	8.7E-04	86%	8.8
Manganese	221,143	2.21E-03	7.0E-02	67%	22.9
Phosphorus	3,271,635	2.21E-03	UNK	31%	0.0
Potassium	303,733,452	2.21E-03	1.1E-03	80%	590.7
Silicon	3,287,851	2.21E-03	UNK	73%	0.0
Sodium	525,354,036	2.21E-03	5.5E-06	45%	2.9
Sulfur	149,168,609	2.21E-03	5.6E-06	88%	1.6
Titanium	30,375	2.21E-03	2.9E-02	8%	0.2
Zinc	139,777	2.21E-03	4.7E-02	20%	2.9
Total	6,343,719,726				8,509

Note 1: Pound equivalent baseline discharges are rounded to the nearest 0.1 pounds.
Note 2: Chemicals for which no TWF or POTW removal factor is available (designated by "UNK") are entered as having zero pound equivalent baseline discharges.
For excluded facilities baseline loads approximate 0.0 pe and were therefore not included in the analysis.

TABLE B-3

BASELINE POLLUTANT DISCHARGES
TRUCK CHEMICAL & PETROLEUM SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalent Discharged at Baseline
		Grams/ Pounds	Toxic Weighting Factor	
Adsorbable Organic Halides (AOX)	35,942	2.21E-03	UNK	0.0
5-Day Biochemical Oxygen Demand	420,162	2.21E-03	UNK	0.0
Chemical Oxygen Demand (COD)	16,146,256	2.21E-03	UNK	0.0
Fluoride	1,067,412	2.21E-03	3.5E-02	82.6
Nitrate/Nitrite	40,756	2.21E-03	UNK	0.0
Surfactants (MBAS)	57,250	2.21E-03	UNK	0.0
Total Organic Carbon (TOC)	12,265,728	2.21E-03	UNK	0.0
Total Petroleum Hydrocarbons (TPH)	291,112	2.21E-03	UNK	0.0
Total Phenols	105,965	2.21E-03	UNK	0.0
Total Phosphorus	566,505	2.21E-03	UNK	0.0
Oil and Grease	318,404	2.21E-03	UNK	0.0
Total Suspended Solids	1,547,553	2.21E-03	UNK	0.0
Acetone	137,516	2.21E-03	5.0E-06	0.0
Benzene	582	2.21E-03	1.8E-02	0.0
Chloroform	582	2.21E-03	2.1E-03	0.0
1,2-Dichloroethane	708	2.21E-03	6.2E-03	0.0
Ethylbenzene	582	2.21E-03	1.4E-03	0.0
Methyl ethyl ketone	8,242	2.21E-03	2.5E-05	0.0
Methyl isobutyl ketone	9,391	2.21E-03	1.3E-04	0.0
Methylene Chloride	98,411	2.21E-03	4.2E-04	0.1
Tetrachloroethylene	582	2.21E-03	1.3E-02	0.0
Toluene	582	2.21E-03	5.6E-03	0.0
1,1,1-Trichloroethane	586	2.21E-03	4.5E-03	0.0
Trichloroethylene	799	2.21E-03	6.4E-03	0.0
m-Xylene	582	2.21E-03	1.5E-03	0.0
o+p-Xylene	582	2.21E-03	4.7E-03	0.0
Alpha-Terpineol	582	2.21E-03	1.1E-03	0.0
Benzoic acid	123,932	2.21E-03	3.3E-04	0.1
Benzyl alcohol	1,129	2.21E-03	5.6E-03	0.0
Bis (2-ethylhexyl) phthalate	582	2.21E-03	9.5E-02	0.1
2-Chlorophenol	774	2.21E-03	3.3E-02	0.1
o-Cresol	776	2.21E-03	2.7E-03	0.0
p-Cresol	786	2.21E-03	4.0E-03	0.0
p-Cymene	582	2.21E-03	2.4E-02	0.0
n-Decane	582	2.21E-03	4.3E-03	0.0
1,2-Dichlorobenzene	582	2.21E-03	1.1E-02	0.0
Dimethyl sulfone	582	2.21E-03	UNK	0.0
Di-n-octyl phthalate	582	2.21E-03	2.2E-01	0.3

TABLE B-3 (continued)

BASELINE POLLUTANT DISCHARGES
TRUCK CHEMICAL & PETROLEUM SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Conversion Factors: Toxic Weighting Factor	Pound Equivalent Discharge at Baseline
n-Docosane	582	2.21E-03	8.2E-05	0.0
n-Dodecane	582	2.21E-03	4.3E-03	0.0
n-Eicosane	582	2.21E-03	4.3E-03	0.0
n-Hexacosane	582	2.21E-03	8.2E-05	0.0
n-Hexadecane	582	2.21E-03	4.3E-03	0.0
2-Isopropylnaphthalene	582	2.21E-03	7.2E-02	0.1
2-Methylnaphthalene	582	2.21E-03	8.0E-02	0.1
Naphthalene	582	2.21E-03	1.5E-02	0.0
n-Octadecane	582	2.21E-03	4.3E-03	0.0
Styrene	777	2.21E-03	1.4E-02	0.0
n-Tetracosane	582	2.21E-03	8.2E-05	0.0
n-Tetradecane	582	2.21E-03	4.3E-03	0.0
n-Triacontane	582	2.21E-03	8.2E-05	0.0
Azinphos methyl	291	2.21E-03	2.8E+01	18.0
Leptophos	116	2.21E-03	1.1E+01	2.8
beta-BHC	6	2.21E-03	1.2E+01	0.2
Diallate	242	2.21E-03	4.5E-01	0.2
Pentachloronitrobenzene	3	2.21E-03	7.4E-01	0.0
Dalapon	6	2.21E-03	5.1E-03	0.0
2,4-DB (Butoxon)	542	2.21E-03	3.6E-02	0.0
MCPA	15,429	2.21E-03	1.6E-02	0.5
2,4,5-T	12	2.21E-03	2.8E-01	0.0
2,4,5-TP	46	2.21E-03	1.8E-01	0.0
1234678-HPCDD	0	2.21E-03	4.2E+06	27.0
1234678-HPCDF	0	2.21E-03	6.7E+05	10.6
OCDD	0	2.21E-03	4.2E+05	5.4
Aluminum	11,353	2.21E-03	6.4E-02	1.6
Boron	15,866	2.21E-03	1.8E-01	6.3
Chromium	1,134	2.21E-03	7.6E-02	0.2
Copper	5,040	2.21E-03	6.3E-01	7.0
Iron	54,531	2.21E-03	5.6E-03	0.7
Manganese	12,130	2.21E-03	7.0E-02	1.9
Mercury	12	2.21E-03	1.2E+02	3.2
Phosphorus	1,249,843	2.21E-03	UNK	0.0
Silicon	301,379	2.21E-03	UNK	0.0
Tin	377,088	2.21E-03	3.0E-01	250.0
Titanium	1,110	2.21E-03	2.9E-02	0.1
Zinc	1,164	2.21E-03	4.7E-02	0.1
Total	35,309,353			420

Note 1: Pound equivalent baseline discharges are rounded to the nearest 0.1 pounds.

Note 2: Chemicals for which no TWF or POTW removal factor is available (designated by "UNK") are entered as having zero pound equivalent baseline discharges.

TABLE B-4

BASELINE POLLUTANT DISCHARGES
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
DIRECT DISCHARGERS

Chemical Name	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Conversion Factors: Toxic Weighting Factor	Pound Equivalent Discharge at Baseline
Adsorbable Organic Halides (AOX)	759	2.21E-03	UNK	0.0
Ammonia as Nitrogen	14,925	2.21E-03	1.8E-03	0.1
5-Day Biochemical Oxygen Demand	28,204	2.21E-03	UNK	0.0
Chemical Oxygen Demand (COD)	351,265	2.21E-03	UNK	0.0
Chloride	2,445,766	2.21E-03	2.4E-05	0.1
Fluoride	4,645	2.21E-03	3.5E-02	0.4
Nitrate/Nitrite	4,409	2.21E-03	UNK	0.0
Surfactants (MBAS)	4,956	2.21E-03	UNK	0.0
Total Dissolved Solids	15,433,477	2.21E-03	UNK	0.0
Total Organic Carbon (TOC)	348,076	2.21E-03	UNK	0.0
Total Petroleum Hydrocarbons (TPH	39,507	2.21E-03	UNK	0.0
Total Phenols	826	2.21E-03	UNK	0.0
Total Phosphorus	18,605	2.21E-03	UNK	0.0
Oil and Grease	22,869	2.21E-03	UNK	0.0
Total Suspended Solids	38,460	2.21E-03	UNK	0.0
Acetone	128	2.21E-03	5.0E-06	0.0
Ethylbenzene	26	2.21E-03	1.4E-03	0.0
Methyl ethyl ketone	281	2.21E-03	2.5E-05	0.0
m-Xylene	26	2.21E-03	1.5E-03	0.0
o+p-Xylene	26	2.21E-03	4.7E-03	0.0
Anthracene	67	2.21E-03	2.5E+00	0.4
Benzoic acid	150	2.21E-03	3.3E-04	0.0
Carbazole	79	2.21E-03	2.7E-01	0.0
p-Cresol	84	2.21E-03	4.0E-03	0.0
2,4-Diaminotoluene	3,304	2.21E-03	1.8E-01	1.3
Dimethyl sulfone	44	2.21E-03	UNK	0.0
n-Docosane	26	2.21E-03	8.2E-05	0.0
n-Dodecane	26	2.21E-03	4.3E-03	0.0
n-Eicosane	26	2.21E-03	4.3E-03	0.0
Fluoranthene	29	2.21E-03	8.0E-01	0.1
n-Hexacosane	33	2.21E-03	8.2E-05	0.0
n-Hexadecane	26	2.21E-03	4.3E-03	0.0
Hexanoic Acid	4,956	2.21E-03	3.7E-04	0.0
1-Methylphenanthrene	26	2.21E-03	1.0E-01	0.0
Naphthalene	26	2.21E-03	1.5E-02	0.0
n-Octacosane	28	2.21E-03	8.2E-05	0.0
n-Octadecane	26	2.21E-03	4.3E-03	0.0
Phenanthrene	62	2.21E-03	2.9E-01	0.0
Phenol	94	2.21E-03	2.8E-02	0.0
Pyrene	26	2.21E-03	1.1E-01	0.0
Styrene	26	2.21E-03	1.4E-02	0.0
n-Tetracosane	50	2.21E-03	8.2E-05	0.0
n-Tetradecane	26	2.21E-03	4.3E-03	0.0
n-Triacontane	48	2.21E-03	8.2E-05	0.0
Acephate	1,331	2.21E-03	4.6E-02	0.1
Benefluralin	4	2.21E-03	1.9E-01	0.0

TABLE B-4 (continued)

BASELINE POLLUTANT DISCHARGES
RAIL CHEMICAL & PETROLEUM SUBCATEGORY
DIRECT DISCHARGERS

Chemical Name	Pollutants Discharged at Baseline (grams)	Conversion Factors: Grams/ Pounds	Conversion Factors: Toxic Weighting Factor	Pound Equivalent Discharge at Baseline
Alpha-BHC	0	2.21E-03	4.3E+01	0.0
Beta-BHC	0	2.21E-03	1.2E+01	0.0
Delta-BHC	0	2.21E-03	3.5E-02	0.0
Gamma-Chlordane	0	2.21E-03	1.6E+03	0.6
Dacthal (DCPA)	0	2.21E-03	3.4E-02	0.0
Diallate	364	2.21E-03	4.5E-01	0.4
Dieldrin	1	2.21E-03	5.7E+04	74.9
Endosulfan Sulfate	0	2.21E-03	1.0E+02	0.0
Pentachloronitrobenzene	0	2.21E-03	7.4E-01	0.0
Propachlor	1	2.21E-03	3.3E-01	0.0
Propazine	10	2.21E-03	3.5E-03	0.0
Terbacil	5	2.21E-03	1.0E-03	0.0
Terbuthylazine	4,221	2.21E-03	3.5E-02	0.3
2,4-DB (Butoxon)	202	2.21E-03	3.6E-02	0.0
Dicamba	881	2.21E-03	1.5E-02	0.0
Dichloroprop	80	2.21E-03	9.3E-02	0.0
Dinoseb	48	2.21E-03	9.0E-01	0.1
MCPP	58,732	2.21E-03	1.8E-03	0.2
2,4,5-T	19	2.21E-03	2.8E-01	0.0
2,4,5-TP	20	2.21E-03	1.8E-01	0.0
OCDD	0	2.21E-03	4.2E+05	23.9
OCDF	0	2.21E-03	6.7E+04	0.6
Aluminum	10,217	2.21E-03	6.4E-02	1.4
Arsenic	75	2.21E-03	3.5E+00	0.6
Barium	1,513	2.21E-03	2.0E-03	0.0
Boron	3,458	2.21E-03	1.8E-01	1.4
Calcium	60,879	2.21E-03	2.8E-05	0.0
Chromium	96	2.21E-03	7.6E-02	0.0
Copper	210	2.21E-03	6.3E-01	0.3
Iron	31,611	2.21E-03	5.6E-03	0.4
Magnesium	25,687	2.21E-03	8.7E-04	0.0
Manganese	1,295	2.21E-03	7.0E-02	0.2
Phosphorus	20,233	2.21E-03	UNK	0.0
Potassium	1,918,732	2.21E-03	1.1E-03	4.7
Silicon	25,768	2.21E-03	UNK	0.0
Sodium	3,107,077	2.21E-03	5.5E-06	0.0
Sulfur	888,609	2.21E-03	5.6E-06	0.0
Titanium	140	2.21E-03	2.9E-02	0.0
Zinc	686	2.21E-03	4.7E-02	0.1
Total	24,928,725			113

Note 1: Pound equivalent baseline discharges are rounded to the nearest 0.1 pounds.

Note 2: Chemicals for which no TWF or POTW removal factor is available (designated by "UNK" are entered as having zero pound equivalent baseline discharges.