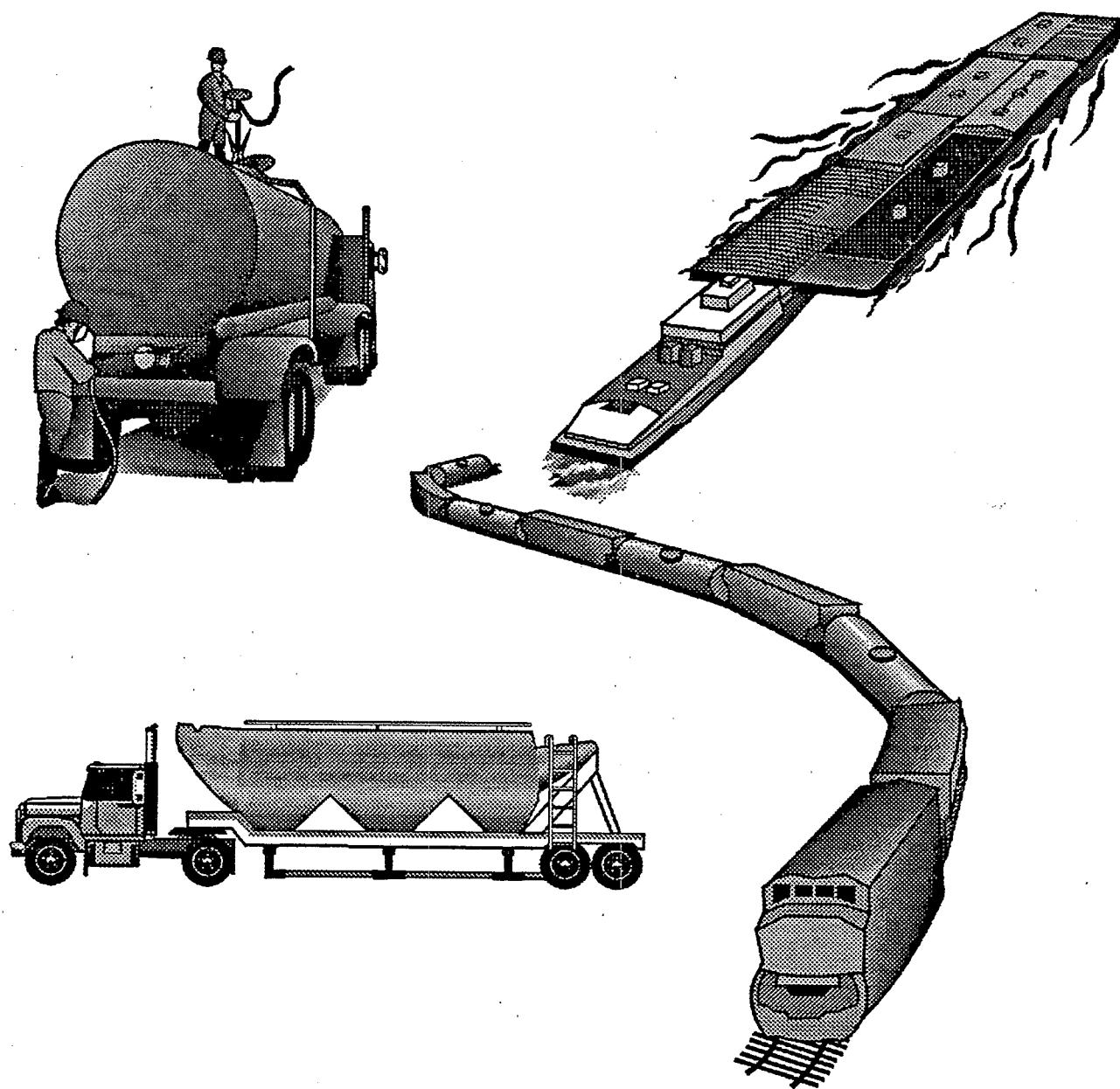
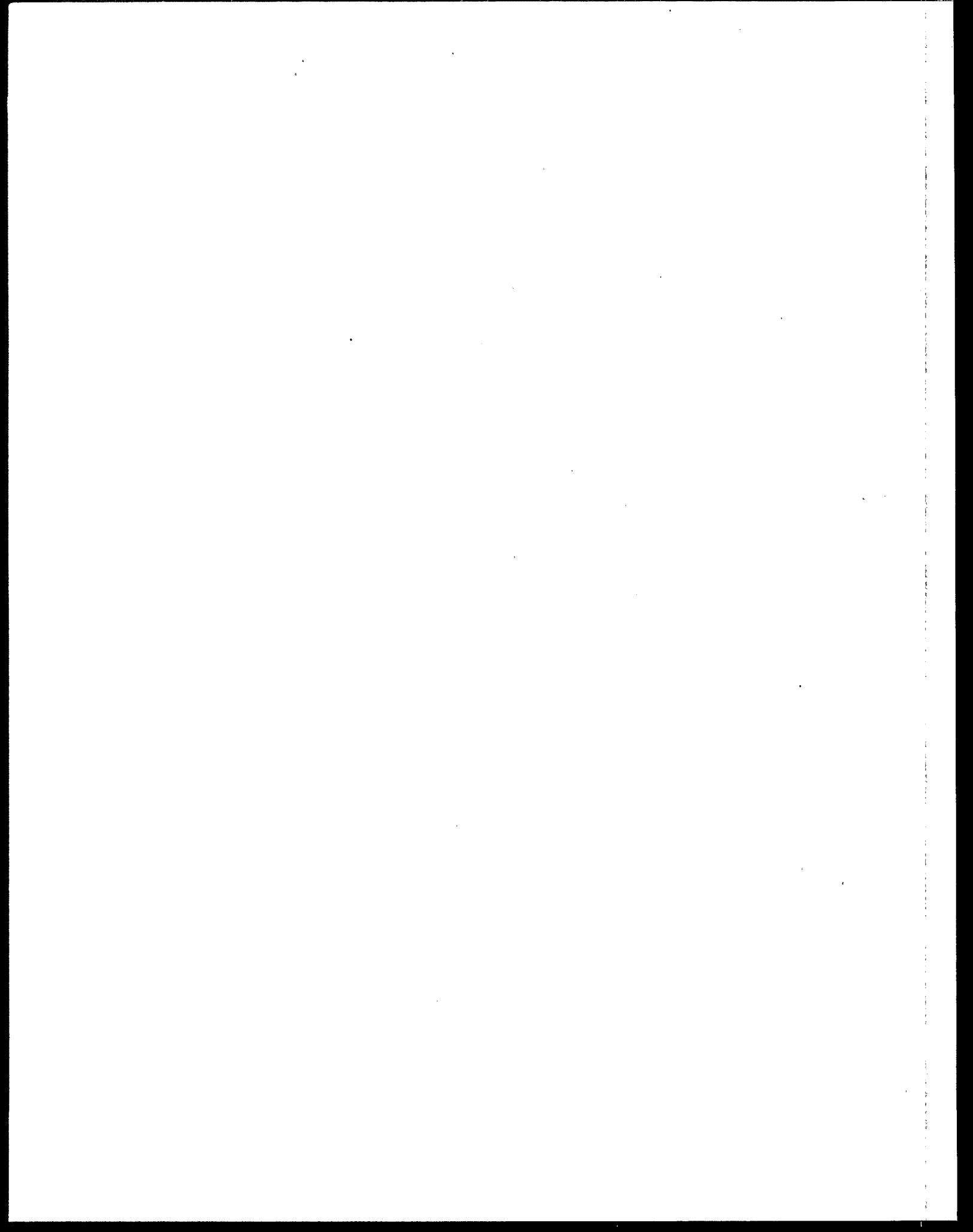




Cost - Effectiveness Analysis Of Proposed Effluent Limitations Guidelines And Standards For The Transportation Equipment Cleaning Category





Cost-Effectiveness Analysis of Proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry Point Source Category

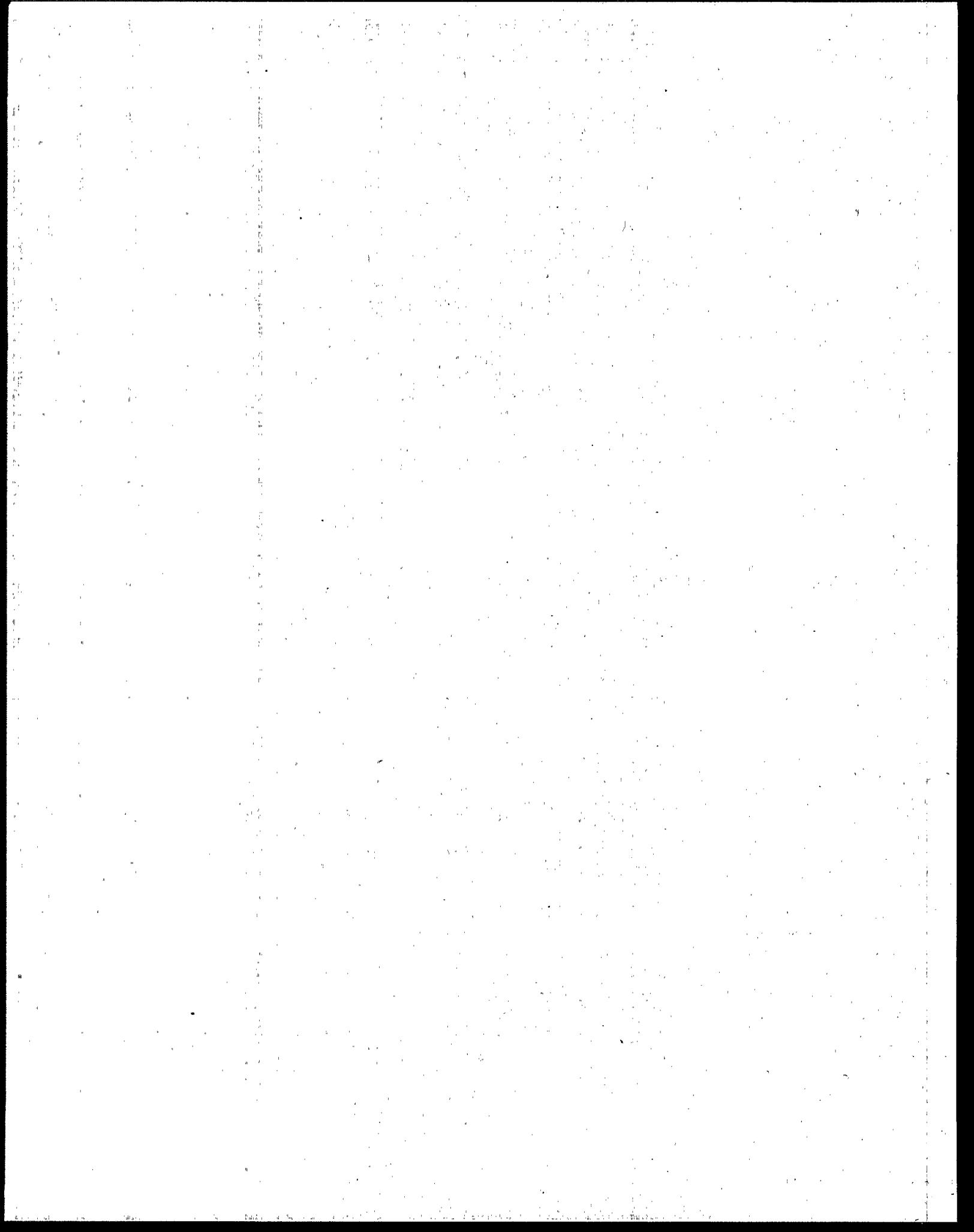
Prepared for:

**U.S. Environmental Protection Agency
Office of Water
Office of Science and Technology
Engineering and Analysis Division
Economic and Statistical Analysis Branch
401 M Street SW (4304)
Washington, DC 20460**

Prepared by:

**Eastern Research Group, Inc.
110 Hartwell Avenue
Lexington, MA 02173-3198**

May 1998



CONTENTS

	<u>Page</u>
SECTION 1	INTRODUCTION
SECTION 2	METHODOLOGY
2.1	Selection of Pollutants Effectively Removed 2-3
2.2	Toxic Weighting Factors 2-3
2.3	POTW Removal Factors 2-10
2.4	Pollutant Removals and Pound-Equivalent Calculations 2-10
2.5	Annualized Costs of Compliance 2-12
2.6	Calculation of the Cost-Effectiveness Values 2-12
2.7	Comparison of Cost-Effectiveness Values 2-13
SECTION 3	POLLUTION CONTROL AND MONITORING OPTIONS
3.1	Pollution Control Options 3-1
3.2	Monitoring Options 3-1
SECTION 4	RESULTS OF COST-EFFECTIVENESS ANALYSIS
4.1	Truck Chemical 4-1
4.2	Rail Chemical 4-3
4.3	Barge Chemical and Petroleum 4-3
4.4	Truck Petroleum 4-8
4.5	Rail Petroleum 4-8
4.6	Truck Food 4-8
4.7	Rail Food 4-13

CONTENTS

		<u>Page</u>
4.8	Barge Food	4-17
4.9	Truck Hopper	4-17
4.10	Rail Hopper	4-17
4.11	Barge Hopper	4-22
SECTION 5	COMPARISON OF COST-EFFECTIVENESS VALUES WITH PROMULGATED RULES	5-1
SECTION 6	COST-REASONABLENESS OF CONVENTIONAL POLLUTANTS REMOVED	6-1
6.1	BCT Cost-Reasonableness Test	6-1
6.1.1	POTW Test	6-1
6.1.2	Industry Ratio Test	6-2
6.2	Subcategory BCT Tests	6-2
6.2.1	Truck Food	6-3
6.2.2	Rail Food	6-3
6.2.3	Barge Food	6-3
6.2.4	Truck Chemical	6-7
6.2.5	Rail Chemical	6-7
6.2.6	Barge Chemical and Petroleum	6-7
6.2.7	Barge Hopper	6-11
SECTION 7	REFERENCES	7-1
APPENDIX A	SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: POLLUTANT LOADINGS AND POUND EQUIVALENTS REMOVED	
APPENDIX B	SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: BASELINE POLLUTANT DISCHARGES IN POUNDS AND POUND EQUIVALENTS	

CONTENTS

	Page
APPENDIX C	SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: CONVENTIONAL POLLUTANT REMOVALS
APPENDIX D	SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: BASELINE CONVENTIONAL POLLUTANT DISCHARGES

SECTION 1

INTRODUCTION

This cost-effectiveness analysis presents an evaluation of the technical efficiency of pollutant control options for the proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry based on Best Available Technology Economically Achievable (BAT) and Pretreatment Standards for Existing Sources (PSES).¹ For the purposes of this analysis, the U.S. Environmental Protection Agency (EPA) has 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)²
- Truck Petroleum (TT/PETR)
- Rail Petroleum (RT/PETR)
- Truck Food (TT/FOOD)
- Rail Food (RT/FOOD)
- Barge Food (TB/FOOD)
- Truck Hopper (TH/HOPPER)

¹ Best Available Technology Economically Achievable (BAT) is required under Section 304(b)(2) of the Clean Water Act. These rules control the discharge of priority and non-conventional pollutants and apply to existing industrial dischargers. Pretreatment Standards for Existing Sources (PSES) are analogous to BAT; these rules apply to indirect dischargers (whose discharges flow to publicly owned treatment works (POTWs).

² Effluent sampling found no significant difference between Barge Chemical and Barge Petroleum subcategories; therefore, these two subcategories were combined into a single Barge Chemical and Petroleum subcategory; see the Development Document (U.S. EPA, 1998b) for details.

- Rail Hopper (RH/HOPPER)
- Barge Hopper (BH/HOPPER)

In this 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.

This cost-effectiveness 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 considers the removal efficiency of each pollution control option. 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 proposed 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. Appendixes C and D present data on conventional pollutant removals and discharges, respectively.

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 Guidelines and Standards to that of effluent 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 pollutant 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

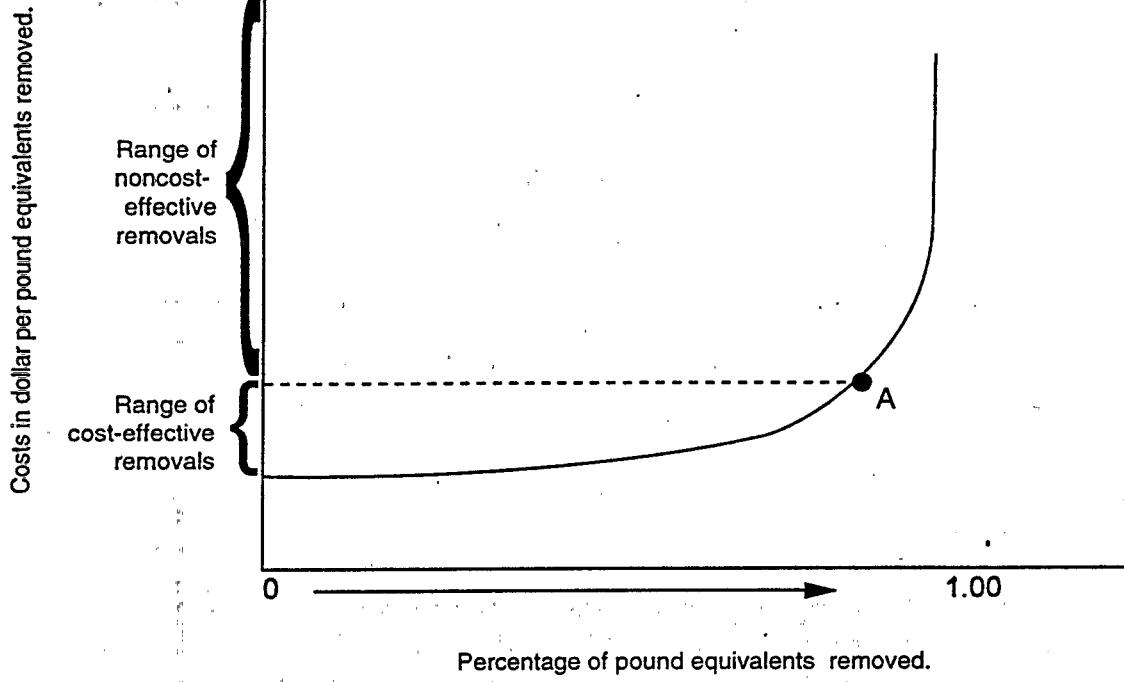


Figure 2-1. Cost effectiveness

- Determine the annualized cost of each pollution control option

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 a master list of the pollutants effectively removed and the subcategories in which they are considered.

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.³ Table 2-1 presents the toxic weighting factors used for the regulated pollutants in this cost-effectiveness analysis.

³ Although the water quality criterion has been revised (to 12.0 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 0.467 rather than 1.0.

TABLE 2-1
POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

Pollutant	Toxic Weighting Factor (TWF)	POTW Removal Factor	Ref. Factor	Ref.	Subcategory				Hopper				
					Truck Tank	Rail Tank Car	Tank Barge	Food	Petroleum	Chemical	Food	Petroleum	Chemical
NONCONVENTIONALS													
Total Cyanide	1.10E+00	A	3.00E-01	A	X	X	X	X	X	X	X	X	X
Fluoride	3.50E-02	A	3.90E-01	A	X	X	X	X	X	X	X	X	X
VOLATILES													
Acetone	7.60E-06	A	1.60E-01	A	X	X	X	X	X	X	X	X	X
Acrylonitrile	8.50E-01	B	5.00E-02	D	X	X	X	X	X	X	X	X	X
Benzene	1.80E-02	A	5.00E-02	A	X	X	X	X	X	X	X	X	X
Chloroform	2.10E-03	A	2.70E-01	A	X	X	X	X	X	X	X	X	X
1,2-Dichloroethane	6.20E-03	A	1.10E-01	A	X	X	X	X	X	X	X	X	X
Ethylbenzene	1.40E-03	A	6.00E-02	A	X	X	X	X	X	X	X	X	X
Methyl ethyl ketone	2.20E-05	A	8.00E-02	A	X	X	X	X	X	X	X	X	X
Methyl isobutyl ketone	1.20E-04	A	1.20E-01	A	X	X	X	X	X	X	X	X	X
Methylene Chloride	4.20E-04	A	4.60E-01	A	X	X	X	X	X	X	X	X	X
Tetrachloroethylene	7.40E-02	A	1.50E-01	A	X	X	X	X	X	X	X	X	X
Toluene	5.60E-03	A	4.00E-02	A	X	X	X	X	X	X	X	X	X
1,1,1-Trichloroethane	4.30E-03	A	1.00E-01	A	X	X	X	X	X	X	X	X	X
Trichloroethylene	6.30E-02	A	1.30E-01	A	X	X	X	X	X	X	X	X	X
Vinyl Acetate	4.00E-03	B	1.00E+00	*	X	X	X	X	X	X	X	X	X
m-Xylene	1.50E-03	A	3.50E-01	A	X	X	X	X	X	X	X	X	X
o- and p-Xylene	8.50E-03	A	5.00E-02	A	X	X	X	X	X	X	X	X	X
SEMOVOLATILES													
Acenaphthene	2.50E-01	A	2.00E-02	A	X	X	X	X	X	X	X	X	X
Acenaphthylene	8.40E-03	A	5.00E-02	A	X	X	X	X	X	X	X	X	X
Alpha-Terpinol	1.00E-03	A	5.00E-02	A	X	X	X	X	X	X	X	X	X
Anthracene	2.50E+00	A	4.00E-02	A	X	X	X	X	X	X	X	X	X
2,3-Benzofluorene	2.20E-01	A	3.00E-01	A	X	X	X	X	X	X	X	X	X
Benzoic acid	3.30E-04	A	1.90E-01	A	X	X	X	X	X	X	X	X	X
Benzyl alcohol	5.60E-03	A	2.20E-01	A	X	X	X	X	X	X	X	X	X
Biphenyl	3.70E-02	A	4.00E-02	A	X	X	X	X	X	X	X	X	X
Bis(2-ethylhexyl)phthalate	1.10E-01	A	4.00E-01	A	X	X	X	X	X	X	X	X	X
Carbazole	2.70E-01	A	1.00E-00	A	X	X	X	X	X	X	X	X	X
4-Chloro-3-Methylphenol	4.30E-03	B	2.90E-01	D	X	X	X	X	X	X	X	X	X
2-Chlorophenol	3.30E-02	A	5.00E-02	A	X	X	X	X	X	X	X	X	X
o-Cresol	3.30E-03	A	4.70E-01	A	X	X	X	X	X	X	X	X	X

TABLE 2-1 (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

Pollutant	Toxic Weighting Factor (TWF)	Ref.	POTW Removal Factor	Ref.	Subcategory						Hopper	
					Truck Tank			Rail Tank Car				
					Chemical	Food	Petroleum	Chemical	Food	Petroleum		
SEMIVOLATILES (continued)												
p-Cresol	2.40E-03	A	2.80E-01	A	X	X	X	X	X	X	X	X
p-Cymene	4.30E-02	A	1.00E-02	A	X	X	X	X	X	X	X	X
n-Decane	4.30E-03	A	9.10E-01	A	X	X	X	X	X	X	X	X
2,4-Diaminotoluene	1.80E-01	A	1.00E+00	A								
1,2-Dichlorobenzene	1.10E-02	A	1.10E-01	A	X	X	X	X	X	X	X	X
3,6-Dimethylphenanthrene	4.70E-01	A	5.00E-02	A								
Di-n-octyl phthalate	2.20E-01	A	1.70E-01	A	X	X	X	X	X	X	X	X
Diphenyl Ether	2.60E-02	B	1.30E-01	D								
n-Docosane	8.20E-05	A	1.20E-01	A	X	X	X	X	X	X	X	X
n-Dodecane	4.30E-03	A	5.00E-02	A	X	X	X	X	X	X	X	X
n-Eicosane	4.30E-03	A	8.00E-02	A	X	X	X	X	X	X	X	X
Fluoranthene	9.20E-01	A	5.80E-01	A	X	X	X	X	X	X	X	X
Fluorene	7.00E-01	A	3.00E-01	A	X	X	X	X	X	X	X	X
n-Hexacosane	8.20E-05	A	2.90E-01	A	X	X	X	X	X	X	X	X
n-Hexadecane	4.30E-03	A	2.90E-01	A	X	X	X	X	X	X	X	X
Hexanoic Acid	3.40E-04	B	1.60E-01	D	X	X	X	X	X	X	X	X
n-Octacosane	9.80E-02	A	7.20E-01	A	X	X	X	X	X	X	X	X
n-Octadecane	8.90E-02	A	3.00E-01	A	X	X	X	X	X	X	X	X
1-Methylnaphthalene	1.80E-02	A	7.20E-01	A	X	X	X	X	X	X	X	X
2-Methylnaphthalene	1.40E-01	A	5.00E-02	A	X	X	X	X	X	X	X	X
1-Methylphenanthrene	1.50E-02	A	5.00E-02	A	X	X	X	X	X	X	X	X
Naphthalene	8.20E-05	A	2.90E-01	A	X	X	X	X	X	X	X	X
n-Octacosane	4.30E-03	A	2.90E-01	A	X	X	X	X	X	X	X	X
Penamethylbenzene	2.90E-01	A	9.00E-02	A	X	X	X	X	X	X	X	X
Phenanthrene	1.90E+01	A	5.00E-02	A								
Phenol	2.80E-02	A	5.00E-02	A	X	X	X	X	X	X	X	X
Pyrene	7.50E-02	A	5.00E-02	A	X	X	X	X	X	X	X	X
Styrene	1.40E-02	A	6.00E-02	A	X	X	X	X	X	X	X	X
n-Tetracosane	8.20E-05	A	2.90E-01	A	X	X	X	X	X	X	X	X
n-Tetradecane	4.30E-03	A	2.90E-01	A	X	X	X	X	X	X	X	X
n-Triacontane	8.20E-05	A	2.90E-01	A	X	X	X	X	X	X	X	X
Tripropylene glycol Methyl Ether	8.20E-06	B	5.30E-01	D								

TABLE 2-I (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

Pollutant	PESTICIDES	Toxic Weighting Factor (TWF)	POTW Removal Factor	Ref.	Subcategory				Hopper	Barge		
					Truck Tank		Rail Tank Car					
					Chemical	Food	Petroleum	Chemical				
Azinphos ethyl	5.10E+03	G	1.00E+00	A	X							
Azinphos methyl methyl-Guthion	2.80E+01	A	2.60E+01	A	X							
Coumaphos	5.60E+03	A	1.00E+00	A	X							
Dichlofenthion	1.40E+01	A	1.00E+00	A	X							
Dioxathion	6.20E+01	A	1.00E+00	*						X		
Disulfoton	1.20E+02	A	1.00E+00	A	X							
EPN / Santox	7.60E+02	A	1.00E+00	A	X							
Lepophos	1.10E+01	A	1.00E+00	A	X							
Memphos Folex	2.50E+01	A	1.00E+00	A	X							
Tetrachlorvinphos												
Tokuthion	9.30E-03	A	1.00E+00	*						X		
Trichlorfon	7.00E+02	A	1.00E+00	*						X		
Trichloronate	5.60E+03	B	1.00E+00	*						X		
Trimeethylphosphate	1.90E-03	A	1.00E+00	*						X		
Acipheate	1.30E-02	A	1.00E+00	A	X							
Alachlor	1.60E-02	A	1.00E+00	E	X							
Atrazine	9.40E-02	A	5.80E-01	A	X							
Benefuralin	1.60E-01	A	1.00E+00	A	X							
alpha-BHC	4.30E+01	A	3.60E-01	A	X							
beta-BHC	1.20E+01	A	5.70E-01	A	X							
delta-BHC	8.60E-02	A	1.00E+00	A	X							
gamma-BHC	7.00E+01	A	4.80E-01	A	X							
Bromacil	5.60E-03	A	1.00E+00	*								
Bromoxyll Octanoate	1.10E+00	A	1.00E+00	*						X		
Butachlor	7.40E-03	A	1.00E+00	*						X		
Captafol	2.70E+00	A	1.00E+00	*						X		
Capilan	1.60E+00	A	1.00E+00	*						X		
Carbofenonil	6.60E-01	A	1.00E+00	*						X		
Alpha-Chlordane	2.30E+03	A	5.00E-01	A	X							
Gamma-Chlordane	2.30E+03	A	5.00E-01	A	X							
Chlorbenzilate	1.60E-01	A	1.00E+00	A	X					X		
Chloneb	4.70E-03	A	1.00E+00	*						X		
DCPA/Dacthal	9.50E-03	A	1.60E-01	A	X					X		
'4,4'-DDD	7.60E+02	A	5.00E-01	A	X					X		

TABLE 2-1 (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

Pollutant	Toxic Weighting Factor (TWF)	Ref.	POTW Removal Factor	Ref.	Subcategory				Hopper			
					Truck	Tank	Rail Tank Car	Tank Barge	Food	Petroleum	Chemical	Food
PESTICIDES (continued)												
4,4'-DDE			9.50E+02	A	5.00E-01	A	X	X	X	X	X	X
4,4'-DDT			6.50E+03	A	4.00E-01	A	X	X	X	X	X	X
Diallate			8.40E-03	A	1.00E+00	A	X	X	X	X	X	X
Dichlorone			4.00E+01	B	1.00E+00	*	X	X	X	X	X	X
Dicofol			5.70E+02	A	1.00E+00	*	X	X	X	X	X	X
Dieldrin			5.70E+04	A	1.40E-01	A	X	X	X	X	X	X
Endosulfan I (alpha-)			1.00E+02	A	5.00E-01	A	X	X	X	X	X	X
Endosulfan II (beta-)			1.00E+02	B	1.00E+00	F	X	X	X	X	X	X
Endosulfan sulfate			1.00E+02	A	4.20E-01	A	X	X	X	X	X	X
Eindrin			9.80E+01	A	5.00E-01	A	X	X	X	X	X	X
Endrin Aldehyde			9.80E+01	A	1.00E+00	A	X	X	X	X	X	X
Endrin Ketone			9.80E+01	A	1.00E+00	*	X	X	X	X	X	X
Ethalflurralin			7.50E+00	A	1.00E+00	A	X	X	X	X	X	X
Etridiazole			4.60E-03	A	1.00E+00	*	X	X	X	X	X	X
Fenarimol			6.20E-02	A	1.00E+00	*	X	X	X	X	X	X
Hepachlor Epoxide			6.80E+03	A	1.00E+00	A	X	X	X	X	X	X
Isodrin			1.40E+01	A	1.00E+00	*	X	X	X	X	X	X
Isopropalin			5.80E-01	A	1.00E+00	*	X	X	X	X	X	X
Methoxychlor			1.90E+02	A	4.20E-01	A	X	X	X	X	X	X
Metrizbuin			1.30E-03	A	1.00E+00	*	X	X	X	X	X	X
Mirex \ Decholane			5.60E+03	A	1.00E+00	A	X	X	X	X	X	X
Nitrofen \ TOK			4.80E-02	A	1.00E+00	A	X	X	X	X	X	X
Pendamethalin			1.50E-01	A	1.00E+00	*	X	X	X	X	X	X
Pentachloronitrobenzene \ Quintozene			2.70E-01	A	1.00E+00	A	X	X	X	X	X	X
Cis-Permethrin			3.40E+00	A	1.00E+00	*	X	X	X	X	X	X
Perthane			1.40E+01	A	1.00E+00	*	X	X	X	X	X	X
Propachlor			3.30E-01	A	1.00E+00	A	X	X	X	X	X	X
Propazine			4.70E-03	A	1.00E+00	A	X	X	X	X	X	X
Simazine			5.60E-01	A	1.00E+00	A	X	X	X	X	X	X
Strobane			1.10E+02	A	1.00E+00	*	X	X	X	X	X	X
Terbacil			8.80E-01	A	1.00E+00	A	X	X	X	X	X	X
Terbutylazine			1.20E-02	A	1.00E+00	A	X	X	X	X	X	X
Triadimefon			5.80E-03	A	1.00E+00	*	X	X	X	X	X	X
Trifluralin \ Treflan			4.20E+00	A	2.30E-01	A	X	X	X	X	X	X

TABLE 2-1.(continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

Pollutant	Toxic Weighting Factor (TWF)	POTW Removal Factor	Ref.	Subcategory					
				Truck Tank			Hopper		
				Ref.	Chemical	Food	Petroleum	Chemical	Food
HERBICIDES									
2,4-Dichlorophenoxyacetic acid	3.10E-03	A	5.10E-01	A	X	X	X	X	X
Dalapon	5.10E-03	A	1.00E+00	A	X	X	X	X	X
2,4-DB salts and esters	3.60E-02	A	1.00E+00	A	X	X	X	X	X
Dicamba	1.50E-02	A	1.00E+00	A	X	X	X	X	X
Dichlorprop	9.30E-02	A	1.00E+00	A	X	X	X	X	X
Dinoseb \ DNEP	1.90E+00	A	1.00E+00	A	X	X	X	X	X
MCPA	1.60E-02	A	1.00E+00	A	X	X	X	X	X
MCPP	6.90E-03	A	1.00E+00	A	X	X	X	X	X
Picloram	2.10E+00	A	1.00E+00	A	X	X	X	X	X
2,4,5-T	2.80E-01	A	4.40E-01	A	X	X	X	X	X
2,4,5-TP	1.80E-01	A	5.60E-01	A	X	X	X	X	X
METALS									
Aluminum	6.40E-02	A	1.20E-01	A	X	X	X	X	X
Antimony	1.90E-01	B	4.40E-01	A	X	X	X	X	X
Arsenic	4.00E+00	B	1.00E+00	A	X	X	X	X	X
Barium	2.00E-03	A	6.40E-01	A	X	X	X	X	X
Beryllium	5.30E+00	B	5.40E-01	A	X	X	X	X	X
Boron	1.80E-01	B	7.70E-01	A	X	X	X	X	X
Cadmium	5.20E+00	A	1.00E-01	A	X	X	X	X	X
Calcium	2.80E-05	B	4.50E-01	F	X	X	X	X	X
Chromium	2.70E-02	A	3.30E-01	A	X	X	X	X	X
Chromium hexavalent	5.10E-01	A	9.40E-01	A	X	X	X	X	X
Cobalt	1.10E-01	B	6.30E-01	A	X	X	X	X	X
Copper	4.70E-01	A	1.60E-01	A	X	X	X	X	X
Iron	5.60E-03	A	1.70E-01	A	X	X	X	X	X
Lead	1.80E+00	A	8.00E-02	A	X	X	X	X	X
Magnesium	8.70E-04	B	7.40E-01	A	X	X	X	X	X
Manganese	1.40E-02	A	5.90E-01	A	X	X	X	X	X
Mercury	5.00E+02	A	4.00E-01	A	X	X	X	X	X
Molybdenum	2.00E-01	A	4.80E-01	A	X	X	X	X	X
Nickel	3.60E-02	A	4.90E-01	A	X	X	X	X	X
Phosphorus	0.00E+00	C	3.10E-01	D	X	X	X	X	X
Potassium	1.10E-03	A	8.00E-01	A	X	X	X	X	X
Selenium	1.10E+00	A	5.40E-01	A	X	X	X	X	X

TABLE 2-1 (continued)

POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

Pollutant	Toxic Weighting Factor (TWF)	POTW Removal Ref.	Factor Ref.	Subcategory							
				Truck Tank				Rail Tank Car			
				Chemical	Food	Petroleum	Chemical	Food	Petroleum	Chemical	Food
METALS (continued)											
Silver	4.70E-01	A	2.20E-01	A							X
Sodium	5.50E-06	B	4.50E-01	F							X
Sulfur	5.50E-06	B	8.80E-01	A							X
Tantalum	6.00E-02	A	4.50E-01	A							X
Thallium	1.40E-01	B	4.60E-01	D							X
Tin	3.00E-01	A	3.50E-01	A	X						X
Titanium	2.90E-02	A	3.10E-01	A	X						X
Tungsten	5.30E-03	B	4.50E-01	D	X						X
Vanadium	6.20E-01	B	5.70E-01	A	X						X
Zinc	5.10E-02	A	2.20E-01	A	X						X
Zirconium	5.40E-01	A	1.00E+00	A	X						X

* Denotes chemicals for which no POTW removal factor is available. They are entered as having a factor of 1.00 (100% pass-through).

References:

- A: Lotus 1-2-3 file from Gina Matthews, EPA, to Cal Franz, ERG, dated 27 August 1997 entitled "TWFRMMS.WK4."
- B: Memorandum from Jim Keating, Versar, Inc., to Ed Gardetto, EPA, dated 16 February 1995 entitled "TWF and Categorization for TEC Analytes."
- C: E-mail from Gina Matthews, EPA, to Cal Franz, ERG, dated 22 November 1996 entitled "TWF for Lanthanum."
- D: Facsimile from Gina Matthews, EPA, to Maureen Kaplan, ERG, dated 6 December 1995; Table 2-7.
- E: Facsimile from Gina Matthews, EPA, to Cal Franz, ERG, dated 30 December 1996 entitled "Updated TECI POTW Removals."
- F: Facsimile from Gina Matthews, EPA, to Maureen Kaplan, ERG, dated 6 December 1995; Appendix C.
- G: Lotus 1-2-3 file from Gina Matthews, EPA, to Cal Franz, ERG, dated 29 January 1997 entitled "TECI POTW Removals".

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, 11 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 11 times greater than the toxic weight of copper (5.16 divided by 0.467 equals 11.05).

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 cadmium in its effluent stream to a POTW and the POTW has a 38 percent removal efficiency for cadmium, then the cadmium discharged to surface waters is only 62 pounds (1 minus 0.38 equals 0.62). If the regulation reduces cadmium 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 0.62 equals 31 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 31 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 ($\mu\text{g/l}$)	Aquatic Chronic Criteria ($\mu\text{g/l}$)	Weighting Calculation	Toxic Weighting Factor
Copper	---	12.0	5.6/12.0	0.467
Cadmium	84	1.1	5.6/84 + 5.6/1.1	5.16
Naphthalene	41,026	370	5.6/41,026 + 5.6/370	0.015

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., 1995.

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

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

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

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 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 for proposal (U.S. EPA, 1998a). 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 pre-tax costs to the TEC industry.

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 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 AND MONITORING OPTIONS

EPA may subcategorize an industry to establish effluent limitations guidelines based on untreated wastewater characteristics, commodity transported, mode of transportation, or other factors. EPA divided the TEC industry into 11 subcategories, listed in Section 1, based on the commodity transported and the mode of transportation. In addition to subcategories, 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.

3.1 POLLUTION CONTROL OPTIONS

The Development Document (U.S. EPA, 1998b) 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 TEC industry subcategories. 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.

3.2 MONITORING OPTIONS

EPA considered each technology option with up to six monitoring options:

- No monitoring
- Quarterly

TABLE 3-1
TECHNOLOGY OPTIONS FOR TEC INDUSTRY SUBCATEGORIES

Option	Description
Truck Chemical Direct Dischargers	
1 ¹	Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, biological treatment, and sludge dewatering
2	Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, biological treatment, <i>activated carbon adsorption</i> , and sludge dewatering
Truck Chemical Indirect Dischargers	
1	Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, and sludge dewatering
2	Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, <i>activated carbon adsorption</i> , and sludge dewatering
Rail Chemical Direct Dischargers	
1 ²	Flow reduction, oil/water separation, equalization, biological treatment, and sludge dewatering
2	Flow reduction, oil/water separation, equalization, <i>dissolved air flotation (with flocculation and pH adjustment)</i> , biological treatment, and sludge dewatering
3	Flow reduction, oil/water separation, equalization, dissolved air flotation (with flocculation and pH adjustment), biological treatment, <i>organo-clay/activated carbon adsorption</i> and sludge dewatering
Rail Chemical Indirect Dischargers	
1	Flow reduction, and oil/water separation
2	Flow reduction, oil/water separation, <i>equalization, dissolved air flotation (with flocculation and pH adjustment), and sludge dewatering</i>
3	Flow reduction, oil/water separation, equalization, dissolved air flotation (with flocculation and pH adjustment), <i>organo-clay/activated carbon adsorption</i> , and sludge dewatering

TABLE 3-1(continued)
TECHNOLOGY OPTIONS FOR TEC INDUSTRY SUBCATEGORIES

Barge Chemical Direct Dischargers	
1	Flow reduction, oil/water separation, dissolved air flotation, filter press, biological treatment, and sludge dewatering
2	Flow reduction, oil/water separation, dissolved air flotation, filter press, biological treatment, <i>reverse osmosis</i> , and sludge dewatering
Barge Chemical Indirect Dischargers	
1	Flow reduction, oil/water separation, dissolved air flotation, and in-line filter press
2	Flow reduction, oil/water separation, dissolved air flotation, in-line filter press, <i>biological treatment, and sludge dewatering</i>
3	Flow reduction, oil/water separation, dissolved air flotation, in-line filter press, biological treatment, <i>reverse osmosis</i> , and sludge dewatering
Food Grade	
1	Flow reduction, and oil/water separation
2	Flow reduction, oil/water separation, <i>equalization, biological treatment, and sludge dewatering</i>
Petroleum	
1 ³	Flow reduction, equalization, oil/water separation, and chemical precipitation
2	Flow reduction, equalization, oil/water separation, activated carbon adsorption, and recycle/reuse
Hopper	
1	Flow reduction, and gravity separation

Note: EPA developed options 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.

¹ Option 1 has identical costs and removals as Option 2.

² Equalization was originally costed with Option 2, but later moved to Option 1; costs have not been adjusted.

³ Because Option 1 would result in higher costs and lower removals than Option 2, it was not completely costed.

- Bimonthly
- Monthly
- Combination of weekly and monthly
- Weekly

For example, EPA developed three technology options for the Rail Chemical subcategory (see Table 3-1) with four monitoring options. This results in 12 separate cost combinations. This cost-effectiveness analysis presents costs and pollutant removals associated with monthly monitoring for all indirect dischargers, and costs and removals for a combination of monthly and weekly monitoring for direct dischargers.

SECTION 4

RESULTS OF COST-EFFECTIVENESS ANALYSIS

EPA calculated cost-effectiveness (CE) ratios for direct and indirect dischargers in the 11 TEC industry subcategories. This section presents the ratios by subcategory. (Section 3 outlines technology options for each subcategory.) Costs are presented on a pre-tax basis in 1981 dollars; costs are estimated in 1994 dollars and deflated to 1981 dollars to facilitate comparison with effluent guidelines of other industries. 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.

The monitoring frequency included in the costs is listed for each table. Because the primary purpose of cost-effectiveness analysis is the comparison of the removal efficiencies of technology options, and monitoring adds costs but no pollutant removals, the CE comparison needs to be made using the same monitoring option for all technology options in the comparison.

Where data are based on fewer than three unweighted facilities, the removal and/or the cost data may be suppressed in order to protect confidential business information. Such entries are marked "ND" for not disclosed.

4.1 TRUCK CHEMICAL

All Truck Chemical facilities contained in the detailed questionnaire database are indirect dischargers; however, direct dischargers were identified in the screener questionnaire data.

Table 4-1 presents the results of the CE analysis for direct dischargers. This analysis is based on unweighted data because the facilities are only present in the screener database. There are two technology options for direct dischargers in this subcategory (see Table 3-1). Option 1 results in identical costs and

TABLE 4-1

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION OF MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	NA	NA	NA	NA	NA
Option 2 *	ND	ND	ND	ND	\$602

* Option 1 has identical costs and removals as Option 2.

ND: Not disclosed due to business confidentiality.

removals as Option 2. The incremental CE ratio is \$602 under Option 2. Option 2 is the proposed option for direct dischargers in the Truck Chemical subcategory.

Table 4-2 presents the results of the CE analysis for the indirect dischargers. There are two technology options for the Truck Chemical Indirect Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$86/pound equivalents (pe) under Option 1 to \$309/pe under Option 2. Option 2 is the proposed option for indirect dischargers in the Truck Chemical subcategory.

4.2 RAIL CHEMICAL

All Rail Chemical facilities in the detailed questionnaire database are indirect dischargers; however, direct dischargers were identified in the screener questionnaire data. Table 4-3 presents the results of the CE analysis for direct dischargers. This analysis is based on unweighted data, because the facilities are only present in the screener database. There are three technology options for the Rail Chemical Direct Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$84 under Option 1 to \$526 under Option 3. Option 1 is the proposed option for direct dischargers in the Rail Chemical subcategory.

Table 4-4 presents the results of the CE analysis for the indirect dischargers. There are three technology options for the Rail Chemical Indirect Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$56/pe under Option 1 to \$362/pe under Option 3. Option 1 is the proposed option for indirect dischargers in the Rail Chemical subcategory.

4.3 BARGE CHEMICAL AND PETROLEUM

The Barge Chemical and Petroleum subcategory includes both direct and indirect dischargers. Table 4-5 presents the results of the CE analysis for the direct dischargers. There are two technology options for direct dischargers in this subcategory (see Table 3-1). The incremental CE ratio ranges from \$104/pe under Option 1 to \$1,444/pe under Option 2. Option 1 is the proposed option for direct dischargers in the Barge Chemical and Petroleum subcategory.

TABLE 4-2

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
TRUCK CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Pre-tax Annualized Cost (\$1981)	Pre-tax Annualized Cost (\$1981)	Incremental Cost-Effectiveness (\$1981/PE)	Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)				
Baseline	0.0	NA	NA	NA	NA	NA	NA	NA
Option 1	149,794.8	\$12,854,782	149,794.8	\$12,854,782	\$86	\$86	\$86	\$86
Option 2	171,485.9	\$19,567,341	21,691.1	\$6,712,559	\$309	\$309	\$309	\$309

TABLE 4-3

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION OF MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	\$84
Option 2	ND	ND	ND	ND	\$260
Option 3	ND	ND	ND	ND	\$526
					\$123
					\$142

ND: Not disclosed due to business confidentiality.

TABLE 4-4

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
RAIL CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	20,825.6	\$1,173,145	20,825.6	\$1,173,145	\$56
Option 2	22,630.8	\$1,758,116	1,805.2	\$584,971	\$78
Option 3	24,470.0	\$2,423,227	1,839.2	\$665,111	\$99
					\$362

TABLE 4-5

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION OF MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	13,856.1	\$1,437,712	13,856.1	\$1,437,712	\$104
Option 2	14,022.7	\$1,678,308	166.6	\$240,596	\$120

Table 4-6 presents the results of the CE analysis for the indirect dischargers in the Barge Chemical and Petroleum subcategory. There are three technology options for the Barge Chemical and Petroleum Indirect Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$838/pe under Option 2 to \$15,364/pe under Option 3. EPA has chosen not to set pretreatment standards for existing indirect dischargers in the Barge Chemical and Petroleum subcategory at this time.

4.4 TRUCK PETROLEUM

All Truck Petroleum facilities in the detailed questionnaire database are indirect dischargers. Table 4-7 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Petroleum subcategory (see Table 3-1). Option 1 results in higher costs and lower removals than Option 2, and therefore was not completely costed. The incremental CE ratio is \$24,362/pe under Option 2. EPA has chosen not to regulate the Truck Petroleum subcategory at this time.

4.5 RAIL PETROLEUM

All Rail Petroleum facilities in the detailed questionnaire database are indirect dischargers. Table 4-8 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in this subcategory (see Table 3-1). Option 1 results in higher costs and lower removals than Option 2, and therefore was not completely costed. The incremental CE ratio is (\$1,450)/pe under Option 2 due to the fact that the technology option results in a cost savings for the modeled facility. EPA has chosen not to regulate the Rail Petroleum subcategory at this time.

4.6 TRUCK FOOD

All Truck Food facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in this subcategory. Table 4-9 presents the results of the CE analysis for direct dischargers. This analysis assumed that direct discharger facilities have the same characteristics as indirect dischargers; therefore, facility data for indirect dischargers can be used as a proxy

TABLE 4-6

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
BARGE CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental			Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Incremental Cost-Effectiveness (\$1981/PE)	
Baseline	0.0	NA	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	ND	\$2,376
Option 2	ND	ND	ND	ND	ND	\$838
Option 3	ND	ND	ND	ND	ND	\$1,470
						\$1,634

ND: Not disclosed due to business confidentiality.

TABLE 4-7

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
TRUCK PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	NC	NC	NC	NC	NC
Option 2	28.2	\$687,005	28.2	\$687,005	\$24,362
					\$24,362

NC: Not completely costed; would result in higher costs and lower removals than option 2.

TABLE 4-8

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
RAIL PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Pre-tax Annualized Cost (\$1981)	Annualized Cost (\$1981)	Incremental Cost-Effectiveness (\$1981/PE)	Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Annualized Cost (\$1981)				
Baseline	0.0	NA	NA	NA			NA	NA
Option 1	NC	NC	NC	NC			NC	NC
Option 2	0.1	(\$145)	0.1	0.1	(\$145)	(\$145)	(\$1,450)	(\$1,450)

NC: Not completely costed; would result in higher costs and lower removals than option 2.

TABLE 4-9

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
TRUCK FOOD SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION OF MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual		Incremental		Incremental Cost-Effectiveness (\$1981/PE)	Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)		
Baseline	0.0	NA	NA	NA	NA	NA
Option 1	0.6	\$3,739,820	0.6	\$3,739,820	\$6,233,033	\$6,233,033
Option 2	50,974.1	\$7,854,805	50,973.5	\$4,114,985	\$81	\$154

for direct dischargers. In order to represent direct dischargers, the POTW removal factors were deleted from the calculation of pound equivalents removed. There are two technology options for direct dischargers in the Truck Food subcategory (see Table 3-1). The incremental CE ratio ranges from \$81/pe under Option 2 to \$6,233,033/pe under Option 1. EPA has chosen not to set BAT standards for direct dischargers in the Truck Food subcategory at this time.

Table 4-10 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Food Grade subcategory (see Table 3-1). The incremental CE ratio ranges from \$610/pe under Option 2 to \$30,588,400/pe under Option 1. EPA has chosen not to regulate indirect dischargers in the Truck Food subcategory at this time.

4.7 RAIL FOOD

All Rail Food facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in this subcategory. Table 4-11 presents the results of the CE analysis for direct dischargers. This analysis assumed that direct discharger facilities have the same characteristics as indirect dischargers; therefore, facility data for indirect dischargers can be used as a proxy for direct dischargers. In order to represent direct dischargers, the POTW removal factors were deleted from the calculation of pound equivalents removed. There are two technology options for direct dischargers in the Rail Food subcategory (see Table 3-1). The incremental CE ratio is undefined under Option 1 since this option results in no incremental pollutant removals. The incremental CE under Option 2 is \$234/pe. EPA has chosen not to set BAT standards for direct dischargers in the Rail Food subcategory at this time.

Table 4-12 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Food Grade subcategory (see Table 3-1). The incremental CE ratio is undefined under Option 1 since this option results in no incremental pollutant removals. The incremental CE under Option 2 is \$1,766/pe. EPA has chosen not to regulate indirect dischargers in the Rail Food subcategory at this time.

TABLE 4-10

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
TRUCK FOOD SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Incremental Cost-Effectiveness (\$1981/PE)	Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)		
Baseline	0.0	NA	NA	NA	NA	NA
Option 1	0.1	\$3,058,840	0.1	\$3,058,840	\$30,588,400	\$30,588,400
Option 2	6,750.5	\$7,173,825	6,750.4	\$4,114,985	\$610	\$1,063

TABLE 4-11

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
RAIL FOOD SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION OF MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	*
Option 2	ND	ND	ND	ND	\$399

* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

TABLE 4-12

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
RAIL FOOD SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	*
Option 2	ND	ND	ND	ND	\$2,822

* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

4.8 BARGE FOOD

All Barge Food facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in this subcategory. Table 4-13 presents the results of the CE analysis for direct dischargers. This analysis assumed that direct discharger facilities have the same characteristics as indirect dischargers; therefore, facility data for indirect dischargers can be used as a proxy for direct dischargers. In order to represent direct dischargers, the POTW removal factors were deleted from the calculation of pound equivalents removed. There are two technology options for direct dischargers in the Barge Food subcategory (see Table 3-1). The incremental CE ratio is undefined under Option 1 since this option results in no incremental pollutant removals. The incremental CE under Option 2 is \$138/pe. EPA has chosen not to set BAT standards for direct dischargers in the Barge Food subcategory at this time.

Table 4-14 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Food Grade subcategory (see Table 3-1). Because the modeled facility has sufficient treatment in place, no incremental pollutant removals exist under Option 1; therefore the CE for Option 1 is undefined. The incremental CE under Option 2 is \$1,721/pe. EPA has chosen not to regulate indirect dischargers in the Barge Food subcategory at this time.

4.9 TRUCK HOPPER

All Truck Hopper facilities in the detailed questionnaire database are indirect dischargers. Table 4-15 presents the results of the CE analysis for the indirect dischargers. There is one technology option for indirect dischargers in the Hopper subcategory (see Table 3-1). The incremental CE ratio is \$183,823/pe under Option 1. EPA has chosen not to regulate the Truck Hopper subcategory at this time.

4.10 RAIL HOPPER

All Rail Hopper facilities in the detailed questionnaire database are indirect dischargers. Table 4-16 presents the results of the CE analysis for the indirect dischargers. There is one technology option for indirect dischargers in the Hopper subcategory (see Table 3-1). Because the modeled facility has sufficient treatment

TABLE 4-13

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
BARGE FOOD SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION OF MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost, Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	*
Option 2	ND	ND	ND	ND	\$433

* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

TABLE 4-14

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
BARGE FOOD SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	*
Option 2	ND	ND	ND	ND	\$1,721
					\$3,272

* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

TABLE 4-15

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
TRUCK HOPPER SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Incremental Cost-Effectiveness (\$1981/PE)	Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)		
Baseline	0.0	NA	NA	NA	NA	NA
Option 1	1.5	\$275,734	1.5	\$275,734	\$183,823	\$183,823

TABLE 4-16

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
RAIL HOPPER SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Incremental Cost-Effectiveness (\$1981/PE)	Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)		
Baseline	0.0	NA	NA	NA	NA	NA
Option 1	ND	ND	ND	ND	*	*

* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

in place, no incremental pollutant removals exist under Option 1; therefore, the CE for Option 1 is undefined. EPA has chosen not to regulate indirect dischargers in the Rail Hopper subcategory at this time.

4.11 BARGE HOPPER

The Barge Hopper subcategory includes both direct and indirect dischargers. Table 4-17 presents the results of the CE analysis for the direct dischargers. There is one technology option for direct dischargers in the Hopper subcategory (see Table 3-1). The incremental CE ratio is \$27,674/pe under Option 1. EPA has chosen not to regulate direct dischargers in the Barge Hopper subcategory at this time.

Table 4-18 presents the results of the CE analysis for the indirect dischargers. There is one technology option for indirect dischargers in this subcategory (see Table 3-1). The incremental CE ratio is \$165,190/pe under Option 1. EPA has chosen not to regulate indirect dischargers in the Barge Hopper subcategory at this time.

TABLE 4-17

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
BARGE HOPPER SUBCATEGORY
DIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline	0.0	NA	NA	NA	NA
Option 1	11.7	\$323,784	11.7	\$323,784	\$27,674

TABLE 4-18

COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS
BARGE HOPPER SUBCATEGORY
INDIRECT DISCHARGERS
MONTHLY MONITORING

Technology Option	Total Annual		Incremental		Average Cost-Effectiveness (\$1981/PE)
	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	Pound Equivalents Removed (PE)	Pre-tax Annualized Cost (\$1981)	
Baseline Option 1	0.0 0.1	NA \$16,519	NA 0.1	NA \$16,519	NA \$165,190
					NA \$165,190

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 proposed options are:

- Truck Chemical: Option 2 for both direct and indirect dischargers
- Rail Chemical: Option 1 for both direct and indirect dischargers
- Barge Chemical and Petroleum: Option 1 for direct dischargers (Indirect dischargers are not regulated at this time.)
- Truck Petroleum: not regulated at this time
- Rail Petroleum: not regulated at this time
- Truck Food: not regulated at this time⁴
- Rail Food: not regulated at this time⁴
- Barge Food: not regulated at this time⁴
- Truck Hopper: not regulated at this time
- Rail Hopper: not regulated at this time
- Barge Hopper: not regulated at this time

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

⁴ At this time EPA is proposing BPT and BCT, but not BAT for the Food subcategories.

TABLE 5-1

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

Subcategory	Incremental			Cost-Effectiveness (\$/PE)
	Pre-tax Annualized Cost (\$1981)	PE Removed		
Truck Chemical	ND	ND		\$602
Rail Chemical	ND	ND		\$84
Barge Chemical	\$1,437,712	13,856.1		\$104
Truck Petroleum	NA	NA		NA
Rail Petroleum	NA	NA		NA
Truck Food	NA	NA		NA
Rail Food	NA	NA		NA
Barge Food	NA	NA		NA
Truck Hopper	NA	NA		NA
Rail Hopper	NA	NA		NA
Barge Hopper	NA	NA		NA
Industry Total	\$1,549,180	14,399.2		\$108

ND: Not disclosed due to business confidentiality.

NA: Not applicable.

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)	PE Removed	Cost-Effectiveness (\$/PE)
Truck Chemical	\$6,712,559	21,691.1	\$309
Rail Chemical	\$1,173,145	20,825.6	\$56
Barge Chemical	NA	NA	NA
Truck Petroleum	NA	NA	NA
Rail Petroleum	NA	NA	NA
Truck Food	NA	NA	NA
Rail Food	NA	NA	NA
Barge Food	NA	NA	NA
Truck Hopper	NA	NA	NA
Rail Hopper	NA	NA	NA
Barge Hopper	NA	NA	NA
Industry Total	\$7,928,221	42,882.5	\$185

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

Table 5-1 presents the incremental cost-effectiveness of proposed pollution control options for direct dischargers in the TEC industry. The incremental cost-effectiveness resulting from the proposed options for direct dischargers in the Truck Chemical, Rail Chemical, and Barge Chemical and Petroleum subcategories is \$108/pe.

Table 5-2 presents the incremental cost-effectiveness of proposed pollution control options for indirect dischargers in the TEC industry. The incremental industry cost-effectiveness resulting from the proposed options for indirect dischargers in the Truck Chemical and Rail Chemical subcategories is \$185/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 pre-tax costs, whereas many of the numbers presented for other effluent guidelines are post-tax 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 post-tax cost-effectiveness, however, is approximately 60 to 70 percent of pre-tax 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	2,328 239	33 35
Organic Chemicals	54,225	9,735	5
Pesticides	2,461	371	14
Pharmaceuticals ^c	A/C B/D	897 90	47 0.5
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
Transportation Equipment Cleaning ^c	15	0.8	108

^aAlthough toxic weighting factors for priority pollutants varied across these rules, this table reflects the cost-effectiveness at the time of regulation.

^bProduced water only; for produced sand and drilling fluids and drill cuttings, BAT=NSPS.

^cProposed.

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	426	383	185

^aAlthough toxic weighting factors for priority pollutants varied across these rules, this table reflects the cost-effectiveness at the time of regulation.

^bNo known indirect dischargers at this time for offshore oil and gas and coastal oil and gas.

^cProposed.

SECTION 6

COST-REASONABILITY OF CONVENTIONAL POLLUTANTS REMOVED

6.1 BCT COST-REASONABILITY TEST

EPA evaluates the cost-reasonability 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-reasonability 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:

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

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):

$$\text{Industry Cost-Effectiveness} = \text{BCT Incremental Cost per Pound} / \text{BPT Incremental Cost per Pound}$$

6.2 SUBCATEGORY BCT TESTS

The following seven tables present the cost-reasonableness of BCT options by subcategory for the TEC industry effluent guidelines. All costs are presented in 1994 dollars. Each table presents figures based on a combination of monthly and weekly monitoring.

For three subcategories—Truck Food, Rail Food, and Barge Food—all facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in these subcategories, and identified several direct dischargers in the screener questionnaire database. This analysis assumes that direct discharger facilities in these subcategories have the same characteristics as the indirect dischargers in the detailed questionnaire database; therefore, facility data for indirect dischargers can be used as a proxy for direct dischargers. To accurately represent direct dischargers in calculating pounds removed, the POTW removal factors were deleted.

For two subcategories—Truck Chemical and Rail Chemical—all facilities in the detailed questionnaire database are indirect dischargers; nonetheless, direct dischargers were identified in the screener questionnaire database. EPA performed this analysis on the facilities identified from the screener survey.

6.2.1 Truck Food

Table 6-1 presents the results of the BCT cost test for direct dischargers in the Truck Food subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$0.0006 under Option 2 to \$0.0799 under Option 1. The incremental cost per pound is \$0.0003 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

6.2.2 Rail Food

Table 6-2 presents the results of the BCT cost test for direct dischargers in the Rail Food subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$0.13 under Option 2 to \$32,539.92 under Option 1. The incremental cost per pound is \$0.07 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

6.2.3 Barge Food

Table 6-3 presents the results of the BCT cost test for direct dischargers in the Barge Food subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound is undefined under Option 1 because no pounds of conventional pollutants were removed, and is \$0.003 under Option 2. The incremental cost per pound is \$0.001 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

TABLE 6-1

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
TRUCK FOOD SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental			Industry Cost Test
	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	
Option 1	\$35,721,343	71,580,474	\$0.0799	\$5,721,343	71,580,474	\$0.0799	NA
Option 2	\$12,016,630	21,144,967,819	\$0.0006	\$6,295,287	21,073,387,344	\$0.0003	NA

NA: Not applicable because Option 2 = BPT.

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

TABLE 6-2

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
RAIL FOOD SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental			Industry Cost-Effectiveness Test	BCT Cost Test
	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)		
Option 1	ND	ND	\$32,539.92	ND	ND	\$32,539.92	NA	NA
Option 2	ND	ND	\$0.13	ND	ND	\$0.07	NA	NA

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

TABLE 6-3

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
BARGE FOOD SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental			Industry Cost-Effectiveness Test
	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	
Option 1	\$43,633	0	*	\$43,633	0	*	NA
Option 2	\$64,073	19,081,180	\$0.003	\$20,439	19,081,180	\$0.001	NA

* Incremental cost per pound is undefined since there are no incremental pollutant removals.

NA: Not applicable because Option 2 = BPT.

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

6.2.4 Truck Chemical

Table 6-4 presents the results of the BCT cost test for direct dischargers in the Truck Chemical subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). Costs and removals were not calculated for Option 1. The cost per pound is \$0.48 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

6.2.5 Rail Chemical

Table 6-5 presents the results of the BCT cost test for direct dischargers in the Rail Chemical subcategory. Three technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$35.55 under Option 2 to \$96.87 under Option 1. The incremental cost per pound is \$20.66 under Option 2 and \$27.81 under Option 3. The industry cost-effectiveness ratio ranges from 0.21 with Option 1 as BPT and Option 2 as BCT to 0.29 with Option 1 as BPT and Option 3 as BCT. Both Option 2 and Option 3 fail the POTW test and, consequently, fail the BCT cost test. EPA has set Option 1 for BPT and BCT for this subcategory.

6.2.6 Barge Chemical and Petroleum

Table 6-6 presents the results of the BCT cost test for direct dischargers in the Barge Chemical and Petroleum subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$0.35 under Option 1 to \$0.39 under Option 2. The incremental cost per pound is \$1.64 under Option 2. The industry cost-effectiveness ratio is 4.73 with Option 1 as BPT and Option 2 as BCT. Option 2 fails the BCT cost test; it passes neither the POTW test nor the industry cost-effectiveness test. EPA has set Option 1 for BPT and BCT for this subcategory.

TABLE 6-4
COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental			Industry Cost-Effectiveness Test
	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1.994)	
Option 1 *	ND	ND	\$0.48	ND	ND	\$0.48	NA
Option 2	ND	ND	\$0.48	ND	ND	\$0.48	NA

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

TABLE 6-5

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental		
	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)
Option 1	ND	ND	\$96.87	ND	ND	\$96.87
Option 2	ND	ND	\$35.55	ND	ND	\$20.66
Option 1	ND	ND	\$96.87	ND	ND	\$96.87
Option 3	ND	ND	\$40.53	ND	ND	\$27.81

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

TABLE 6-6

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental			Industry Cost-Effectiveness Test	BCT Cost Test
	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Pre-tax Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)		
Option 1	\$2,199,476	6,353,309	\$0.35	\$2,199,476	6,353,309	\$0.35		
Option 2	\$2,567,550	6,578,143	\$0.39	\$368,074	224,834	\$1.64	4.73	Fail

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

6.2.7 Barge Hopper

Table 6-7 presents the results of the BCT cost test for direct dischargers in the Barge Hopper subcategory. One technology option for direct dischargers exists in this subcategory (see Table 3-1). The cost per pound is \$13.57 under Option 1. The BCT test was not performed for this subcategory because EPA chose Option 1 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has chosen not to set BPT or BCT for this subcategory.

TABLE 6-7

COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS
BARGE HOPPER SUBCATEGORY
DIRECT DISCHARGERS
COMBINATION MONTHLY/WEEKLY MONITORING

Technology Option	Total Annual			Incremental			Industry Cost-Effectiveness Test	BCT Cost Test
	Pre-tax Cost (\$1994)	Annualized Cost (\$1994)	Pounds Removed	Cost per Pound (\$1994)	Annualized Cost (\$1994)	Pounds Removed		
Option 1	\$117,056	8,626	\$13.57	\$117,056	8,626	\$13.57	NA	NA

NA: Not applicable because Option 1 = BPT.
 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

REFERENCES

Engineering News Record. 1996. Construction cost index history, 1907-1996. Engineering News Record. March 25. page 72.

SAIC. 1996. Transportation equipment cleaning industry detailed questionnaire sample design report (interim draft). Prepared for U.S. Environmental Protection Agency, Office of Water by SAIC. McLean, Virginia. April 12.

U.S. EPA. 1993. Tank and container interior cleaning screener questionnaire. OMB No. 2040-0166. Washington, DC: U.S. Environmental Protection Agency, Office of Water.

U.S. EPA. 1995. 1994 Detailed questionnaire for the transportation equipment cleaning industry. OMB No. 2040-0179. Washington, DC: U.S. Environmental Protection Agency, Office of Water. April.

U.S. EPA. 1998a. Economic analysis of proposed effluent limitations guidelines and standards for the transportation equipment cleaning industry. EPA-821-B-98-012. Washington, DC: U.S. Environmental Protection Agency, Office of Water. May.

U.S. EPA. 1998b. Development document for the proposed effluent limitations guidelines and standards for the transportation equipment cleaning industry. EPA-821-B-98-011. Washington, DC: U.S. Environmental Protection Agency, Office of Water. May.

Versar, Inc. 1995. TWF and categorization information for TEC analytes. Prepared for U.S. Environmental Protection Agency, Office of Water. February 1995.

APPENDIX A

**SUPPORTING DOCUMENTATION FOR
COST-EFFECTIVENESS ANALYSIS:
POLLUTANT LOADINGS AND POUND EQUIVALENTS REMOVED**

TABLE A-1

PRIORITY NONCONVENTIONAL POLLUTANT REMOVALS UNDER SELECTED OPTIONS
INDUSTRY TOTALS

Subcategory	Pounds			Pound Equivalents (PEs)		
	Direct	Indirect	Total	Direct	Indirect	Total
Truck Chemical *	ND	717,165	ND	ND	171,485.9	ND
Rail Chemical *	ND	23,043	ND	ND	20,825.6	ND
Barge Chemical	218,579	NA	218,579	13,856.1	NA	13,856.1
Truck Petroleum	NA	NA	0	NA	NA	0.0
Rail Petroleum	NA	NA	0	NA	NA	0.0
Truck Food	NA	NA	0	NA	NA	0.0
Rail Food	NA	NA	0	NA	NA	0.0
Barge Food	NA	NA	0	NA	NA	0.0
Truck Hopper	NA	NA	0	NA	NA	0.0
Rail Hopper	NA	NA	0	NA	NA	0.0
Barge Hopper	NA	NA	0	NA	NA	0.0
Industry Total	218,728	740,208	958,936	14,399.2	192,311.4	206,710.6

* 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 SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors		Pound Equivalents Removed
	Option 1		Grams/ Pounds	Toxic Weighting Factor	Option 1
Acetone	ND	2.21E-03	7.60E-06		ND
Benzene	ND	2.21E-03	1.80E-02		ND
Chloroform	ND	2.21E-03	2.10E-03		ND
1,2-Dichloroethane	ND	2.21E-03	6.20E-03		ND
Ethylbenzene	ND	2.21E-03	1.40E-03		ND
Methyl ethyl ketone	ND	2.21E-03	2.20E-05		ND
Methyl isobutyl ketone	ND	2.21E-03	1.20E-04		ND
Methylene chloride	ND	2.21E-03	4.20E-04		ND
Tetrachloroethylene	ND	2.21E-03	7.40E-02		ND
Toluene	ND	2.21E-03	5.60E-03		ND
1,1,1-Trichloroethane	ND	2.21E-03	4.30E-03		ND
Trichloroethylene	ND	2.21E-03	6.30E-02		ND
m-Xylene	ND	2.21E-03	1.50E-03		ND
o+p-Xylene	ND	2.21E-03	8.50E-03		ND
alpha-Terpineol	ND	2.21E-03	1.00E-03		ND
Benzoic acid	ND	2.21E-03	3.30E-04		ND
Benzyl alcohol	ND	2.21E-03	5.60E-03		ND
bis (2-Ethylhexyl) phthalate	ND	2.21E-03	1.10E-01		ND
2-Chlorophenol	ND	2.21E-03	3.30E-02		ND
o-Cresol	ND	2.21E-03	3.30E-03		ND
p-Cresol	ND	2.21E-03	2.40E-03		ND
p-Cymene	ND	2.21E-03	4.30E-02		ND
n-Decane	ND	2.21E-03	4.30E-03		ND
1,2-Dichlorobenzene	ND	2.21E-03	1.10E-02		ND
Di-n-octyl phthalate	ND	2.21E-03	2.20E-01		ND
n-Docosane	ND	2.21E-03	8.20E-05		ND
n-Dodecane	ND	2.21E-03	4.30E-03		ND
n-Eicosane	ND	2.21E-03	4.30E-03		ND
n-Hexacosane	ND	2.21E-03	8.20E-05		ND
n-Hexadecane	ND	2.21E-03	4.30E-03		ND
2-Isopropylnaphthalene	ND	2.21E-03	9.82E-02		ND
2-Methylnaphthalene	ND	2.21E-03	1.80E-02		ND
Naphthalene	ND	2.21E-03	1.50E-02		ND
n-Octadecane	ND	2.21E-03	4.30E-03		ND
Styrene	ND	2.21E-03	1.40E-02		ND
n-Tetracosane	ND	2.21E-03	8.20E-05		ND
n-Tetradecane	ND	2.21E-03	4.30E-03		ND
n-Triacontane	ND	2.21E-03	8.20E-05		ND
Azinphos ethyl	ND	2.21E-03	5.10E+03		ND
Azinphos methyl	ND	2.21E-03	2.80E+01		ND
Coumaphos	ND	2.21E-03	5.60E+03		ND
Dichlofenthion	ND	2.21E-03	1.40E+01		ND

TABLE A-2 (continued)

POLLUTANT REMOVALS
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors		Pound Equivalents Removed
	Option 1		Grams/ Pounds	Toxic Weighting Factor	Option 1
Disulfoton	ND	2.21E-03	1.20E+02		ND
EPN	ND	2.21E-03	7.60E+02		ND
Leptophos	ND	2.21E-03	1.10E+01		ND
Merphos	ND	2.21E-03	2.50E+01		ND
Tetrachlorvinphos	ND	2.21E-03	1.40E-01		ND
Beta-BHC	ND	2.21E-03	1.20E+01		ND
Gamma-BHC	ND	2.21E-03	7.00E+01		ND
Gamma-Chlordane	ND	2.21E-03	2.30E+03		ND
Chlorobenzilate	ND	2.21E-03	1.60E-01		ND
4,4'-DDT	ND	2.21E-03	6.50E+03		ND
Diallate	ND	2.21E-03	8.40E-03		ND
Dieldrin	ND	2.21E-03	5.70E+04		ND
Endosulfan II	ND	2.21E-03	1.00E+02		ND
Endosulfan Sulfate	ND	2.21E-03	1.00E+02		ND
Nitrofen	ND	2.21E-03	4.80E-02		ND
Pentachloronitrobenzene	ND	2.21E-03	2.70E-01		ND
Simazine	ND	2.21E-03	5.60E-01		ND
Terbutylazine	ND	2.21E-03	1.20E-02		ND
2,4-D	ND	2.21E-03	3.10E-03		ND
Dalapon	ND	2.21E-03	5.10E-03		ND
2,4-DB (Butoxon)	ND	2.21E-03	3.60E-02		ND
Dinoseb	ND	2.21E-03	1.90E+00		ND
MCPA	ND	2.21E-03	1.60E-02		ND
MCPP	ND	2.21E-03	6.90E-03		ND
Picloram	ND	2.21E-03	2.10E+00		ND
2,4,5-T	ND	2.21E-03	2.80E-01		ND
2,4,5-TP	ND	2.21E-03	1.80E-01		ND
Aluminum	ND	2.21E-03	6.40E-02		ND
Boron	ND	2.21E-03	1.80E-01		ND
Chromium	ND	2.21E-03	2.70E-02		ND
Copper	ND	2.21E-03	4.70E-01		ND
Manganese	ND	2.21E-03	1.40E-02		ND
Mercury	ND	2.21E-03	5.00E+02		ND
Tin	ND	2.21E-03	3.00E-01		ND
Titanium	ND	2.21E-03	2.90E-02		ND
Zinc	ND	2.21E-03	5.10E-02		ND
Fluoride	ND	2.21E-03	3.50E-02		ND
Total Cyanide	ND	2.21E-03	1.10E+00		ND
Total	ND				ND

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-3
POLLUTANT REMOVALS
TRUCK CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors			Pound Equivalents Removed	
	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2
Acetone	5,339,900	77,546,967	2.21E-03	7.60E-06	1.63E-01	0.0	0.2
Benzene	47,644	47,644	2.21E-03	1.80E-02	5.24E-02	0.1	0.1
Chloroform	86,035	86,035	2.21E-03	2.10E-03	2.66E-01	0.1	0.1
1,2-Dichloroethane	872,084	1,069,385	2.21E-03	6.20E-03	1.10E-01	1.3	1.6
Ethylbenzene	694,101	922,804	2.21E-03	1.40E-03	6.21E-02	0.1	0.2
Methyl ethyl ketone	959,988	13,319,798	2.21E-03	2.20E-05	8.17E-02	0.0	0.1
Methyl isobutyl ketone	2,126,203	4,691,831	2.21E-03	1.20E-04	1.21E-01	0.1	0.2
Methylene chloride	11,277,856	28,216,148	2.21E-03	4.20E-04	4.57E-01	4.8	12.0
Tetrachloroethylene	1,895,281	2,056,639	2.21E-03	7.40E-02	1.54E-01	47.7	51.8
Toluene	2,675,315	3,618,728	2.21E-03	5.60E-03	3.82E-02	1.3	1.7
1,1,1-Trichloroethane	1,166,864	1,328,083	2.21E-03	4.30E-03	9.55E-02	1.1	1.2
Trichloroethylene	25,246	25,246	2.21E-03	6.30E-02	1.30E-01	0.5	0.5
m-Xylene	3,323,103	3,718,177	2.21E-03	1.50E-03	3.46E-01	3.8	4.3
o,p-Xylene	1,696,641	1,941,937	2.21E-03	8.50E-03	4.93E-02	1.6	1.8
alpha-Terpineol	87,218	777,520	2.21E-03	1.00E-03	5.40E-02	0.0	0.1
Benzoic acid	4,440,034	43,439,088	2.21E-03	3.30E-04	1.95E-01	0.6	6.2
Benzyl alcohol	462,452	462,452	2.21E-03	5.60E-03	2.20E-01	1.3	1.3
bis (2-Ethylhexyl) phthalate	885,667	885,667	2.21E-03	1.10E-01	4.02E-01	86.6	86.6
2-Chlorophenol	96,988	96,988	2.21E-03	3.30E-02	5.00E-02	0.4	0.4
o-Cresol	119,379	119,379	2.21E-03	3.30E-03	4.75E-01	0.4	0.4
p-Cresol	13,203	212,386	2.21E-03	2.40E-03	2.83E-01	0.0	0.3
p-Cymene	88,348	88,348	2.21E-03	4.30E-02	2.10E-03	0.0	0.0
n-Decane	609,225	609,225	2.21E-03	4.30E-03	9.10E-01	5.3	5.3
1,2-Dichlorobenzene	166,571	166,571	2.21E-03	1.10E-02	1.10E-01	0.4	0.4
Di-n-octyl phthalate	289,842	289,842	2.21E-03	2.20E-01	1.70E-01	24.0	24.0
n-Docosane	177,778	177,778	2.21E-03	8.20E-05	1.20E-01	0.0	0.0
n-Dodecane	1,953,996	1,953,996	2.21E-03	4.30E-03	4.95E-02	0.9	0.9
n-Eicosane	496,207	496,207	2.21E-03	4.30E-03	7.60E-02	0.4	0.4
n-Hexacosane	245,016	245,016	2.21E-03	8.20E-05	2.89E-01	0.0	0.0
n-Hexadecane	1,225,579	1,225,579	2.21E-03	4.30E-03	2.89E-01	3.4	3.4
2-Isopropylnaphthalene	312,255	312,255	2.21E-03	9.80E-02	7.20E-01	48.7	48.7
2-Methylnaphthalene	116,143	116,143	2.21E-03	1.80E-02	7.20E-01	3.3	3.3
Naphthalene	518,448	518,448	2.21E-03	1.50E-02	5.31E-02	0.9	0.9
n-Octadecane	665,257	665,257	2.21E-03	4.30E-03	2.89E-01	1.8	1.8
Styrene	4,968,651	6,658,645	2.21E-03	1.40E-02	6.35E-02	9.8	13.1
n-Tetacosane	306,652	306,652	2.21E-03	8.20E-05	2.89E-01	0.0	0.0
n-Tetradecane	833,354	833,354	2.21E-03	4.30E-03	2.89E-01	2.3	2.3
n-Triacontane	368,287	368,287	2.21E-03	8.20E-05	2.89E-01	0.0	0.0
Azinphos ethyl	3,691	3,691	2.21E-03	5.10E+03	1.00E+00	41,602.7	41,602.7
Azinphos methyl	2,634	2,634	2.21E-03	2.80E+01	2.60E-01	42.4	42.4
Coumaphos	6,850	6,850	2.21E-03	5.60E+03	1.00E+00	84,778.6	84,778.6
Dichlofenthion	3,098	3,098	2.21E-03	1.40E+01	1.00E+00	95.8	95.8
Disulfoton	3,073	42,982	2.21E-03	1.20E+02	1.00E+00	815.0	11,398.9
EPN	6,419	6,419	2.21E-03	7.60E+02	1.00E+00	10,781.2	10,781.2
Leptophos	8,660	8,660	2.21E-03	1.10E+01	1.00E+00	210.5	210.5
Merphos	408	3,450	2.21E-03	2.50E+01	1.00E+00	22.5	190.6
Tetrachlorvinphos	2,337	2,337	2.21E-03	1.40E-01	1.00E+00	0.7	0.7
Beta-BHC	657	657	2.21E-03	1.20E+01	5.70E-01	9.9	9.9
Gamma-BHC	43	563	2.21E-03	7.00E+01	4.80E-01	3.2	41.8

TABLE A-3 (continued)

POLLUTANT REMOVALS
TRUCK CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors			Pound Equivalents Removed	
	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2
Gamma-Chlordane	312	312	2.21E-03	2.30E+03	5.00E-01	792.4	792.4
Chlorobenzilate	6,502	6,692	2.21E-03	1.60E-01	1.00E+00	2.3	2.4
4,4'-DDT	545	545	2.21E-03	6.50E+03	4.00E-01	3,131.9	3,131.9
Diallate	22,734	39,515	2.21E-03	8.40E-03	1.00E+00	0.4	0.7
Dieldrin	240	240	2.21E-03	5.70E+04	1.40E-01	4,240.4	4,240.4
Endosulfan II	5,451	5,451	2.21E-03	1.00E+02	5.00E-01	602.3	602.3
Endosulfan Sulfate	545	545	2.21E-03	1.00E+02	4.20E-01	50.6	50.6
Nitrofen	1,146	1,146	2.21E-03	4.80E-02	1.00E+00	0.1	0.1
Pentachloronitrobenzene	13,412	13,412	2.21E-03	2.70E-01	1.00E+00	8.0	8.0
Simazine	50,330	50,330	2.21E-03	5.60E-01	1.00E+00	62.3	62.3
Terbutylazine	27,814	27,814	2.21E-03	1.20E-02	1.00E+00	0.7	0.7
2,4-D	771	771	2.21E-03	3.10E-03	5.10E-01	0.0	0.0
Dalapon	163	1,912	2.21E-03	5.10E-03	1.00E+00	0.0	0.0
2,4-DB (Butoxon)	2,045	15,679	2.21E-03	3.60E-02	1.00E+00	0.2	1.2
Dinoseb	464	464	2.21E-03	1.90E+00	1.00E+00	1.9	1.9
MCPP	602,972	893,365	2.21E-03	1.60E-02	1.00E+00	21.3	31.6
MCPP	32,352	302,355	2.21E-03	6.90E-03	1.00E+00	0.5	4.6
Picloram	1,717	1,717	2.21E-03	2.10E+00	1.00E+00	8.0	8.0
2,4,5-T	505	505	2.21E-03	2.80E-01	4.40E-01	0.1	0.1
2,4,5-TP	618	618	2.21E-03	1.80E-01	5.60E-01	0.1	0.1
Aluminum	9,701,403	12,037,074	2.21E-03	6.40E-02	1.20E-01	164.7	204.3
Boron	600,194	10,322,761	2.21E-03	1.80E-01	7.70E-01	183.8	3,161.9
Chromium	3,348,407	3,348,407	2.21E-03	2.70E-02	3.30E-01	65.9	65.9
Copper	358,712	358,712	2.21E-03	4.70E-01	1.60E-01	59.6	59.6
Manganese	310,770	310,770	2.21E-03	1.40E-02	5.90E-01	5.7	5.7
Mercury	2,518	2,577	2.21E-03	5.00E+02	4.00E-01	1,113.2	1,139.1
Tin	2,219,944	27,404,992	2.21E-03	3.00E-01	3.50E-01	515.1	6,359.3
Titanium	312,691	312,691	2.21E-03	2.90E-02	3.12E-01	6.3	6.3
Zinc	1,001,177	1,001,177	2.21E-03	5.10E-02	2.20E-01	24.9	24.9
Fluoride	3,785,250	68,308,331	2.21E-03	3.50E-02	3.90E-01	114.2	2,060.6
Total Cyanide	3,482	42,227	2.21E-03	1.10E+00	2.96E-01	2.5	30.3
Total	74,085,872	324,508,954				149,794.8	171,485.9

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-4
POLLUTANT REMOVALS
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)			Conversion Factors		Pound Equivalents Removed		
	Option 1	Option 2	Option 3	Grams/ Pounds	Toxic Weighting Factor	Option 1	Option 2	Option 3
Acetone	ND	ND	ND	2.21E-03	7.60E-06	ND	ND	ND
Ethylbenzene	ND	ND	ND	2.21E-03	1.40E-03	ND	ND	ND
Methyl ethyl ketone	ND	ND	ND	2.21E-03	2.20E-05	ND	ND	ND
m-Xylene	ND	ND	ND	2.21E-03	1.50E-03	ND	ND	ND
o,p-Xylene	ND	ND	ND	2.21E-03	8.50E-03	ND	ND	ND
Anthracene	ND	ND	ND	2.21E-03	2.50E+00	ND	ND	ND
Benzoic acid	ND	ND	ND	2.21E-03	3.30E-04	ND	ND	ND
Biphenyl	ND	ND	ND	2.21E-03	3.70E-02	ND	ND	ND
Carbazole	ND	ND	ND	2.21E-03	2.70E+01	ND	ND	ND
p-Cresol	ND	ND	ND	2.21E-03	2.40E-03	ND	ND	ND
2,4-Diaminotoluene	ND	ND	ND	2.21E-03	1.80E-01	ND	ND	ND
n-Docosane	ND	ND	ND	2.21E-03	8.20E-05	ND	ND	ND
n-Dodecane	ND	ND	ND	2.21E-03	4.30E-03	ND	ND	ND
n-Eicosane	ND	ND	ND	2.21E-03	4.30E-03	ND	ND	ND
Fluoranthene	ND	ND	ND	2.21E-03	9.20E-01	ND	ND	ND
n-Hexacosane	ND	ND	ND	2.21E-03	8.20E-05	ND	ND	ND
n-Hexadecane	ND	ND	ND	2.21E-03	4.30E-03	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	2.21E-03	1.80E-02	ND	ND	ND
1-Methylphenanthrene	ND	ND	ND	2.21E-03	1.40E-01	ND	ND	ND
Naphthalene	ND	ND	ND	2.21E-03	1.50E-02	ND	ND	ND
n-Octacosane	ND	ND	ND	2.21E-03	8.20E-05	ND	ND	ND
n-Octadecane	ND	ND	ND	2.21E-03	4.30E-03	ND	ND	ND
Phenanthrene	ND	ND	ND	2.21E-03	1.90E+01	ND	ND	ND
Phenol	ND	ND	ND	2.21E-03	2.80E-02	ND	ND	ND
Pyrene	ND	ND	ND	2.21E-03	7.50E-02	ND	ND	ND
Styrene	ND	ND	ND	2.21E-03	1.40E-02	ND	ND	ND
n-Tetracosane	ND	ND	ND	2.21E-03	8.20E-05	ND	ND	ND
n-Tetradecane	ND	ND	ND	2.21E-03	4.30E-03	ND	ND	ND
n-Triaccontane	ND	ND	ND	2.21E-03	8.20E-05	ND	ND	ND
Dioxathione	ND	ND	ND	2.21E-03	6.22E+01	ND	ND	ND
Tetrachlorvinphos	ND	ND	ND	2.21E-03	1.40E-01	ND	ND	ND
Tokuthion	ND	ND	ND	2.21E-03	9.30E-03	ND	ND	ND
Trichlorfon	ND	ND	ND	2.21E-03	7.00E+02	ND	ND	ND
Trichloroate	ND	ND	ND	2.21E-03	5.60E+03	ND	ND	ND
Trimethylphosphate	ND	ND	ND	2.21E-03	1.90E-03	ND	ND	ND
Acophate	ND	ND	ND	2.21E-03	1.30E-02	ND	ND	ND
Alachlor	ND	ND	ND	2.21E-03	1.60E-02	ND	ND	ND
Atrazine	ND	ND	ND	2.21E-03	9.40E-02	ND	ND	ND
Benefluralin	ND	ND	ND	2.21E-03	1.60E-01	ND	ND	ND
Alpha-BHC	ND	ND	ND	2.21E-03	4.30E+01	ND	ND	ND
Beta-BHC	ND	ND	ND	2.21E-03	1.20E+01	ND	ND	ND
Delta-BHC	ND	ND	ND	2.21E-03	8.60E-02	ND	ND	ND
Gamma-BHC	ND	ND	ND	2.21E-03	7.00E+01	ND	ND	ND
Bromacil	ND	ND	ND	2.21E-03	5.60E-03	ND	ND	ND
Bromoxynil octanoate	ND	ND	ND	2.21E-03	1.10E+00	ND	ND	ND
Butachlor	ND	ND	ND	2.21E-03	7.40E-03	ND	ND	ND
Captafol	ND	ND	ND	2.21E-03	2.70E+00	ND	ND	ND
Captan	ND	ND	ND	2.21E-03	1.60E+00	ND	ND	ND
Carbofenthion	ND	ND	ND	2.21E-03	6.60E-01	ND	ND	ND
Alpha-Chlordane	ND	ND	ND	2.21E-03	2.30E+03	ND	ND	ND
Gamma-Chlordane	ND	ND	ND	2.21E-03	2.30E+03	ND	ND	ND
Chlorobenzilate	ND	ND	ND	2.21E-03	1.60E-01	ND	ND	ND
Chlorothob	ND	ND	ND	2.21E-03	4.70E-03	ND	ND	ND
Dacthal (DCPA)	ND	ND	ND	2.21E-03	9.50E-03	ND	ND	ND
4,4'-DDD	ND	ND	ND	2.21E-03	7.60E+02	ND	ND	ND

TABLE A-4 (continued)
POLLUTANT REMOVALS
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)			Conversion Factors		Pound Equivalents Removed		
	Option 1	Option 2	Option 3	Grams/ Pounds	Toxic Weighting Factor	Option 1	Option 2	Option 3
4,4'-DDE	ND	ND	ND	2.21E-03	9.50E+02	ND	ND	ND
4,4'-DDT	ND	ND	ND	2.21E-03	6.50E+03	ND	ND	ND
Diallate	ND	ND	ND	2.21E-03	8.40E-03	ND	ND	ND
Dichlone	ND	ND	ND	2.21E-03	4.00E+01	ND	ND	ND
Dicofol	ND	ND	ND	2.21E-03	5.70E+02	ND	ND	ND
Dieldrin	ND	ND	ND	2.21E-03	5.70E+04	ND	ND	ND
Endosulfan I	ND	ND	ND	2.21E-03	1.00E+02	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	2.21E-03	1.00E+02	ND	ND	ND
Endrin	ND	ND	ND	2.21E-03	9.80E+01	ND	ND	ND
Endrin aldehyde	ND	ND	ND	2.21E-03	9.80E+01	ND	ND	ND
Endrin ketone	ND	ND	ND	2.21E-03	9.80E+01	ND	ND	ND
Ethalfluralin	ND	ND	ND	2.21E-03	7.50E+00	ND	ND	ND
Etriazole	ND	ND	ND	2.21E-03	4.60E-03	ND	ND	ND
Fenarimol	ND	ND	ND	2.21E-03	6.20E-02	ND	ND	ND
Heptachlor epoxide	ND	ND	ND	2.21E-03	6.80E+03	ND	ND	ND
Isodrin	ND	ND	ND	2.21E-03	1.40E+01	ND	ND	ND
Isopropalin	ND	ND	ND	2.21E-03	5.80E-01	ND	ND	ND
Methoxychlor	ND	ND	ND	2.21E-03	1.90E+02	ND	ND	ND
Metribuzin	ND	ND	ND	2.21E-03	1.30E-03	ND	ND	ND
Mirex	ND	ND	ND	2.21E-03	5.60E+03	ND	ND	ND
Nitrofen	ND	ND	ND	2.21E-03	4.80E-02	ND	ND	ND
Pendamethalin	ND	ND	ND	2.21E-03	1.50E-01	ND	ND	ND
Pentachloronitrobenzene	ND	ND	ND	2.21E-03	2.70E-01	ND	ND	ND
CIS-Permethrin	ND	ND	ND	2.21E-03	3.40E+00	ND	ND	ND
Perthane	ND	ND	ND	2.21E-03	1.40E+01	ND	ND	ND
Propachlor	ND	ND	ND	2.21E-03	3.30E-01	ND	ND	ND
Propazine	ND	ND	ND	2.21E-03	4.70E-03	ND	ND	ND
Simazine	ND	ND	ND	2.21E-03	5.60E-01	ND	ND	ND
Stropane	ND	ND	ND	2.21E-03	1.10E+02	ND	ND	ND
Terbacil	ND	ND	ND	2.21E-03	8.00E-01	ND	ND	ND
Terbutylazine	ND	ND	ND	2.21E-03	1.20E-02	ND	ND	ND
Triadimefon	ND	ND	ND	2.21E-03	5.80E-03	ND	ND	ND
Trifluralin	ND	ND	ND	2.21E-03	4.20E+00	ND	ND	ND
2,4-D	ND	ND	ND	2.21E-03	3.10E-03	ND	ND	ND
Dalapon	ND	ND	ND	2.21E-03	5.10E-03	ND	ND	ND
2,4-DB (Butoxon)	ND	ND	ND	2.21E-03	3.60E-02	ND	ND	ND
Dicamba	ND	ND	ND	2.21E-03	1.50E-02	ND	ND	ND
Dichloroprop	ND	ND	ND	2.21E-03	9.30E-02	ND	ND	ND
Dinoserb	ND	ND	ND	2.21E-03	1.90E+00	ND	ND	ND
MCPA	ND	ND	ND	2.21E-03	1.60E-02	ND	ND	ND
MCPP	ND	ND	ND	2.21E-03	6.90E-03	ND	ND	ND
Picloram	ND	ND	ND	2.21E-03	2.10E+00	ND	ND	ND
2,4,5-T	ND	ND	ND	2.21E-03	2.80E-01	ND	ND	ND
2,4,5-TP	ND	ND	ND	2.21E-03	1.80E-01	ND	ND	ND
Aluminum	ND	ND	ND	2.21E-03	6.40E-02	ND	ND	ND
Barium	ND	ND	ND	2.21E-03	2.00E-03	ND	ND	ND
Chromium	ND	ND	ND	2.21E-03	2.70E-02	ND	ND	ND
Copper	ND	ND	ND	2.21E-03	4.70E-01	ND	ND	ND
Titanium	ND	ND	ND	2.21E-03	2.90E-02	ND	ND	ND
Zinc	ND	ND	ND	2.21E-03	5.10E-02	ND	ND	ND
Fluoride	ND	ND	ND	2.21E-03	3.50E-02	ND	ND	ND
Total	ND	ND	ND			ND	ND	ND

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-5
POLLUTANT REMOVALS
RAIL CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)			Conversion Factors			Pound Equivalents Removed		
	Option 1	Option 2	Option 3	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2	Option 3
Ethylbenzene	227	227	29,971	2.21E-03	1.40E-03	6.21E-02	0.0	0.0	0.0
Methyl ethyl ketone	847	847	97,956	2.21E-03	2.20E-05	8.17E-02	0.0	0.0	0.0
m-Xylene	512	512	68,604	2.21E-03	1.50E-03	3.46E-01	0.0	0.0	0.1
o,p-Xylene	336	336	44,656	2.21E-03	8.50E-03	4.93E-02	0.0	0.0	0.0
Anthracene	25,156	25,156	25,156	2.21E-03	2.50E+00	4.00E-02	5.6	5.6	5.6
Benzoic acid	6,351	6,351	860,040	2.21E-03	3.30E-04	1.95E-01	0.0	0.0	0.1
Carbazole	19,193	19,193	19,193	2.21E-03	2.70E-01	1.00E+00	11.5	11.5	11.5
p-Cresol	107	107	13,189	2.21E-03	2.40E-03	2.83E-01	0.0	0.0	0.0
2,4-Diaminotoluene	3,935	3,935	547,875	2.21E-03	1.80E-01	1.00E+00	1.6	1.6	217.9
n-Docosane	75,837	75,837	75,837	2.21E-03	8.20E-05	1.20E-01	0.0	0.0	0.0
n-Dodecane	94,129	99,963	99,963	2.21E-03	4.30E-03	4.95E-02	0.0	0.0	0.0
n-Eicosane	313,631	317,494	317,494	2.21E-03	4.30E-03	7.60E-02	0.2	0.2	0.2
Fluoranthene	29,607	29,607	29,607	2.21E-03	9.20E-01	5.80E-01	34.9	34.9	34.9
n-Hexacosane	39,782	39,782	39,782	2.21E-03	8.20E-05	2.89E-01	0.0	0.0	0.0
n-Hexadecane	637,418	637,418	637,418	2.21E-03	4.30E-03	2.89E-01	1.7	1.7	1.7
1-Methylphenanthrene	25,016	25,016	25,016	2.21E-03	1.40E-01	5.00E-02	0.4	0.4	0.4
Naphthalene	4,124	14,342	14,342	2.21E-03	1.50E-02	5.31E-02	0.0	0.0	0.0
n-Octacosane	22,610	22,610	22,610	2.21E-03	8.20E-05	2.89E-01	0.0	0.0	0.0
n-Octadecane	374,351	377,403	377,403	2.21E-03	4.30E-03	2.89E-01	1.0	1.0	1.0
Phenanthrene	63,656	63,656	63,656	2.21E-03	1.90E+01	5.11E-02	136.6	136.6	136.6
Phenol	1,101	1,101	154,730	2.21E-03	2.80E-02	4.75E-02	0.0	0.0	0.5
Pyrene	22,698	22,698	22,698	2.21E-03	7.50E-02	5.00E-02	0.2	0.2	0.2
Styrene	47,209	47,209	47,209	2.21E-03	1.40E-02	6.35E-02	0.1	0.1	0.1
n-Tetracosane	64,766	64,766	64,766	2.21E-03	8.20E-05	2.89E-01	0.0	0.0	0.0
n-Tetradecane	429,663	432,950	432,950	2.21E-03	4.30E-03	2.89E-01	1.2	1.2	1.2
n-Triacontane	23,826	23,826	23,826	2.21E-03	8.20E-05	2.89E-01	0.0	0.0	0.0
Dioxathion	970	970	970	2.21E-03	6.22E+01	1.00E+00	133.3	133.3	133.3
Tetrachlorvinphos	215	215	215	2.21E-03	1.40E-01	1.00E+00	0.1	0.1	0.1
Tokuthion	438	438	438	2.21E-03	9.30E-03	1.00E+00	0.0	0.0	0.0
Trichlorfon	1,053	1,053	1,053	2.21E-03	7.00E+02	1.00E+00	1,629.1	1,629.1	1,629.1
Trichloronate	161	161	161	2.21E-03	5.60E+03	1.00E+00	1,989.6	1,989.6	1,989.6
Trimethylphosphate	521	521	521	2.21E-03	1.90E-03	1.00E+00	0.0	0.0	0.0
Acophate	14,330	17,760	201,222	2.21E-03	1.30E-02	1.00E+00	0.4	0.5	5.8
Alachlor	35	35	35	2.21E-03	1.60E-02	1.00E+00	0.0	0.0	0.0
Atrazine	206	4,787	15,978	2.21E-03	9.40E-02	5.80E-01	0.0	0.6	1.9
Benefluralin	143	292	411	2.21E-03	1.60E-01	1.00E+00	0.1	0.1	0.1
Alpha-BHC	7	25	26	2.21E-03	4.30E+01	3.60E-01	0.2	0.9	0.9
Beta-BHC	7,982	7,990	7,991	2.21E-03	1.20E+01	5.70E-01	120.7	120.8	120.8
Delta-BHC	91	95	95	2.21E-03	2.80E-01	1.00E+00	0.1	0.1	0.1
Gamma-BHC	27	31	83	2.21E-03	7.00E+01	4.80E-01	2.0	2.3	6.1
Bromacil	58	144	144	2.21E-03	5.60E-03	1.00E+00	0.0	0.0	0.0
Bromoxynil octanoate	30	84	84	2.21E-03	1.10E+00	1.00E+00	0.1	0.2	0.2
Butachlor	51	53	53	2.21E-03	7.40E-03	1.00E+00	0.0	0.0	0.0
Captafol	205	205	205	2.21E-03	2.70E+00	1.00E+00	1.2	1.2	1.2
Captan	58	143	171	2.21E-03	1.60E+00	1.00E+00	0.2	0.5	0.6
Carbophenothon	117	117	117	2.21E-03	6.60E-01	1.00E+00	0.2	0.2	0.2
Alpha-Chlordane	10	10	10	2.21E-03	2.30E+03	5.00E-01	25.2	25.2	25.2
Gamma-Chlordane	5	15	15	2.21E-03	2.30E+03	5.00E-01	11.8	36.9	36.9
Chlorobenzilate	64	182	182	2.21E-03	1.60E-01	1.00E+00	0.0	0.1	0.1
Chloroneb	48	1,093	6,796	2.21E-03	4.70E-03	1.00E+00	0.0	0.0	0.1
Dacthal (DCPA)	78	83	83	2.21E-03	9.50E-03	1.00E+00	0.0	0.0	0.0
4,4'-DDD	35	35	35	2.21E-03	7.60E+02	1.00E+00	58.1	58.1	58.1
4,4'-DDE	0	0	30	2.21E-03	9.50E+02	1.00E+00	0.7	0.7	63.9
4,4'-DDT	28	38	38	2.21E-03	6.50E+03	4.00E-01	163.4	216.0	216.0
Diallate	53,876	59,594	59,594	2.21E-03	8.40E-03	1.00E+00	1.0	1.1	1.1

TABLE A-5 (continued)
POLLUTANT REMOVALS
RAIL CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)			Conversion Factors			Pound Equivalents Removed		
	Option 1	Option 2	Option 3	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2	Option 3
Dichlone	2	56	56	2.21E-03	4.00E+01	1.00E+00	0.2	5.0	5.0
Dicofol	77	207	207	2.21E-03	5.70E+02	1.00E+00	97.3	260.6	260.6
Dieldrin	323	355	368	2.21E-03	5.70E+04	1.40E-01	5,696.9	6,255.2	6,487.7
Endosulfan I	6	14	18	2.21E-03	1.00E+02	5.00E-01	0.6	1.5	2.0
Endosulfan Sulfate	34	42	42	2.21E-03	1.00E+02	4.20E-01	3.2	3.9	3.9
Endrin	12	30	38	2.21E-03	9.80E+01	5.00E-01	1.3	3.2	4.1
Endrin aldehyde	74	80	109	2.21E-03	9.80E+01	1.00E+00	16.0	17.3	23.6
Endrin ketone	7	18	18	2.21E-03	9.80E-01	1.00E+00	0.0	0.0	0.0
Ethalfluralin	169	455	1,312	2.21E-03	7.50E+00	1.00E+00	2.8	7.5	21.8
Etridiazole	0	0	31	2.21E-03	4.60E-03	1.00E+00	0.0	0.0	0.0
Fenarimol	18	56	56	2.21E-03	6.20E-02	1.00E+00	0.0	0.0	0.0
Heptachlor epoxide	7	22	22	2.21E-03	6.80E+03	1.00E+00	111.7	335.3	335.3
Isodrin	28	28	28	2.21E-03	1.40E+01	1.00E+00	0.9	0.9	0.9
Isopropalin	29	80	108	2.21E-03	5.80E-01	1.00E+00	0.0	0.1	0.1
Methoxychlor	1	1	63	2.21E-03	1.90E+02	4.20E-01	0.1	0.1	11.2
Metribuzin	22	22	22	2.21E-03	1.30E-03	1.00E+00	0.0	0.0	0.0
Mirex	2	36	36	2.21E-03	5.60E+03	1.00E+00	20.3	443.9	443.9
Nitrofen	143	170	176	2.21E-03	4.80E-02	1.00E+00	0.0	0.0	0.0
Pendamethalin	36	104	107	2.21E-03	1.50E-01	1.00E+00	0.0	0.0	0.0
Pentachloronitrobenzene	18	71	81	2.21E-03	2.70E-01	1.00E+00	0.0	0.0	0.0
CIS-Permethrin	221	718	718	2.21E-03	3.40E+00	1.00E+00	1.7	5.4	5.4
Perthane	10,539	10,539	10,607	2.21E-03	1.40E+01	1.00E+00	326.1	326.1	328.2
Propachlor	3,672	3,672	3,672	2.21E-03	3.30E-01	1.00E+00	2.7	2.7	2.7
Propazine	3,123	3,123	3,123	2.21E-03	4.70E-03	1.00E+00	0.0	0.0	0.0
Simazine	5,527,713	5,731,258	6,675,665	2.21E-03	5.60E-01	1.00E+00	6,841.1	7,093.0	8,261.8
Strobane	13,571	13,571	13,571	2.21E-03	1.10E+02	1.00E+00	3,299.0	3,299.0	3,299.0
Terbacil	5,665	5,665	5,665	2.21E-03	8.00E-01	1.00E+00	10.0	10.0	10.0
Terbuthylazine	5,030	119,083	727,211	2.21E-03	1.20E-02	1.00E+00	0.1	3.2	19.3
Triadimefon	89	101	101	2.21E-03	5.80E-03	1.00E+00	0.0	0.0	0.0
Trifluralin	81	207	253	2.21E-03	4.20E+00	2.90E-01	0.2	0.6	0.7
2,4-D	10,203	11,686	11,686	2.21E-03	3.10E-03	5.10E-01	0.0	0.0	0.0
Dalapon	3,082	3,082	3,082	2.21E-03	5.10E-03	1.00E+00	0.0	0.0	0.0
2,4-DB (Butoxon)	4,320	17,029	21,095	2.21E-03	3.60E-02	1.00E+00	0.3	1.4	1.7
Dicamba	4,533	66,905	67,021	2.21E-03	1.50E-02	1.00E+00	0.2	2.2	2.2
Dichloroprop	10,518	11,499	13,678	2.21E-03	9.30E-02	1.00E+00	2.2	2.4	2.8
Dinoseb	3,885	4,630	4,630	2.21E-03	1.90E+00	1.00E+00	16.3	19.4	19.4
MCPP	58,670	343,090	368,398	2.21E-03	1.60E-02	1.00E+00	2.1	12.1	13.0
Picloram	645,846	4,634,697	5,186,698	2.21E-03	6.90E-03	1.00E+00	9.8	70.7	79.1
2,4,5-T	44	44	6,233	2.21E-03	2.10E+00	1.00E+00	0.2	0.2	28.9
2,4,5-TP	1,602	1,884	2,027	2.21E-03	2.80E-01	4.40E-01	0.4	0.5	0.6
Aluminum	1,659,717	1,659,717	3,789,760	2.21E-03	1.80E-01	5.60E-01	0.0	0.4	0.4
Barium	23,466	121,891	121,891	2.21E-03	2.00E-03	6.40E-01	0.1	0.3	0.3
Chromium	5,044	22,303	22,303	2.21E-03	2.70E-02	3.30E-01	0.1	0.4	0.4
Copper	2,469	17,684	17,684	2.21E-03	4.70E-01	1.59E-01	0.4	2.9	2.9
Titanium	1,726	17,095	17,095	2.21E-03	2.90E-02	3.12E-01	0.0	0.3	0.3
Zinc	7,616	76,451	76,451	2.21E-03	5.10E-02	2.20E-01	0.2	1.9	1.9
Fluoride	6,154	6,154	687,802	2.21E-03	3.50E-02	3.90E-01	0.2	0.2	20.7
Total	10,426,724	15,355,713	22,315,298				20,825.6	22,630.8	24,470.0

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-6
POLLUTANT REMOVALS
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors		Pound Equivalents Removed	
	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factors	Option 1	Option 2
Acetone	2,434,613	3,432,577	2.21E-03	7.6E-06	0.0	0.1
Acrylonitrile	2,265,455	2,265,455	2.21E-03	8.5E-01	4,255.7	4,255.7
Benzene	255,727	299,036	2.21E-03	1.8E-02	10.2	11.9
Chloroform	4,958	4,958	2.21E-03	2.1E-03	0.0	0.0
Ethylbenzene	174,257	238,038	2.21E-03	1.4E-03	0.5	0.7
Methyl ethyl ketone	2,625,822	2,689,349	2.21E-03	2.2E-05	0.1	0.1
Methyl isobutyl ketone	1,034,816	1,034,816	2.21E-03	1.2E-04	0.3	0.3
Methylene chloride	2,042	2,042	2.21E-03	4.2E-04	0.0	0.0
Toluene	375,373	447,222	2.21E-03	5.6E-03	4.6	5.5
m-Xylene	136,744	220,292	2.21E-03	1.5E-03	0.5	0.7
o,p-Xylene	115,739	230,304	2.21E-03	8.5E-03	2.2	4.3
Acenaphthene	61,498	61,498	2.21E-03	2.5E-01	34.0	34.0
Acenaphthylene	50,807	50,807	2.21E-03	8.4E-03	0.9	0.9
Anthracene	41,233	41,233	2.21E-03	2.5E+00	227.8	227.8
2,3-Benzofluorene	17,813	17,813	2.21E-03	2.2E-01	8.7	8.7
Benzoic acid	37,339	37,339	2.21E-03	3.3E-04	0.0	0.0
Biphenyl	230,862	230,862	2.21E-03	3.7E-02	18.9	18.9
bis (2-Ethylhexyl) phthalate	84,472	84,472	2.21E-03	1.1E-01	20.5	20.5
p-Cymene	57,377	57,377	2.21E-03	4.3E-02	5.5	5.5
n-Decane	5,804,201	5,809,280	2.21E-03	4.3E-03	55.2	55.2
3,6-Dimethylphenanthrene	38,443	38,443	2.21E-03	4.7E-01	39.9	39.9
Di-n-octyl phthalate	55,164	55,164	2.21E-03	2.2E-01	26.8	26.8
n-Docosane	291,322	291,322	2.21E-03	8.2E-05	0.1	0.1
n-Dodecane	3,111,416	3,129,225	2.21E-03	4.3E-03	29.6	29.7
n-Eicosane	898,961	898,961	2.21E-03	4.3E-03	8.5	8.5
Fluorene	94,496	94,496	2.21E-03	7.0E-01	146.2	146.2
n-Hexacosane	33,127	33,127	2.21E-03	8.2E-05	0.0	0.0
n-Hexadecane	3,405,439	3,410,129	2.21E-03	4.3E-03	32.4	32.4
1-Methylfluorene	82,616	82,616	2.21E-03	8.9E-02	16.2	16.2
2-Methylnaphthalene	616,462	632,606	2.21E-03	1.8E-02	24.5	25.2
1-Methylnaphthalene	189,808	189,808	2.21E-03	1.4E-01	58.7	58.7
Naphthalene	6,327,446	6,352,165	2.21E-03	1.5E-02	209.8	210.6
n-Octacosane	14,583	14,583	2.21E-03	8.2E-05	0.0	0.0
n-Octadecane	1,741,022	1,741,022	2.21E-03	4.3E-03	16.5	16.5
Pentamethylbenzene	276,205	276,205	2.21E-03	2.9E-01	177.0	177.0
Phenanthrene	144,952	144,952	2.21E-03	1.9E+01	6,086.5	6,086.5
Phenol	15,630	15,630	2.21E-03	2.8E-02	1.0	1.0
Pyrene	78,242	78,242	2.21E-03	7.5E-02	13.0	13.0
Styrene	15,392,801	15,450,225	2.21E-03	1.4E-02	476.3	478.0
n-Tetracosane	176,309	176,309	2.21E-03	8.2E-05	0.0	0.0
n-Tetradecane	5,988,921	5,995,600	2.21E-03	4.3E-03	56.9	57.0
Dalapon	680	680	2.21E-03	5.1E-03	0.0	0.0
Aluminum	1,739,789	2,068,475	2.21E-03	6.4E-02	246.1	292.6
Beryllium	91	91	2.21E-03	5.3E+00	1.1	1.1
Cadmium	5,352	5,352	2.21E-03	5.2E+00	61.5	61.5
Chromium	27,025	27,025	2.21E-03	2.7E-02	1.6	1.6
Copper	141,243	141,243	2.21E-03	4.7E-01	146.7	146.7
Hexavalent Chromium	6,228	6,228	2.21E-03	5.1E-01	7.0	7.0
Iron	40,055,479	41,182,205	2.21E-03	5.6E-03	495.7	509.7
Lead	47,952	47,952	2.21E-03	1.8E+00	190.8	190.8
Manganese	201,760	331,409	2.21E-03	1.4E-02	6.2	10.3
Mercury	383	383	2.21E-03	5.0E+02	423.7	423.7

TABLE A-6 (continued)

POLLUTANT REMOVALS
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors		Pound Equivalents Removed	
	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factors	Option 1	Option 2
Molybdenum	120	59,013	2.21E-03	2.0E-01	0.1	26.1
Nickel	116,673	172,872	2.21E-03	3.6E-02	9.3	13.8
Tantalum	23,762	23,762	2.21E-03	6.0E-02	3.2	3.2
Titanium	3,124	3,124	2.21E-03	2.9E-02	0.2	0.2
Zinc	1,749,307	2,306,634	2.21E-03	5.1E-02	197.2	260.0
Zirconium	211	211	2.21E-03	5.4E-01	0.3	0.3
Fluoride	947	947	2.21E-03	3.5E-02	0.1	0.1
Total	98,904,640	102,733,203			13,856.1	14,022.7

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-7

**POLLUTANT REMOVALS
BARGE CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS**

Chemical	Pollutants Removed (grams)			Conversion Factors		Pound Equivalents Removed			
	Option 1	Option 2	Option 3	Grams/ Pounds	Toxic Weighting Factors	POTW Removal Factor	Option 1	Option 2	Option 3
Acetone	ND	ND	ND	2.21E-03	7.60E-06	1.63E-01	ND	ND	ND
Acrylonitrile	ND	ND	ND	2.21E-03	8.50E-01	5.00E-02	ND	ND	ND
Benzene	ND	ND	ND	2.21E-03	1.80E-02	5.24E-02	ND	ND	ND
Chloroform	ND	ND	ND	2.21E-03	2.10E-03	2.66E-01	ND	ND	ND
Ethylbenzene	ND	ND	ND	2.21E-03	1.40E-03	6.21E-02	ND	ND	ND
Methyl ethyl ketone	ND	ND	ND	2.21E-03	2.20E-05	8.17E-02	ND	ND	ND
Methyl isobutyl ketone	ND	ND	ND	2.21E-03	1.20E-04	1.21E-01	ND	ND	ND
Methylene chloride	ND	ND	ND	2.21E-03	4.20E-04	4.57E-01	ND	ND	ND
Toluene	ND	ND	ND	2.21E-03	5.60E-03	3.82E-02	ND	ND	ND
m-Xylene	ND	ND	ND	2.21E-03	1.50E-03	3.46E-01	ND	ND	ND
o,p-Xylene	ND	ND	ND	2.21E-03	8.50E-03	4.93E-02	ND	ND	ND
Acamphene	ND	ND	ND	2.21E-03	2.50E-01	2.00E-02	ND	ND	ND
Acamaphylene	ND	ND	ND	2.21E-03	8.40E-03	5.00E-02	ND	ND	ND
Anthracene	ND	ND	ND	2.21E-03	2.50E+00	4.00E-02	ND	ND	ND
2,3-Benzofluorene	ND	ND	ND	2.21E-03	2.20E-01	3.00E-01	ND	ND	ND
Benzoic acid	ND	ND	ND	2.21E-03	3.30E-04	1.95E-01	ND	ND	ND
Biphenyl	ND	ND	ND	2.21E-03	3.70E-02	4.00E-02	ND	ND	ND
bis (2-Ethylhexyl) phthalate	ND	ND	ND	2.21E-03	1.10E-01	4.02E-01	ND	ND	ND
p-Cymene	ND	ND	ND	2.21E-03	4.30E-02	1.00E-02	ND	ND	ND
n-Decane	ND	ND	ND	2.21E-03	4.30E-03	9.10E-01	ND	ND	ND
3,6-Dimethylphenanthrene	ND	ND	ND	2.21E-03	4.70E-01	5.00E-02	ND	ND	ND
Di-n-octyl phthalate	ND	ND	ND	2.21E-03	2.20E-01	1.70E-01	ND	ND	ND
n-Docosane	ND	ND	ND	2.21E-03	8.20E-05	1.20E-01	ND	ND	ND
n-Dodecane	ND	ND	ND	2.21E-03	4.30E-03	4.95E-02	ND	ND	ND
n-Eicosane	ND	ND	ND	2.21E-03	4.30E-03	7.60E-02	ND	ND	ND
Fluorine	ND	ND	ND	2.21E-03	7.00E-01	3.00E-01	ND	ND	ND
n-Hexacosane	ND	ND	ND	2.21E-03	8.20E-05	2.89E-01	ND	ND	ND
n-Hexadecane	ND	ND	ND	2.21E-03	4.30E-03	2.89E-01	ND	ND	ND
1-Methylfluorene	ND	ND	ND	2.21E-03	8.90E-02	3.00E-01	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND	2.21E-03	1.80E-02	7.20E-01	ND	ND	ND
1-Methylphenanthrene	ND	ND	ND	2.21E-03	1.40E-01	5.00E-02	ND	ND	ND
Naphthalene	ND	ND	ND	2.21E-03	1.50E-02	5.31E-02	ND	ND	ND
n-Octacosane	ND	ND	ND	2.21E-03	8.20E-05	2.90E-01	ND	ND	ND
n-Octadecane	ND	ND	ND	2.21E-03	4.30E-03	2.89E-01	ND	ND	ND
Pentamethylbenzene	ND	ND	ND	2.21E-03	2.90E-01	9.00E-02	ND	ND	ND
Phenanthrene	ND	ND	ND	2.21E-03	1.90E+01	5.00E-02	ND	ND	ND
Phenol	ND	ND	ND	2.21E-03	2.80E-02	5.00E-02	ND	ND	ND
Pyrene	ND	ND	ND	2.21E-03	7.50E-02	5.00E-02	ND	ND	ND
Sterene	ND	ND	ND	2.21E-03	1.40E-02	6.35E-02	ND	ND	ND
n-Tetracosane	ND	ND	ND	2.21E-03	8.20E-05	2.89E-01	ND	ND	ND
n-Tetradecane	ND	ND	ND	2.21E-03	4.30E-03	2.89E-01	ND	ND	ND
Dalapon	ND	ND	ND	2.21E-03	5.10E-03	1.00E+00	ND	ND	ND
Aluminum	ND	ND	ND	2.21E-03	6.40E-02	1.20E-01	ND	ND	ND
Beryllium	ND	ND	ND	2.21E-03	5.30E+00	5.40E-01	ND	ND	ND
Cadmium	ND	ND	ND	2.21E-03	5.20E+00	1.00E-01	ND	ND	ND
Chromium	ND	ND	ND	2.21E-03	2.70E-02	3.30E-01	ND	ND	ND
Copper	ND	ND	ND	2.21E-03	4.70E-01	1.60E-01	ND	ND	ND
Hexavalent Chromium	ND	ND	ND	2.21E-03	5.10E-01	9.40E-01	ND	ND	ND
Iron	ND	ND	ND	2.21E-03	5.60E-03	1.70E-01	ND	ND	ND
Lead	ND	ND	ND	2.21E-03	1.80E+00	8.00E-02	ND	ND	ND
Manganese	ND	ND	ND	2.21E-03	1.40E-02	5.90E-01	ND	ND	ND
Mercury	ND	ND	ND	2.21E-03	5.00E+02	4.00E-01	ND	ND	ND
Molybdenum	ND	ND	ND	2.21E-03	2.00E-01	4.80E-01	ND	ND	ND
Nickel	ND	ND	ND	2.21E-03	3.60E-02	4.90E-01	ND	ND	ND
Tantalum	ND	ND	ND	2.21E-03	6.00E-02	4.50E-01	ND	ND	ND
Titanium	ND	ND	ND	2.21E-03	2.90E-02	3.12E-01	ND	ND	ND
Zinc	ND	ND	ND	2.21E-03	5.10E-02	2.20E-01	ND	ND	ND
Zirconium	ND	ND	ND	2.21E-03	5.40E-01	1.00E+00	ND	ND	ND
Total	ND	ND	ND				ND	ND	ND

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-8
POLLUTANT REMOVALS
TRUCK PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors			Pound Equivalents Removed
		Option 1	Grams/ Pounds	Toxic Weighting Factors	
Acetone	364,973	2.21E-03	7.6E-06	1.6E-01	0.0
Benzene	13,733	2.21E-03	1.8E-02	5.0E-02	0.0
1,2-Dichloroethane	701	2.21E-03	6.2E-03	1.1E-01	0.0
Ethylbenzene	10,254	2.21E-03	1.4E-03	6.0E-02	0.0
Methyl ethyl ketone	32,958	2.21E-03	2.2E-05	8.0E-02	0.0
Methyl isobutyl ketone	3,493	2.21E-03	1.2E-04	1.2E-01	0.0
Methylene chloride	2,226	2.21E-03	4.2E-04	4.6E-01	0.0
Tetrachloroethylene	961	2.21E-03	7.4E-02	1.5E-01	0.0
Toluene	54,707	2.21E-03	5.6E-03	4.0E-02	0.0
1,1,1-Trichloroethane	3,274	2.21E-03	4.3E-03	1.0E-01	0.0
Trichloroethylene	702	2.21E-03	6.3E-02	1.3E-01	0.0
Vinyl Acetate	3,766	2.21E-03	4.0E-03	1.0E+00	0.0
m-Xylene	16,445	2.21E-03	1.5E-03	3.5E-01	0.0
o+p-Xylene	8,016	2.21E-03	8.5E-03	5.0E-02	0.0
Benzoic acid	17,370	2.21E-03	3.3E-04	1.9E-01	0.0
Biphenyl	385	2.21E-03	3.7E-02	4.0E-02	0.0
bis (2-Ethylhexyl) phthalate	103	2.21E-03	1.1E+01	4.0E-01	1.0
4-Chloro-3-Methylphenol	17,578	2.21E-03	4.3E-03	2.9E-01	0.0
n-Decane	46,633	2.21E-03	4.3E-03	9.1E-01	0.4
Diphenyl Ether	11	2.21E-03	2.6E-02	3.0E-01	0.0
n-Docosane	3,185	2.21E-03	8.2E-05	1.2E-01	0.0
n-Dodecane	34,547	2.21E-03	4.3E-03	5.0E-02	0.0
n-Eicosane	16,550	2.21E-03	4.3E-03	8.0E-02	0.0
n-Hexacosane	3,235	2.21E-03	8.2E-05	2.9E-01	0.0
n-Hexadecane	21,426	2.21E-03	4.3E-03	2.9E-01	0.1
Hexanoic Acid	6,022	2.21E-03	3.4E-04	1.6E-01	0.0
2-Isopropynaphthalene	4,151	2.21E-03	9.8E-02	7.2E-01	0.6
2-Methylnaphthalene	3,711	2.21E-03	1.8E-02	7.2E-01	0.1
Naphthalene	3,513	2.21E-03	1.5E-02	5.0E-02	0.0
n-Octacosane	2,259	2.21E-03	8.2E-05	2.9E-01	0.0
n-Octadecane	7,248	2.21E-03	4.3E-03	2.9E-01	0.0
Pentamethylbenzene	3,909	2.21E-03	2.9E-01	9.0E-02	0.2
Phenol	2,705	2.21E-03	2.8E-02	5.0E-02	0.0
n-Tetracosane	3,445	2.21E-03	8.2E-05	2.9E-01	0.0
n-Tetradecane	10,209	2.21E-03	4.3E-03	2.9E-01	0.0
n-Triacontane	87	2.21E-03	8.2E-05	2.9E-01	0.0
Tripropylene glycol Methyl Ether	113,949	2.21E-03	8.2E-06	5.3E-01	0.0
Aluminum	13,642	2.21E-03	6.4E-02	1.2E-01	0.2
Antimony	55	2.21E-03	1.9E-01	4.4E-01	0.0
Arsenic	143	2.21E-03	4.0E+00	1.0E+00	1.3
Barium	2,410	2.21E-03	2.0E-03	6.4E-01	0.0
Beryllium	29	2.21E-03	5.3E+00	5.4E-01	0.2
Boron	38,658	2.21E-03	1.8E-01	7.7E-01	11.8
Cadmium	175	2.21E-03	5.2E+00	1.0E-01	0.2
Calcium	107,780	2.21E-03	2.8E-05	4.5E-01	0.0
Chromium	1,359	2.21E-03	2.7E-02	3.3E-01	0.0

TABLE A-8 (continued)
POLLUTANT REMOVALS
TRUCK PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors			Pound Equivalents Removed Option 1
		Option 1	Grams/Pounds	Toxic Weighting Factors	
Cobalt	546	2.21E-03	1.1E-01	6.3E-01	0.1
Copper	11,839	2.21E-03	4.7E-01	1.6E-01	2.0
Hexavalent Chromium	1,900	2.21E-03	5.1E-01	9.4E-01	2.0
Iron	160,398	2.21E-03	5.6E-03	1.7E-01	0.3
Lead	8,332	2.21E-03	1.8E+00	8.0E-02	2.7
Magnesium	39,177	2.21E-03	8.7E-04	7.4E-01	0.1
Manganese	4,160	2.21E-03	1.4E-02	5.9E-01	0.1
Mercury	2	2.21E-03	5.0E+02	4.0E-01	0.7
Molybdenum	1,429	2.21E-03	2.0E-01	4.8E-01	0.3
Nickel	42,143	2.21E-03	3.6E-02	4.9E-01	1.6
Phosphorus	2,360	2.21E-03	0.0E+00	3.1E-01	0.0
Potassium	4,901	2.21E-03	1.1E-03	8.0E-01	0.0
Selenium	18	2.21E-03	1.1E+00	5.4E-01	0.0
Silver	132	2.21E-03	4.7E-01	2.2E-01	0.0
Sodium	1,864,821	2.21E-03	5.5E-06	4.5E-01	0.0
Sulfur	6,314	2.21E-03	5.6E-06	8.8E-01	0.0
Tantalum	67	2.21E-03	6.0E-02	4.5E-01	0.0
Thallium	6	2.21E-03	1.4E-01	7.3E-01	0.0
Tin	685	2.21E-03	3.0E-01	3.5E-01	0.2
Titanium	324	2.21E-03	2.9E-02	3.1E-01	0.0
Tungsten	181	2.21E-03	5.3E-03	4.5E-01	0.0
Vanadium	193	2.21E-03	6.2E-01	5.7E-01	0.2
Zinc	11,674	2.21E-03	5.1E-02	2.2E-01	0.3
Zirconium	11	2.21E-03	5.4E-01	1.0E+00	0.0
Fluoride	38,859	2.21E-03	3.5E-02	3.9E-01	1.2
Total Cyanide	48	2.21E-03	1.1E+00	3.0E-01	0.0
Total	3,203,208				28.2

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-9
POLLUTANT REMOVALS
RAIL PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors			Pound Equivalents Removed
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
	Option 1				Option 1
Acetone	1,337	2.21E-03	7.6E-06	1.6E-01	0.0
Benzene	50	2.21E-03	1.8E-02	5.0E-02	0.0
1,2-Dichloroethane	3	2.21E-03	6.2E-03	1.1E-01	0.0
Ethylbenzene	38	2.21E-03	1.4E-03	6.0E-02	0.0
Methyl ethyl ketone	121	2.21E-03	2.2E-05	8.0E-02	0.0
Methyl isobutyl ketone	13	2.21E-03	1.2E-04	1.2E-01	0.0
Methylene chloride	8	2.21E-03	4.2E-04	4.6E-01	0.0
Tetrachloroethylene	4	2.21E-03	7.4E-02	1.5E-01	0.0
Toluene	200	2.21E-03	5.6E-03	4.0E-02	0.0
1,1,1-Trichloroethane	12	2.21E-03	4.3E-03	1.0E-01	0.0
Trichloroethylene	3	2.21E-03	6.3E-02	1.3E-01	0.0
Vinyl Acetate	14	2.21E-03	4.0E-03	1.0E+00	0.0
m-Xylene	60	2.21E-03	1.5E-03	3.5E-01	0.0
o+p-Xylene	29	2.21E-03	8.5E-03	5.0E-02	0.0
Benzoic acid	64	2.21E-03	3.3E-04	1.9E-01	0.0
Biphenyl	1	2.21E-03	3.7E-02	4.0E-02	0.0
bis (2-Ethylhexyl) phthalate	0	2.21E-03	1.1E+01	4.0E-01	0.0
4-Chloro-3-Methylphenol	64	2.21E-03	4.3E-03	2.9E-01	0.0
n-Decane	171	2.21E-03	4.3E-03	9.1E-01	0.0
Diphenyl Ether	0	2.21E-03	2.6E-02	3.0E-01	0.0
n-Docosane	12	2.21E-03	8.2E-05	1.2E-01	0.0
n-Dodecane	127	2.21E-03	4.3E-03	5.0E-02	0.0
n-Eicosane	61	2.21E-03	4.3E-03	8.0E-02	0.0
n-Hexacosane	12	2.21E-03	8.2E-05	2.9E-01	0.0
n-Hexadecane	78	2.21E-03	4.3E-03	2.9E-01	0.0
Hexanoic Acid	22	2.21E-03	3.4E-04	1.6E-01	0.0
2-Isopropylnaphthalene	15	2.21E-03	9.8E-02	7.2E-01	0.0
2-Methylnaphthalene	14	2.21E-03	1.8E-02	7.2E-01	0.0
Naphthalene	13	2.21E-03	1.5E-02	5.0E-02	0.0
n-Octacosane	8	2.21E-03	8.2E-05	2.9E-01	0.0
n-Octadecane	27	2.21E-03	4.3E-03	2.9E-01	0.0
Pentamethylbenzene	14	2.21E-03	2.9E-01	9.0E-02	0.0
Phenol	10	2.21E-03	2.8E-02	5.0E-02	0.0
n-Tetracosane	13	2.21E-03	8.2E-05	2.9E-01	0.0
n-Tetradecane	37	2.21E-03	4.3E-03	2.9E-01	0.0
n-Triacontane	0	2.21E-03	8.2E-05	2.9E-01	0.0
Tripropylene glycol Methyl Ether	417	2.21E-03	8.2E-06	5.3E-01	0.0
Aluminum	50	2.21E-03	6.4E-02	1.2E-01	0.0
Antimony	0	2.21E-03	1.9E-01	4.4E-01	0.0
Arsenic	1	2.21E-03	4.0E+00	1.0E+00	0.0
Barium	9	2.21E-03	2.0E-03	6.4E-01	0.0
Beryllium	0	2.21E-03	5.3E+00	5.4E-01	0.0
Boron	142	2.21E-03	1.8E-01	7.7E-01	0.0
Cadmium	1	2.21E-03	5.2E+00	1.0E-01	0.0
Calcium	395	2.21E-03	2.8E-05	4.5E-01	0.0
Chromium	5	2.21E-03	2.7E-02	3.3E-01	0.0

TABLE A-9 (continued)
POLLUTANT REMOVALS
RAIL PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams) <u>Option 1</u>	Conversion Factors			Pound Equivalents Removed <u>Option 1</u>
		Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	
Cobalt	2	2.21E-03	1.1E-01	6.3E-01	0.0
Copper	43	2.21E-03	4.7E-01	1.6E-01	0.0
Hexavalent Chromium	7	2.21E-03	5.1E-01	9.4E-01	0.0
Iron	587	2.21E-03	5.6E-03	1.7E-01	0.0
Lead	31	2.21E-03	1.8E+00	8.0E-02	0.0
Magnesium	143	2.21E-03	8.7E-04	7.4E-01	0.0
Manganese	15	2.21E-03	1.4E-02	5.9E-01	0.0
Mercury	0	2.21E-03	5.0E+02	4.0E-01	0.0
Molybdenum	5	2.21E-03	2.0E-01	4.8E-01	0.0
Nickel	154	2.21E-03	3.6E-02	4.9E-01	0.0
Phosphorus	9	2.21E-03	0.0E+00	3.1E-01	0.0
Potassium	18	2.21E-03	1.1E-03	8.0E-01	0.0
Selenium	0	2.21E-03	1.1E+00	5.4E-01	0.0
Silver	0	2.21E-03	4.7E-01	2.2E-01	0.0
Sodium	6,830	2.21E-03	5.5E-06	4.5E-01	0.0
Sulfur	23	2.21E-03	5.6E-06	8.8E-01	0.0
Tantalum	0	2.21E-03	6.0E-02	4.5E-01	0.0
Thallium	0	2.21E-03	1.4E-01	7.3E-01	0.0
Tin	3	2.21E-03	3.0E-01	3.5E-01	0.0
Titanium	1	2.21E-03	2.9E-02	3.1E-01	0.0
Tungsten	1	2.21E-03	5.3E-03	4.5E-01	0.0
Vanadium	1	2.21E-03	6.2E-01	5.7E-01	0.0
Zinc	43	2.21E-03	5.1E-02	2.2E-01	0.0
Zirconium	0	2.21E-03	5.4E-01	1.0E+00	0.0
Fluoride	142	2.21E-03	3.5E-02	3.9E-01	0.0
Total Cyanide	0	2.21E-03	1.1E+00	3.0E-01	0.0
Total	11,732				0.1

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-10
POLLUTANT REMOVALS
TRUCK FOOD SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Conversion Factors			Pound Equivalents Removed			
	Pollutants Removed (grams)		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2
	Option 1	Option 2					
Benzoic acid	23,557	2,072,585,949	2.21E-03	3.30E-04	1.90E-01	0.0	287.2
Hexanoic Acid	532,692	48,275,577,659	2.21E-03	3.40E-04	1.60E-01	0.1	5,803.9
Phenol	2,491	213,126,140	2.21E-03	2.80E-02	5.00E-02	0.0	659.4
Total	558,740	50,561,289,748				0.1	6,750.5

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-11
POLLUTANT REMOVALS
RAIL FOOD SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factors			Pound Equivalents Removed	
	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2
Benzoic acid	ND	ND	2.21E-03	3.30E-04	1.90E-01	ND	ND
Hexanoic Acid	ND	ND	2.21E-03	3.40E-04	1.60E-01	ND	ND
Phenol	ND	ND	2.21E-03	2.80E-02	5.00E-02	ND	ND
Total	ND	ND				ND	ND

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-12
POLLUTANT REMOVALS
BARGE FOOD SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)			Conversion Factors			Pound Equivalents Removed	
	Option 1	Option 2	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1	Option 2	
Benzoic acid	ND	ND	2.21E-03	3.30E-04	1.90E-01	ND	ND	
Hexanoic Acid	ND	ND	2.21E-03	3.40E-04	1.60E-01	ND	ND	
Phenol	ND	ND	2.21E-03	2.80E-02	5.00E-02	ND	ND	
Total	ND	ND				ND	ND	

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-13
POLLUTANT REMOVALS
TRUCK HOPPER SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors			Pound Equivalents Removed
	Option 1	Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	Option 1
Aluminum	39,775	2.21E-03	6.40E-02	1.20E-01	0.7
Beryllium	18	2.21E-03	5.30E+00	5.40E-01	0.1
Calcium	599,274	2.21E-03	2.80E-05	4.50E-01	0.0
Chromium	49	2.21E-03	2.70E-02	3.30E-01	0.0
Iron	236,812	2.21E-03	5.60E-03	1.70E-01	0.5
Manganese	7,125	2.21E-03	1.40E-02	5.90E-01	0.1
Titanium	1,512	2.21E-03	2.90E-02	3.10E-01	0.0
Zinc	559	2.21E-03	5.10E-02	2.20E-01	0.0
Total	885,123				1.5

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-14
POLLUTANT REMOVALS
RAIL HOPPER SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors			Pound Equivalents Removed
		Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	
	Option 1				Option 1
Aluminum	ND	2.21E-03	6.40E-02	1.20E-01	ND
Beryllium	ND	2.21E-03	5.30E+00	5.40E-01	ND
Calcium	ND	2.21E-03	2.80E-05	4.50E-01	ND
Chromium	ND	2.21E-03	2.70E-02	3.30E-01	ND
Iron	ND	2.21E-03	5.60E-03	1.70E-01	ND
Manganese	ND	2.21E-03	1.40E-02	5.90E-01	ND
Titanium	ND	2.21E-03	2.90E-02	3.10E-01	ND
Zinc	ND	2.21E-03	5.10E-02	2.20E-01	ND
Total	ND				ND

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-15
POLLUTANT REMOVALS
BARGE HOPPER SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors		Pound Equivalents Removed
	Option 1	Grams/ Pounds	Toxic Weighting Factor	Option 1
Aluminum	50,865	2.21E-03	6.40E-02	7.2
Beryllium	22	2.21E-03	5.30E+00	0.3
Calcium	773,702	2.21E-03	2.80E-05	0.0
Chromium	79	2.21E-03	2.70E-02	0.0
Iron	302,141	2.21E-03	5.60E-03	3.7
Manganese	9,125	2.21E-03	1.40E-02	0.3
Titanium	1,913	2.21E-03	2.90E-02	0.1
Zinc	720	2.21E-03	5.10E-02	0.1
Total	1,138,567			11.7

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-16
POLLUTANT REMOVALS
BARGE HOPPER SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factors			Pound Equivalents Removed
		Grams/ Option 1	Pounds	Toxic Weighting Factor	
Aluminum	3,950	2.21E-03		6.40E-02	1.20E-01
Beryllium	1	2.21E-03		5.30E+00	5.40E-01
Calcium	86,820	2.21E-03		2.80E-05	4.50E-01
Chromium	25	2.21E-03		2.70E-02	3.30E-01
Iron	20,903	2.21E-03		5.60E-03	1.70E-01
Manganese	759	2.21E-03		1.40E-02	5.90E-01
Titanium	76	2.21E-03		2.90E-02	3.10E-01
Zinc	76	2.21E-03		5.10E-02	2.20E-01
Total	112,609				0.1

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

APPENDIX B

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

TABLE B-1

**PRIORITY NONCONVENTIONAL POLLUTANTS DISCHARGED AT BASELINE
INDUSTRY TOTALS**

Subcategory	Pounds			Pound Equivalents (PEs)		
	Direct	Indirect	Total	Direct	Indirect	Total
Truck Chemical *	1,896	893,493	895,388	5,959.1	352,309.7	358,268.8
Rail Chemical *	360	50,418	50,779	657.9	35,513.1	36,171.0
Barge Chemical	229,006	18,912	247,918	14,534.1	130.4	14,664.5
Truck Petroleum	NA	7,079	7,079	NA	28.2	28.2
Rail Petroleum	NA	26	26	NA	0.1	0.1
Truck Food	NA	111,736,628	111,736,628	NA	6,750.3	6,750.3
Rail Food	NA	32,054,643	32,054,643	NA	1,936.5	1,936.5
Barge Food	NA	212,258	212,258	NA	12.8	12.8
Truck Hopper	NA	4,127	4,127	NA	2.7	2.7
Rail Hopper	NA	43	43	NA	0.0	0.0
Barge Hopper	5,234	1,449	6,683	21.2	0.8	22.0
Industry Total	236,497	144,979,077	145,215,574	21,172.3	396,684.7	417,857.0

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

NA: Not applicable.

TABLE B-2
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	
Acetone	139,244.2	2.21E-03	7.60E-06	0.0
Benzene	5.8	2.21E-03	1.80E-02	0.0
Chloroform	102.9	2.21E-03	2.10E-03	0.0
1,2-Dichloroethane	716.9	2.21E-03	6.20E-03	0.0
Ethylbenzene	336.3	2.21E-03	1.40E-03	0.0
Methyl ethyl ketone	8,345.3	2.21E-03	2.20E-05	0.0
Methyl isobutyl ketone	9,508.9	2.21E-03	1.20E-04	0.0
Methylene chloride	99,646.9	2.21E-03	4.20E-04	0.1
Tetrachloroethylene	589.6	2.21E-03	7.40E-02	0.1
Toluene	579.7	2.21E-03	5.60E-03	0.0
1,1,1-Trichloroethane	593.7	2.21E-03	4.30E-03	0.0
Trichloroethylene	809.4	2.21E-03	6.30E-02	0.1
m-Xylene	589.6	2.21E-03	1.50E-03	0.0
o+p-Xylene	589.6	2.21E-03	8.50E-03	0.0
alpha-Terpineol	589.5	2.21E-03	1.00E-03	0.0
Benzoic acid	125,488.9	2.21E-03	3.30E-04	0.1
Benzyl alcohol	1,143.1	2.21E-03	5.60E-03	0.0
bis (2-Ethylhexyl) phthalate	263.1	2.21E-03	1.10E-01	0.1
2-Chlorophenol	783.5	2.21E-03	3.30E-02	0.1
o-Cresol	785.3	2.21E-03	3.30E-03	0.0
p-Cresol	795.9	2.21E-03	2.40E-03	0.0
p-Cymene	196.6	2.21E-03	4.30E-02	0.0
n-Decane	47.2	2.21E-03	4.30E-03	0.0
1,2-Dichlorobenzene	589.5	2.21E-03	1.10E-02	0.0
Di-n-octyl phthalate	589.5	2.21E-03	2.20E-01	0.3
n-Docosane	171.0	2.21E-03	8.20E-05	0.0
n-Dodecane	76.7	2.21E-03	4.30E-03	0.0
n-Eicosane	351.0	2.21E-03	4.30E-03	0.0
n-Hexacosane	589.5	2.21E-03	8.20E-05	0.0
n-Hexadecane	50.1	2.21E-03	4.30E-03	0.0
2-Isopropylnaphthalene	589.5	2.21E-03	9.80E-02	0.1
2-Methylnaphthalene	141.5	2.21E-03	1.80E-02	0.0
Naphthalene	57.3	2.21E-03	1.50E-02	0.0
n-Octadecane	100.2	2.21E-03	4.30E-03	0.0
Styrene	787.3	2.21E-03	1.40E-02	0.0
n-Tetracosane	589.5	2.21E-03	8.20E-05	0.0
n-Tetradecane	23.6	2.21E-03	4.30E-03	0.0
n-Triacontane	589.5	2.21E-03	8.20E-05	0.0
Azinphos ethyl	117.9	2.21E-03	5.10E+03	1,328.9
Azinphos methyl	294.8	2.21E-03	2.80E+01	18.2
Coumaphos	294.8	2.21E-03	5.60E+03	3,648.1
Dichlofenthion	117.9	2.21E-03	1.40E+01	3.6
Disulfoton	206.3	2.21E-03	1.20E+02	54.7
EPN	117.9	2.21E-03	7.60E+02	198.0
Leptophos	117.9	2.21E-03	1.10E+01	2.9

TABLE B-2 (continued)
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	
Merphos	117.9	2.21E-03	2.50E+01	6.5
Tetrachlorvinphos	117.9	2.21E-03	1.40E-01	0.0
Beta-BHC	5.9	2.21E-03	1.20E+01	0.2
Gamma-BHC	6.3	2.21E-03	7.00E+01	1.0
Gamma-Chlordane	2.9	2.21E-03	2.30E+03	15.0
Chlorobenzilate	59.0	2.21E-03	1.60E-01	0.0
4,4'-DDT	5.9	2.21E-03	6.50E+03	84.7
Diallate	274.0	2.21E-03	8.40E-03	0.0
Dieldrin	2.4	2.21E-03	5.70E+04	297.1
Endosulfan II	59.0	2.21E-03	1.00E+02	13.0
Endosulfan Sulfate	5.9	2.21E-03	1.00E+02	1.3
Nitrofen	11.8	2.21E-03	4.80E-02	0.0
Pentachloronitrobenzene	2.9	2.21E-03	2.70E-01	0.0
Simazine	471.6	2.21E-03	5.60E-01	0.6
Terbutylazine	294.8	2.21E-03	1.20E-02	0.0
2,4-D	249.5	2.21E-03	3.10E-03	0.0
Dalapon	2.4	2.21E-03	5.10E-03	0.0
2,4-DB (Butoxon)	117.9	2.21E-03	3.60E-02	0.0
Dinoseb	182.6	2.21E-03	1.90E+00	0.8
MCPA	21,484.3	2.21E-03	1.60E-02	0.8
MCPP	4,480.5	2.21E-03	6.90E-03	0.1
Picloram	29.5	2.21E-03	2.10E+00	0.1
2,4,5-T	59.9	2.21E-03	2.80E-01	0.0
2,4,5-TP	29.5	2.21E-03	1.80E-01	0.0
Aluminum	11,496.3	2.21E-03	6.40E-02	1.6
Boron	16,065.0	2.21E-03	1.80E-01	6.4
Chromium	1,147.9	2.21E-03	2.70E-02	0.1
Copper	5,103.4	2.21E-03	4.70E-01	5.3
Manganese	12,282.1	2.21E-03	1.40E-02	0.4
Mercury	12.4	2.21E-03	5.00E+02	13.7
Tin	381,824.8	2.21E-03	3.00E-01	253.1
Titanium	1,124.3	2.21E-03	2.90E-02	0.1
Zinc	672.1	2.21E-03	5.10E-02	0.1
Fluoride	1,081.7	2.21E-03	3.50E-02	0.1
Total Cyanide	629.0	2.21E-03	1.10E+00	1.5
Total	857,829 (1,896 pounds)			5,959.1

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-3
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Acetone	96,442,328	2.21E-03	7.60E-06	1.63E-01	0.3
Benzene	85,882	2.21E-03	1.80E-02	5.24E-02	0.2
Chloroform	171,522	2.21E-03	2.10E-03	2.66E-01	0.2
1,2-Dichloroethane	1,093,205	2.21E-03	6.20E-03	1.10E-01	1.6
Ethylbenzene	942,392	2.21E-03	1.40E-03	6.21E-02	0.2
Methyl ethyl ketone	17,338,690	2.21E-03	2.20E-05	8.17E-02	0.1
Methyl isobutyl ketone	5,285,811	2.21E-03	1.20E-04	1.21E-01	0.2
Methylene chloride	31,527,325	2.21E-03	4.20E-04	4.57E-01	13.4
Tetrachloroethylene	2,076,223	2.21E-03	7.40E-02	1.54E-01	52.3
Toluene	3,638,316	2.21E-03	5.60E-03	3.82E-02	1.7
1,1,1-Trichloroethane	1,347,806	2.21E-03	4.30E-03	9.55E-02	1.2
Trichloroethylene	52,142	2.21E-03	6.30E-02	1.30E-01	0.9
m-Xylene	3,737,758	2.21E-03	1.50E-03	3.46E-01	4.3
o+p-Xylene	1,961,522	2.21E-03	8.50E-03	4.93E-02	1.8
alpha-Terpineol	797,114	2.21E-03	1.00E-03	5.40E-02	0.1
Benzoic acid	80,202,259	2.21E-03	3.30E-04	1.95E-01	11.4
Benzyl alcohol	500,434	2.21E-03	5.60E-03	2.20E-01	1.4
bis (2-Ethylhexyl) phthalate	915,812	2.21E-03	1.10E-01	4.02E-01	89.5
2-Chlorophenol	123,022	2.21E-03	3.30E-02	5.00E-02	0.4
o-Cresol	145,472	2.21E-03	3.30E-03	4.75E-01	0.5
p-Cresol	238,831	2.21E-03	2.40E-03	2.83E-01	0.4
p-Cymene	122,727	2.21E-03	4.30E-02	2.10E-03	0.0
n-Decane	628,812	2.21E-03	4.30E-03	9.10E-01	5.4
1,2-Dichlorobenzene	186,160	2.21E-03	1.10E-02	1.10E-01	0.5
Di-n-octyl phthalate	309,430	2.21E-03	2.20E-01	1.70E-01	25.6
n-Docosane	197,367	2.21E-03	8.20E-05	1.20E-01	0.0
n-Dodecane	1,973,579	2.21E-03	4.30E-03	4.95E-02	0.9
n-Eicosane	549,214	2.21E-03	4.30E-03	7.60E-02	0.4
n-Hexacosane	264,605	2.21E-03	8.20E-05	2.89E-01	0.0
n-Hexadecane	1,245,164	2.21E-03	4.30E-03	2.89E-01	3.4
2-Isopropylnaphthalene	331,843	2.21E-03	9.80E-02	7.20E-01	51.7
2-Methylnaphthalene	135,731	2.21E-03	1.80E-02	7.20E-01	3.9
Naphthalene	556,528	2.21E-03	1.50E-02	5.31E-02	1.0
n-Octadecane	684,844	2.21E-03	4.30E-03	2.89E-01	1.9
Styrene	6,712,512	2.21E-03	1.40E-02	6.35E-02	13.2
n-Tetracosane	326,240	2.21E-03	8.20E-05	2.89E-01	0.0
n-Tetradecane	852,940	2.21E-03	4.30E-03	2.89E-01	2.3
n-Triacontane	387,875	2.21E-03	8.20E-05	2.89E-01	0.0
Azinphos ethyl	7,609	2.21E-03	5.10E+03	1.00E+00	85,761.1
Azinphos methyl	12,428	2.21E-03	2.80E+01	2.60E-01	200.0
Coumaphos	16,645	2.21E-03	5.60E+03	1.00E+00	205,996.7
Dichlofenthion	7,015	2.21E-03	1.40E+01	1.00E+00	217.1
Disulfoton	49,838	2.21E-03	1.20E+02	1.00E+00	13,217.1
EPN	10,337	2.21E-03	7.60E+02	1.00E+00	17,361.5
Leptophos	12,578	2.21E-03	1.10E+01	1.00E+00	305.8

TABLE B-3 (continued)
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Merphos	7,368	2.21E-03	2.50E+01	1.00E+00	407.1
Tetrachlorvinphos	6,255	2.21E-03	1.40E-01	1.00E+00	1.9
Beta-BHC	853	2.21E-03	1.20E+01	5.70E-01	12.9
Gamma-BHC	772	2.21E-03	7.00E+01	4.80E-01	57.4
Gamima-Chlordane	410	2.21E-03	2.30E+03	5.00E-01	1,041.3
Chlorobenzilate	8,651	2.21E-03	1.60E-01	1.00E+00	3.1
4,4'-DDT	741	2.21E-03	6.50E+03	4.00E-01	4,257.6
Diallate	48,621	2.21E-03	8.40E-03	1.00E+00	0.9
Dieldrin	319	2.21E-03	5.70E+04	1.40E-01	5,622.3
Endosulfan II	7,410	2.21E-03	1.00E+02	5.00E-01	818.8
Endosulfan Sulfate	741	2.21E-03	1.00E+02	4.20E-01	68.8
Nitrofen	1,538	2.21E-03	4.80E-02	1.00E+00	0.2
Pentachloronitrobenzene	13,510	2.21E-03	2.70E-01	1.00E+00	8.1
Simazine	66,001	2.21E-03	5.60E-01	1.00E+00	81.7
Terbutylazine	37,608	2.21E-03	1.20E-02	1.00E+00	1.0
2,4-D	8,445	2.21E-03	3.10E-03	5.10E-01	0.0
Dalapon	3,071	2.21E-03	5.10E-03	1.00E+00	0.0
2,4-DB (Butoxon)	19,596	2.21E-03	3.60E-02	1.00E+00	1.6
Dinoseb	6,842	2.21E-03	1.90E+00	1.00E+00	28.7
MCPP	1,607,248	2.21E-03	1.60E-02	1.00E+00	56.8
MCPP	451,233	2.21E-03	6.90E-03	1.00E+00	6.9
Picloram	2,696	2.21E-03	2.10E+00	1.00E+00	12.5
2,4,5-T	2,497	2.21E-03	2.80E-01	4.40E-01	0.7
2,4,5-TP	1,598	2.21E-03	1.80E-01	5.60E-01	0.4
Aluminum	12,419,050	2.21E-03	6.40E-02	1.20E-01	210.8
Boron	10,856,556	2.21E-03	1.80E-01	7.70E-01	3,325.4
Chromium	3,386,535	2.21E-03	2.70E-02	3.30E-01	66.7
Copper	528,289	2.21E-03	4.70E-01	1.60E-01	87.8
Manganese	718,880	2.21E-03	1.40E-02	5.90E-01	13.1
Mercury	2,989	2.21E-03	5.00E+02	4.00E-01	1,321.0
Tin	40,092,193	2.21E-03	3.00E-01	3.50E-01	9,303.4
Titanium	350,047	2.21E-03	2.90E-02	3.12E-01	7.0
Zinc	1,023,506	2.21E-03	5.10E-02	2.20E-01	25.4
Fluoride	68,344,188	2.21E-03	3.50E-02	3.90E-01	2,061.7
Total Cyanide	63,128	2.21E-03	1.10E+00	2.96E-01	45.4
Total	404,295,270 (893,493 pounds)				352,309.7

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-4
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	
Acetone	58	2.21E-03	7.60E-06	0.0
Ethylbenzene	7	2.21E-03	1.40E-03	0.0
Methyl ethyl ketone	314	2.21E-03	2.20E-05	0.0
m-Xylene	14	2.21E-03	1.50E-03	0.0
o+p-Xylene	17	2.21E-03	8.50E-03	0.0
Anthracene	240	2.21E-03	2.50E+00	1.3
Benzoic acid	228	2.21E-03	3.30E-04	0.0
Biphenyl	51	2.21E-03	3.70E-02	0.0
Carbazole	203	2.21E-03	2.70E+01	12.1
p-Cresol	85	2.21E-03	2.40E-03	0.0
2,4-Diaminotoluene	3,330	2.21E-03	1.80E-01	1.3
n-Docosane	156	2.21E-03	8.20E-05	0.0
n-Dodecane	99	2.21E-03	4.30E-03	0.0
n-Eicosane	488	2.21E-03	4.30E-03	0.0
Fluoranthene	222	2.21E-03	9.20E-01	0.5
n-Hexacosane	277	2.21E-03	8.20E-05	0.0
n-Hexadecane	362	2.21E-03	4.30E-03	0.0
2-Methylnaphthalene	44	2.21E-03	1.80E-02	0.0
1-Methylphenanthrene	179	2.21E-03	1.40E-01	0.1
Naphthalene	7	2.21E-03	1.50E-02	0.0
n-Octacosane	165	2.21E-03	8.20E-05	0.0
n-Octadecane	440	2.21E-03	4.30E-03	0.0
Phenanthrene	481	2.21E-03	1.90E+01	20.2
Phenol	98	2.21E-03	2.80E-02	0.0
Pyrene	174	2.21E-03	7.50E-02	0.0
Styrene	1	2.21E-03	1.40E-02	0.0
n-Tetracosane	462	2.21E-03	8.20E-05	0.0
n-Tetradecane	118	2.21E-03	4.30E-03	0.0
n-Triacontane	172	2.21E-03	8.20E-05	0.0
Dioxathion	14	2.21E-03	6.22E+01	1.9
Tetrachlorvinphos	4	2.21E-03	1.40E-01	0.0
Tokuthion	6	2.21E-03	9.30E-03	0.0
Trichlorfon	14	2.21E-03	7.00E+02	21.8
Trichloronate	4	2.21E-03	5.60E+03	48.1
Trimethylphosphate	6	2.21E-03	1.90E-03	0.0
Acephate	-1,369	2.21E-03	1.30E-02	0.0
Alachlor	0	2.21E-03	1.60E-02	0.0
Atrazine	174	2.21E-03	9.40E-02	0.0
Benefluralin	4	2.21E-03	1.60E-01	0.0
Alpha-BHC	0	2.21E-03	4.30E+01	0.0
Beta-BHC	54	2.21E-03	1.20E+01	1.4
Delta-BHC	1	2.21E-03	8.60E-02	0.0
Gamima-BHC	1	2.21E-03	7.00E+01	0.1
Bromacil	2	2.21E-03	5.60E-03	0.0
Bromoxynil octanoate	1	2.21E-03	1.10E+00	0.0
Butachlor	1	2.21E-03	7.40E-03	0.0
Captafol	4	2.21E-03	2.70E+00	0.0
Captan	2	2.21E-03	1.60E+00	0.0
Carbophenothion	2	2.21E-03	6.60E-01	0.0
Alpha-Chlordane	0	2.21E-03	2.30E+03	0.9
Gamma-Chlordane	0	2.21E-03	2.30E+03	0.8
Chlorobenzilate	2	2.21E-03	1.60E-01	0.0
Chloroneb	41	2.21E-03	4.70E-03	0.0
Dacthal (DCPA)	1	2.21E-03	9.50E-03	0.0
4,4'-DDD	0	2.21E-03	7.60E+02	0.7

TABLE B-4 (continued)

BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalents Discharged at Baseline
		Grams/ Pounds	Toxic Weighting Factor	
4,4'-DDE	0	2.21E-03	9.50E+02	0.6
4,4'-DDT	0	2.21E-03	6.50E+03	6.9
Diallate	592	2.21E-03	8.40E-03	0.0
Dichrone	2	2.21E-03	4.00E+01	0.2
Dicofol	3	2.21E-03	5.70E+02	3.5
Dieldrin	3	2.21E-03	5.70E+04	419.5
Endosulfan I	0	2.21E-03	1.00E+02	0.0
Endosulfan Sulfate	0	2.21E-03	1.00E+02	0.1
Endrin	0	2.21E-03	9.80E+01	0.1
Endrin aldehyde	1	2.21E-03	9.80E+01	0.1
Endrin ketone	0	2.21E-03	9.80E+01	0.1
Ethalfluralin	8	2.21E-03	7.50E+00	0.1
Etriazole	0	2.21E-03	4.60E-03	0.0
Fenarimol	1	2.21E-03	6.20E-02	0.0
Heptachlor epoxide	0	2.21E-03	6.80E+03	4.2
Isodrin	0	2.21E-03	1.40E+01	0.0
Isopropalin	1	2.21E-03	5.80E-01	0.0
Methoxychlor	1	2.21E-03	1.90E+02	0.2
Metribuzin	0	2.21E-03	1.30E-03	0.0
Mirex	1	2.21E-03	5.60E+03	17.2
Nitrofen	2	2.21E-03	4.80E-02	0.0
Pendamethalin	1	2.21E-03	1.50E-01	0.0
Pentachloronitrobenzene	0	2.21E-03	2.70E-01	0.0
CIS-Permethrin	9	2.21E-03	3.40E+00	0.1
Perthane	81	2.21E-03	1.40E+01	2.5
Propachlor	26	2.21E-03	3.30E-01	0.0
Propazine	28	2.21E-03	4.70E-03	0.0
Simazine	49,949	2.21E-03	5.60E-01	61.8
Strobane	96	2.21E-03	1.10E+02	23.4
Terbacil	41	2.21E-03	8.00E-01	0.1
Terbuthylazine	4,255	2.21E-03	1.20E-02	0.1
Triadimefon	2	2.21E-03	5.80E-03	0.0
Trifluralin	3	2.21E-03	4.20E+00	0.0
2,4-D	118	2.21E-03	3.10E-03	0.0
Dalapon	28	2.21E-03	5.10E-03	0.0
2,4-DB (Butoxon)	203	2.21E-03	3.60E-02	0.0
Dicamba	888	2.21E-03	1.50E-02	0.0
Dichloroprop	115	2.21E-03	9.30E-02	0.0
Dinoseb	50	2.21E-03	1.90E+00	0.2
MCPA	4,255	2.21E-03	1.60E-02	0.2
CPP	59,199	2.21E-03	6.90E-03	0.9
Picloram	37	2.21E-03	2.10E+00	0.2
2,4,5-T	20	2.21E-03	2.80E-01	0.0
2,4,5-TP	20	2.21E-03	1.80E-01	0.0
Aluminum	25,118	2.21E-03	6.40E-02	3.6
Barium	1,472	2.21E-03	2.00E-03	0.0
Chromium	103	2.21E-03	2.70E-02	0.0
Copper	208	2.21E-03	4.70E-01	0.2
Titanium	235	2.21E-03	2.90E-02	0.0
Zinc	961	2.21E-03	5.10E-02	0.1
Fluoride	4,682	2.21E-03	3.50E-02	0.4
Total	163,023			657.9

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE B-5
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	
Ethylbenzene	32,167	2.21E-03	1.40E-03	6.21E-02	0.0
Methyl ethyl ketone	114,008	2.21E-03	2.20E-05	8.17E-02	0.0
m-Xylene	70,800	2.21E-03	1.50E-03	3.46E-01	0.1
o+p-Xylene	46,852	2.21E-03	8.50E-03	4.93E-02	0.0
Anthracene	36,487	2.21E-03	2.50E+00	4.00E-02	8.1
Benzoic acid	879,737	2.21E-03	3.30E-04	1.95E-01	0.1
Carbazole	30,963	2.21E-03	2.70E-01	1.00E+00	18.5
p-Cresol	15,385	2.21E-03	2.40E-03	2.83E-01	0.0
2,4-Diaminotoluene	569,614	2.21E-03	1.80E-01	1.00E+00	226.6
n-Docosane	81,843	2.21E-03	8.20E-05	1.20E-01	0.0
n-Dodecane	102,159	2.21E-03	4.30E-03	4.95E-02	0.0
n-Eicosane	319,690	2.21E-03	4.30E-03	7.60E-02	0.2
Fluoranthene	33,406	2.21E-03	9.20E-01	5.80E-01	39.4
n-Hexacosane	43,405	2.21E-03	8.20E-05	2.89E-01	0.0
n-Hexadecane	645,916	2.21E-03	4.30E-03	2.89E-01	1.8
1-Methylphenanthrene	27,585	2.21E-03	1.40E-01	5.00E-02	0.4
Naphthalene	19,634	2.21E-03	1.50E-02	5.31E-02	0.0
n-Octacosane	26,475	2.21E-03	8.20E-05	2.89E-01	0.0
n-Octadecane	379,599	2.21E-03	4.30E-03	2.89E-01	1.0
Phenanthrene	73,736	2.21E-03	1.90E+01	5.11E-02	158.2
Phenol	156,926	2.21E-03	2.80E-02	4.75E-02	0.5
Pyrene	26,189	2.21E-03	7.50E-02	5.00E-02	0.2
Styrene	49,647	2.21E-03	1.40E-02	6.35E-02	0.1
n-Tetracosane	71,662	2.21E-03	8.20E-05	2.89E-01	0.0
n-Tetradecane	435,146	2.21E-03	4.30E-03	2.89E-01	1.2
n-Triacontane	28,482	2.21E-03	8.20E-05	2.89E-01	0.0
Dioxathion	2,068	2.21E-03	6.22E+01	1.00E+00	284.3
Tetrachlorvinphos	654	2.21E-03	1.40E-01	1.00E+00	0.2
Tokuthion	877	2.21E-03	9.30E-03	1.00E+00	0.0
Trichlorfon	2,151	2.21E-03	7.00E+02	1.00E+00	3,327.6
Trichloronate	600	2.21E-03	5.60E+03	1.00E+00	7,425.0
Trimethylphosphate	960	2.21E-03	1.90E-03	1.00E+00	0.0
Acephate	217,802	2.21E-03	1.30E-02	1.00E+00	6.3
Alachlor	71	2.21E-03	1.60E-02	1.00E+00	0.0
Atrazine	29,747	2.21E-03	9.40E-02	5.80E-01	3.6
Benefluralin	445	2.21E-03	1.60E-01	1.00E+00	0.2
Alpha-BHC	35	2.21E-03	4.30E+01	3.60E-01	1.2
Beta-BHC	8,008	2.21E-03	1.20E+01	5.70E-01	121.0
Delta-BHC	129	2.21E-03	2.80E-01	1.00E+00	0.1
Gamma-BHC	91	2.21E-03	7.00E+01	4.80E-01	6.8

TABLE B-5 (continued)

BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Bromacil	336	2.21E-03	5.60E-03	1.00E+00	0.0
Bromoxynil octanoate	168	2.21E-03	1.10E+00	1.00E+00	0.4
Butachlor	137	2.21E-03	7.40E-03	1.00E+00	0.0
Captafol	540	2.21E-03	2.70E+00	1.00E+00	3.2
Captan	338	2.21E-03	1.60E+00	1.00E+00	1.2
Carbophenothion	284	2.21E-03	6.60E-01	1.00E+00	0.4
Alpha-Chlordane	28	2.21E-03	2.30E+03	5.00E-01	71.2
Gamma-Chlordane	23	2.21E-03	2.30E+03	5.00E-01	59.0
Chlorobenzilate	348	2.21E-03	1.60E-01	1.00E+00	0.1
Chloroneb	6,962	2.21E-03	4.70E-03	1.00E+00	0.1
Dacthal (DCPA)	91	2.21E-03	9.50E-03	1.00E+00	0.0
4,4'-DDD	68	2.21E-03	7.60E+02	1.00E+00	113.9
4,4'-DDE	47	2.21E-03	9.50E+02	1.00E+00	99.7
4,4'-DDT	55	2.21E-03	6.50E+03	4.00E-01	314.5
Diallate	70,417	2.21E-03	8.40E-03	1.00E+00	1.3
Dichlone	348	2.21E-03	4.00E+01	1.00E+00	30.8
Dicofol	426	2.21E-03	5.70E+02	1.00E+00	537.3
Dieldrin	375	2.21E-03	5.70E+04	1.40E-01	6,609.7
Endosulfan I	35	2.21E-03	1.00E+02	5.00E-01	3.8
Endosulfan Sulfate	59	2.21E-03	1.00E+02	4.20E-01	5.4
Endrin	71	2.21E-03	9.80E+01	5.00E-01	7.7
Endrin aldehyde	126	2.21E-03	9.80E+01	1.00E+00	27.3
Endrin ketone	35	2.21E-03	9.80E-01	1.00E+00	0.1
Ethalfluralin	1,329	2.21E-03	7.50E+00	1.00E+00	22.0
Etradiazole	47	2.21E-03	4.60E-03	1.00E+00	0.0
Fenarimol	90	2.21E-03	6.20E-02	1.00E+00	0.0
Heptachlor epoxide	38	2.21E-03	6.80E+03	1.00E+00	568.6
Isodrin	45	2.21E-03	1.40E+01	1.00E+00	1.4
Isopropalin	157	2.21E-03	5.80E-01	1.00E+00	0.2
Methoxychlor	98	2.21E-03	1.90E+02	4.20E-01	17.3
Metribuzin	40	2.21E-03	1.30E-03	1.00E+00	0.0
Mirex	237	2.21E-03	5.60E+03	1.00E+00	2,937.3
Nitrofen	209	2.21E-03	4.80E-02	1.00E+00	0.0
Pendamethalin	191	2.21E-03	1.50E-01	1.00E+00	0.1
Pentachloronitrobenzene	89	2.21E-03	2.70E-01	1.00E+00	0.1
CIS-Permethrin	1,058	2.21E-03	3.40E+00	1.00E+00	8.0
Perthane	12,263	2.21E-03	1.40E+01	1.00E+00	379.4
Propachlor	3,927	2.21E-03	3.30E-01	1.00E+00	2.9
Propazine	4,201	2.21E-03	4.70E-03	1.00E+00	0.0
Simazine	6,678,059	2.21E-03	5.60E-01	1.00E+00	8,264.8

TABLE B-5 (continued)
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	
Strobane	14,444	2.21E-03	1.10E+02	1.00E+00	3,511.4
Terbacil	6,114	2.21E-03	8.00E-01	1.00E+00	10.8
Terbutylazine	728,051	2.21E-03	1.20E-02	1.00E+00	19.3
Triadimefon	274	2.21E-03	5.80E-03	1.00E+00	0.0
Trifluralin	273	2.21E-03	4.20E+00	2.90E-01	0.7
2,4-D	12,400	2.21E-03	3.10E-03	5.10E-01	0.0
Dalapon	4,213	2.21E-03	5.10E-03	1.00E+00	0.0
2,4-DB (Butoxon)	22,522	2.21E-03	3.60E-02	1.00E+00	1.8
Dicamba	67,164	2.21E-03	1.50E-02	1.00E+00	2.2
Dichloroprop	14,445	2.21E-03	9.30E-02	1.00E+00	3.0
Dinoseb	5,003	2.21E-03	1.90E+00	1.00E+00	21.0
MCPA	404,082	2.21E-03	1.60E-02	1.00E+00	14.3
MCPP	5,222,382	2.21E-03	6.90E-03	1.00E+00	79.6
Picloram	6,343	2.21E-03	2.10E+00	1.00E+00	29.4
2,4,5-T	2,170	2.21E-03	2.80E-01	4.40E-01	0.6
2,4,5-TP	1,722	2.21E-03	1.80E-01	5.60E-01	0.4
Aluminum	3,796,352	2.21E-03	6.40E-02	1.20E-01	64.4
Barium	147,364	2.21E-03	2.00E-03	6.40E-01	0.4
Chromium	24,499	2.21E-03	2.70E-02	3.30E-01	0.5
Copper	19,440	2.21E-03	4.70E-01	1.59E-01	3.2
Titanium	17,754	2.21E-03	2.90E-02	3.12E-01	0.4
Zinc	79,744	2.21E-03	5.10E-02	2.20E-01	2.0
Fluoride	852,497	2.21E-03	3.50E-02	3.90E-01	25.7
Total	22,813,796				35,513.1
	(50,418 pounds)				

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-6
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factors	
Acetone	3,480,118	2.21E-03	7.6E-06	0.1
Acrylonitrile	2,330,312	2.21E-03	8.5E-01	4,377.5
Benzene	301,039	2.21E-03	1.8E-02	12.0
Chloroform	6,961	2.21E-03	2.1E-03	0.0
Ethylbenzene	242,380	2.21E-03	1.4E-03	0.7
Methyl ethyl ketone	2,710,319	2.21E-03	2.2E-05	0.1
Methyl isobutyl ketone	1,055,425	2.21E-03	1.2E-04	0.3
Methylene chloride	5,392	2.21E-03	4.2E-04	0.0
Toluene	454,692	2.21E-03	5.6E-03	5.6
m-Xylene	230,905	2.21E-03	1.5E-03	0.8
o+p-Xylene	246,181	2.21E-03	8.5E-03	4.6
Acenaphthene	64,163	2.21E-03	2.5E-01	35.5
Acenaphthylene	54,951	2.21E-03	8.4E-03	1.0
Anthracene	43,236	2.21E-03	2.5E+00	238.9
2,3-Benzofluorene	20,038	2.21E-03	2.2E-01	9.7
Benzoic acid	48,771	2.21E-03	3.3E-04	0.0
Biphenyl	235,018	2.21E-03	3.7E-02	19.2
bis (2-Ethylhexyl) phthalate	86,475	2.21E-03	1.1E-01	21.0
p-Cymene	59,531	2.21E-03	4.3E-02	5.7
n-Decane	5,811,283	2.21E-03	4.3E-03	55.2
3,6-Dimethylphenanthrene	41,508	2.21E-03	4.7E-01	43.1
Di-n-octyl phthalate	57,969	2.21E-03	2.2E-01	28.2
n-Docosane	294,904	2.21E-03	8.2E-05	0.1
n-Dodecane	3,131,228	2.21E-03	4.3E-03	29.8
n-Eicosane	906,896	2.21E-03	4.3E-03	8.6
Fluorene	98,167	2.21E-03	7.0E-01	151.9
n-Hexacosane	35,068	2.21E-03	8.2E-05	0.0
n-Hexadecane	3,412,132	2.21E-03	4.3E-03	32.4
1-Methylfluorene	85,877	2.21E-03	8.9E-02	16.9
2-Methylnaphthalene	634,952	2.21E-03	1.8E-02	25.3
1-Methylphenanthrene	193,224	2.21E-03	1.4E-01	59.8
Naphthalene	6,356,997	2.21E-03	1.5E-02	210.7
n-Octacosane	16,462	2.21E-03	8.2E-05	0.0
n-Octadecane	1,749,875	2.21E-03	4.3E-03	16.6
Pentamethylbenzene	279,101	2.21E-03	2.9E-01	178.9
Phenanthrene	148,958	2.21E-03	1.9E+01	6,254.7
Phenol	17,640	2.21E-03	2.8E-02	1.1

TABLE B-6 (continued)
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors		Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factors	
Pyrene	80,245	2.21E-03	7.5E-02	13.3
Styrene	15,452,374	2.21E-03	1.4E-02	478.1
n-Tetracosane	178,913	2.21E-03	8.2E-05	0.0
n-Tetradecane	5,997,603	2.21E-03	4.3E-03	57.0
Dalapon	1,110	2.21E-03	5.1E-03	0.0
Aluminum	2,075,445	2.21E-03	6.4E-02	293.6
Beryllium	165	2.21E-03	5.3E+00	1.9
Cadmium	6,008	2.21E-03	5.2E+00	69.0
Chromium	31,410	2.21E-03	2.7E-02	1.9
Copper	149,326	2.21E-03	4.7E-01	155.1
Hexavalent Chromium	9,978	2.21E-03	5.1E-01	11.2
Iron	41,201,903	2.21E-03	5.6E-03	509.9
Lead	55,349	2.21E-03	1.8E+00	220.2
Manganese	334,530	2.21E-03	1.4E-02	10.4
Mercury	465	2.21E-03	5.0E+02	514.0
Molybdenum	60,115	2.21E-03	2.0E-01	26.6
Nickel	174,650	2.21E-03	3.6E-02	13.9
Tantalum	61,691	2.21E-03	6.0E-02	8.2
Titanium	3,581	2.21E-03	2.9E-02	0.2
Zinc	2,322,950	2.21E-03	5.1E-02	261.8
Zirconium	4,294	2.21E-03	5.4E-01	5.1
Fluoride	472,593	2.21E-03	3.5E-02	36.6
Total	103,622,849 (229,006 pounds)			14,534.1

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-7
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factors	POTW Removal Factor	
Acetone	732,763	2.21E-03	7.60E-06	1.63E-01	0.0
Acrylonitrile	769,974	2.21E-03	8.50E-01	5.00E-02	72.3
Benzene	81,054	2.21E-03	1.80E-02	5.24E-02	0.2
Chloroform	393	2.21E-03	2.10E-03	2.66E-01	0.0
Ethylbenzene	52,735	2.21E-03	1.40E-03	6.21E-02	0.0
Methyl ethyl ketone	892,145	2.21E-03	2.20E-05	8.17E-02	0.0
Methyl isobutyl ketone	352,791	2.21E-03	1.20E-04	1.21E-01	0.0
Methylene chloride	1,648	2.21E-03	4.20E-04	4.57E-01	0.0
Toluene	121,776	2.21E-03	5.60E-03	3.82E-02	0.1
m-Xylene	37,109	2.21E-03	1.50E-03	3.46E-01	0.0
o+p-Xylene	24,029	2.21E-03	8.50E-03	4.93E-02	0.0
Acenaphthene	2,964	2.21E-03	2.50E-01	2.00E-02	0.0
Acenaphthylene	2,472	2.21E-03	8.40E-03	5.00E-02	0.0
Anthracene	1,783	2.21E-03	2.50E+00	4.00E-02	0.4
2,3-Benzofluorene	1,135	2.21E-03	2.20E-01	3.00E-01	0.2
Benzoic acid	14,507	2.21E-03	3.30E-04	1.95E-01	0.0
Biphenyl	13,784	2.21E-03	3.70E-02	4.00E-02	0.0
bis (2-Ethylhexyl) phthalate	5,328	2.21E-03	1.10E-01	4.02E-01	0.5
p-Cymene	19,459	2.21E-03	4.30E-02	1.00E-02	0.0
n-Decane	332,346	2.21E-03	4.30E-03	9.10E-01	2.9
3,6-Dimethylphenanthrene	2,360	2.21E-03	4.70E-01	5.00E-02	0.1
Di-n-octyl phthalate	3,302	2.21E-03	2.20E-01	1.70E-01	0.3
n-Docosane	17,033	2.21E-03	8.20E-05	1.20E-01	0.0
n-Dodecane	182,493	2.21E-03	4.30E-03	4.95E-02	0.1
n-Eicosane	52,717	2.21E-03	4.30E-03	7.60E-02	0.0
Fluorene	4,869	2.21E-03	7.00E-01	3.00E-01	2.3
n-Hexacosane	2,002	2.21E-03	8.20E-05	2.89E-01	0.0
n-Hexadecane	202,707	2.21E-03	4.30E-03	2.89E-01	0.6
1-Methylfluorene	4,863	2.21E-03	8.90E-02	3.00E-01	0.3
2-Methylnaphthalene	40,533	2.21E-03	1.80E-02	7.20E-01	1.2
1-Methylphenanthrene	10,948	2.21E-03	1.40E-01	5.00E-02	0.2
Naphthalene	405,285	2.21E-03	1.50E-02	5.31E-02	0.7
n-Octacosane	948	2.21E-03	8.20E-05	2.90E-01	0.0
n-Octadecane	101,357	2.21E-03	4.30E-03	2.89E-01	0.3
Pentamethylbenzene	15,805	2.21E-03	2.90E-01	9.00E-02	0.9
Phenanthrene	7,712	2.21E-03	1.90E+01	5.00E-02	16.2
Phenol	4,633	2.21E-03	2.80E-02	5.00E-02	0.0
Pyrene	3,890	2.21E-03	7.50E-02	5.00E-02	0.0
Styrene	1,054,021	2.21E-03	1.40E-02	6.35E-02	2.1
n-Tetracosane	10,152	2.21E-03	8.20E-05	2.89E-01	0.0
n-Tetradecane	368,833	2.21E-03	4.30E-03	2.89E-01	1.0
Dalapon	182	2.21E-03	5.10E-03	1.00E+00	0.0
Aluminum	118,230	2.21E-03	6.40E-02	1.20E-01	2.0
Beryllium	9	2.21E-03	5.30E+00	5.40E-01	0.1
Cadmium	229	2.21E-03	5.20E+00	1.00E-01	0.3

TABLE B-7 (continued)

BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE CHEMICAL SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factors	POTW Removal Factor	
Chromium	1,682	2.21E-03	2.70E-02	3.30E-01	0.0
Copper	5,296	2.21E-03	4.70E-01	1.60E-01	0.9
Hexavalent Chromium	1,772	2.21E-03	5.10E-01	9.40E-01	1.9
Iron	2,312,045	2.21E-03	5.60E-03	1.70E-01	4.9
Lead	2,556	2.21E-03	1.80E+00	8.00E-02	0.8
Manganese	17,051	2.21E-03	1.40E-02	5.90E-01	0.3
Mercury	27	2.21E-03	5.00E+02	4.00E-01	11.7
Molybdenum	3,413	2.21E-03	2.00E-01	4.80E-01	0.7
Nickel	8,537	2.21E-03	3.60E-02	4.90E-01	0.3
Tantalum	3,520	2.21E-03	6.00E-02	4.50E-01	0.2
Titanium	224	2.21E-03	2.90E-02	3.12E-01	0.0
Zinc	125,694	2.21E-03	5.10E-02	2.20E-01	3.1
Zirconium	247	2.21E-03	5.40E-01	1.00E+00	0.3
Total	8,557,371 (18,912 pounds)				130.4

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-8
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factors	POTW Removal Factor	
Acetone	364,973	2.21E-03	7.6E-06	1.6E-01	0.0
Benzene	13,733	2.21E-03	1.8E-02	5.0E-02	0.0
1,2-Dichloroethane	701	2.21E-03	6.2E-03	1.1E-01	0.0
Ethylbenzene	10,254	2.21E-03	1.4E-03	6.0E-02	0.0
Methyl ethyl ketone	32,958	2.21E-03	2.2E-05	8.0E-02	0.0
Methyl isobutyl ketone	3,493	2.21E-03	1.2E-04	1.2E-01	0.0
Methylene chloride	2,226	2.21E-03	4.2E-04	4.6E-01	0.0
Tetrachloroethylene	961	2.21E-03	7.4E-02	1.5E-01	0.0
Toluene	54,707	2.21E-03	5.6E-03	4.0E-02	0.0
1,1,1-Trichloroethane	3,274	2.21E-03	4.3E-03	1.0E-01	0.0
Trichloroethylene	702	2.21E-03	6.3E-02	1.3E-01	0.0
Vinyl Acetate	3,766	2.21E-03	4.0E-03	1.0E+00	0.0
m-Xylene	16,445	2.21E-03	1.5E-03	3.5E-01	0.0
o+p-Xylene	8,016	2.21E-03	8.5E-03	5.0E-02	0.0
Benzoic acid	17,370	2.21E-03	3.3E-04	1.9E-01	0.0
Biphenyl	385	2.21E-03	3.7E-02	4.0E-02	0.0
bis (2-Ethylhexyl) phthalate	103	2.21E-03	1.1E+01	4.0E-01	1.0
4-Chloro-3-Methylphenol	17,578	2.21E-03	4.3E-03	2.9E-01	0.0
n-Decane	46,633	2.21E-03	4.3E-03	9.1E-01	0.4
Diphenyl Ether	11	2.21E-03	2.6E-02	3.0E-01	0.0
n-Docosane	3,185	2.21E-03	8.2E-05	1.2E-01	0.0
n-Dodecane	34,547	2.21E-03	4.3E-03	5.0E-02	0.0
n-Eicosane	16,550	2.21E-03	4.3E-03	8.0E-02	0.0
n-Hexacosane	3,235	2.21E-03	8.2E-05	2.9E-01	0.0
n-Hexadecane	21,426	2.21E-03	4.3E-03	2.9E-01	0.1
Hexanoic Acid	6,022	2.21E-03	3.4E-04	1.6E-01	0.0
2-Isopropylnaphthalene	4,151	2.21E-03	9.8E-02	7.2E-01	0.6
2-Methylnaphthalene	3,711	2.21E-03	1.8E-02	7.2E-01	0.1
Naphthalene	3,513	2.21E-03	1.5E-02	5.0E-02	0.0
n-Octacosane	2,259	2.21E-03	8.2E-05	2.9E-01	0.0
n-Octadecane	7,248	2.21E-03	4.3E-03	2.9E-01	0.0
Pentamethylbenzene	3,909	2.21E-03	2.9E-01	9.0E-02	0.2
Phenol	2,705	2.21E-03	2.8E-02	5.0E-02	0.0
n-Tetracosane	3,445	2.21E-03	8.2E-05	2.9E-01	0.0
n-Tetradecane	10,209	2.21E-03	4.3E-03	2.9E-01	0.0
n-Triacontane	87	2.21E-03	8.2E-05	2.9E-01	0.0
Tripropylene glycol Methyl Ether	113,949	2.21E-03	8.2E-06	5.3E-01	0.0
Aluminum	13,642	2.21E-03	6.4E-02	1.2E-01	0.2
Antimony	55	2.21E-03	1.9E-01	4.4E-01	0.0
Arsenic	143	2.21E-03	4.0E+00	1.0E+00	1.3
Barium	2,410	2.21E-03	2.0E-03	6.4E-01	0.0
Beryllium	29	2.21E-03	5.3E+00	5.4E-01	0.2
Boron	38,658	2.21E-03	1.8E-01	7.7E-01	11.8
Cadmium	175	2.21E-03	5.2E+00	1.0E-01	0.2
Calcium	107,780	2.21E-03	2.8E-05	4.5E-01	0.0
Chromium	1,359	2.21E-03	2.7E-02	3.3E-01	0.0

TABLE B-8 (continued)
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factors	POTW Removal Factor	
Cobalt	546	2.21E-03	1.1E-01	6.3E-01	0.1
Copper	11,839	2.21E-03	4.7E-01	1.6E-01	2.0
Hexavalent Chromium	1,900	2.21E-03	5.1E-01	9.4E-01	2.0
Iron	160,398	2.21E-03	5.6E-03	1.7E-01	0.3
Lead	8,332	2.21E-03	1.8E+00	8.0E-02	2.7
Magnesium	39,177	2.21E-03	8.7E-04	7.4E-01	0.1
Manganese	4,160	2.21E-03	1.4E-02	5.9E-01	0.1
Mercury	2	2.21E-03	5.0E+02	4.0E-01	0.7
Molybdenum	1,429	2.21E-03	2.0E-01	4.8E-01	0.3
Nickel	42,143	2.21E-03	3.6E-02	4.9E-01	1.6
Phosphorus	2,360	2.21E-03	0.0E+00	3.1E-01	0.0
Potassium	4,901	2.21E-03	1.1E-03	8.0E-01	0.0
Selenium	18	2.21E-03	1.1E+00	5.4E-01	0.0
Silver	132	2.21E-03	4.7E-01	2.2E-01	0.0
Sodium	1,864,821	2.21E-03	5.5E-06	4.5E-01	0.0
Sulfur	6,314	2.21E-03	5.6E-06	8.8E-01	0.0
Tantalum	67	2.21E-03	6.0E-02	4.5E-01	0.0
Thallium	6	2.21E-03	1.4E-01	7.3E-01	0.0
Tin	685	2.21E-03	3.0E-01	3.5E-01	0.2
Titanium	324	2.21E-03	2.9E-02	3.1E-01	0.0
Tungsten	181	2.21E-03	5.3E-03	4.5E-01	0.0
Vanadium	193	2.21E-03	6.2E-01	5.7E-01	0.2
Zinc	11,674	2.21E-03	5.1E-02	2.2E-01	0.3
Zirconium	11	2.21E-03	5.4E-01	1.0E+00	0.0
Fluoride	38,859	2.21E-03	3.5E-02	3.9E-01	1.2
Total Cyanide	48	2.21E-03	1.1E+00	3.0E-01	0.0
Total	3,203,208 (7,079 pounds)				28.2

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-9
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Acetone	1,337	2.21E-03	7.6E-06	1.6E-01	0.0
Benzene	50	2.21E-03	1.8E-02	5.0E-02	0.0
1,2-Dichloroethane	3	2.21E-03	6.2E-03	1.1E-01	0.0
Ethylbenzene	38	2.21E-03	1.4E-03	6.0E-02	0.0
Methyl ethyl ketone	121	2.21E-03	2.2E-05	8.0E-02	0.0
Methyl isobutyl ketone	13	2.21E-03	1.2E-04	1.2E-01	0.0
Methylene chloride	8	2.21E-03	4.2E-04	4.6E-01	0.0
Tetrachloroethylene	4	2.21E-03	7.4E-02	1.5E-01	0.0
Toluene	200	2.21E-03	5.6E-03	4.0E-02	0.0
1,1,1-Trichloroethane	12	2.21E-03	4.3E-03	1.0E-01	0.0
Trichloroethylene	3	2.21E-03	6.3E-02	1.3E-01	0.0
Vinyl Acetate	14	2.21E-03	4.0E-03	1.0E+00	0.0
m-Xylene	60	2.21E-03	1.5E-03	3.5E-01	0.0
o+p-Xylene	29	2.21E-03	8.5E-03	5.0E-02	0.0
Benzoic acid	64	2.21E-03	3.3E-04	1.9E-01	0.0
Biphenyl	1	2.21E-03	3.7E-02	4.0E-02	0.0
bis (2-Ethylhexyl) phthalate	0	2.21E-03	1.1E+01	4.0E-01	0.0
4-Chloro-3-Methylphenol	64	2.21E-03	4.3E-03	2.9E-01	0.0
n-Decane	171	2.21E-03	4.3E-03	9.1E-01	0.0
Diphenyl Ether	0	2.21E-03	2.6E-02	3.0E-01	0.0
n-Docosane	12	2.21E-03	8.2E-05	1.2E-01	0.0
n-Dodecane	127	2.21E-03	4.3E-03	5.0E-02	0.0
n-Eicosane	61	2.21E-03	4.3E-03	8.0E-02	0.0
n-Hexacosane	12	2.21E-03	8.2E-05	2.9E-01	0.0
n-Hexadecane	78	2.21E-03	4.3E-03	2.9E-01	0.0
Hexanoic Acid	22	2.21E-03	3.4E-04	1.6E-01	0.0
2-Isopropylnaphthalene	15	2.21E-03	9.8E-02	7.2E-01	0.0
2-Methylnaphthalene	14	2.21E-03	1.8E-02	7.2E-01	0.0
Naphthalene	13	2.21E-03	1.5E-02	5.0E-02	0.0
n-Octacosane	8	2.21E-03	8.2E-05	2.9E-01	0.0
n-Octadecane	27	2.21E-03	4.3E-03	2.9E-01	0.0
Pentamethylbenzene	14	2.21E-03	2.9E-01	9.0E-02	0.0
Phenol	10	2.21E-03	2.8E-02	5.0E-02	0.0
n-Tetracosane	13	2.21E-03	8.2E-05	2.9E-01	0.0
n-Tetradecane	37	2.21E-03	4.3E-03	2.9E-01	0.0
n-Triacontane	0	2.21E-03	8.2E-05	2.9E-01	0.0
Tripropylene glycol Methyl Ether	417	2.21E-03	8.2E-06	5.3E-01	0.0
Aluminum	50	2.21E-03	6.4E-02	1.2E-01	0.0
Antimony	0	2.21E-03	1.9E-01	4.4E-01	0.0
Arsenic	1	2.21E-03	4.0E+00	1.0E+00	0.0
Barium	9	2.21E-03	2.0E-03	6.4E-01	0.0
Beryllium	0	2.21E-03	5.3E+00	5.4E-01	0.0
Boron	142	2.21E-03	1.8E-01	7.7E-01	0.0
Cadmium	1	2.21E-03	5.2E+00	1.0E-01	0.0
Calcium	395	2.21E-03	2.8E-05	4.5E-01	0.0
Chromium	5	2.21E-03	2.7E-02	3.3E-01	0.0

TABLE B-9 (continued)

BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL PETROLEUM SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/ Pounds	Toxic Weighting Factor	POTW Removal Factor	
Cobalt	2	2.21E-03	1.1E-01	6.3E-01	0.0
Copper	43	2.21E-03	4.7E-01	1.6E-01	0.0
Hexavalent Chromium	7	2.21E-03	5.1E-01	9.4E-01	0.0
Iron	587	2.21E-03	5.6E-03	1.7E-01	0.0
Lead	31	2.21E-03	1.8E+00	8.0E-02	0.0
Magnesium	143	2.21E-03	8.7E-04	7.4E-01	0.0
Manganese	15	2.21E-03	1.4E-02	5.9E-01	0.0
Mercury	0	2.21E-03	5.0E+02	4.0E-01	0.0
Molybdenum	5	2.21E-03	2.0E-01	4.8E-01	0.0
Nickel	154	2.21E-03	3.6E-02	4.9E-01	0.0
Phosphorus	9	2.21E-03	0.0E+00	3.1E-01	0.0
Potassium	18	2.21E-03	1.1E-03	8.0E-01	0.0
Selenium	0	2.21E-03	1.1E+00	5.4E-01	0.0
Silver	0	2.21E-03	4.7E-01	2.2E-01	0.0
Sodium	6,830	2.21E-03	5.5E-06	4.5E-01	0.0
Sulfur	23	2.21E-03	5.6E-06	8.8E-01	0.0
Tantalum	0	2.21E-03	6.0E-02	4.5E-01	0.0
Thallium	0	2.21E-03	1.4E-01	7.3E-01	0.0
Tin	3	2.21E-03	3.0E-01	3.5E-01	0.0
Titanium	1	2.21E-03	2.9E-02	3.1E-01	0.0
Tungsten	1	2.21E-03	5.3E-03	4.5E-01	0.0
Vanadium	1	2.21E-03	6.2E-01	5.7E-01	0.0
Zinc	43	2.21E-03	5.1E-02	2.2E-01	0.0
Zirconium	0	2.21E-03	5.4E-01	1.0E+00	0.0
Fluoride	142	2.21E-03	3.5E-02	3.9E-01	0.0
Total Cyanide	0	2.21E-03	1.1E+00	3.0E-01	0.0
Total	11,732 (26 pounds)				0.1

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-10

**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK FOOD SUBCATEGORY
INDIRECT DISCHARGERS**

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Benzoic acid	2,072,555,307	2.21E-03	3.30E-04	1.90E-01	287.2
Hexanoic Acid	48,273,877,828	2.21E-03	3.40E-04	1.60E-01	5,803.7
Phenol	213,127,187	2.21E-03	2.80E-02	5.00E-02	659.4
Total	50,559,560,322 (111,736,628 pounds)				6,750.3

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-11
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL FOOD SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Benzoic acid	594,567,143	2.21E-03	3.30E-04	1.90E-01	82.4
Hexanoic Acid	13,848,655,349	2.21E-03	3.40E-04	1.60E-01	1,664.9
Phenol	61,141,066	2.21E-03	2.80E-02	5.00E-02	189.2
Total	14,504,363,558 (32,054,643 pounds)				1,936.5

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-12
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE FOOD SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Benzoic acid	3,937,080	2.21E-03	3.30E-04	1.90E-01	0.5
Hexanoic Acid	91,702,454	2.21E-03	3.40E-04	1.60E-01	11.0
Phenol	404,861	2.21E-03	2.80E-02	5.00E-02	1.3
Total	96,044,395 (212,258 pounds)				12.8

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-13
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
TRUCK HOPPER SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Aluminum	74,225	2.21E-03	6.40E-02	1.20E-01	1.3
Beryllium	23	2.21E-03	5.30E+00	5.40E-01	0.1
Calcium	1,356,462	2.21E-03	2.80E-05	4.50E-01	0.0
Chromium	605	2.21E-03	2.70E-02	3.30E-01	0.0
Iron	419,112	2.21E-03	5.60E-03	1.70E-01	0.9
Manganese	13,742	2.21E-03	1.40E-02	5.90E-01	0.3
Titanium	2,174	2.21E-03	2.90E-02	3.10E-01	0.0
Zinc	1,219	2.21E-03	5.10E-02	2.20E-01	0.0
Total	1,867,563 (4,127 pounds)				2.7

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-14

BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
RAIL HOPPER SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Aluminum	689	2.21E-03	6.40E-02	1.20E-01	0.0
Beryllium	0	2.21E-03	5.30E+00	5.40E-01	0.0
Calcium	15,134	2.21E-03	2.80E-05	4.50E-01	0.0
Chromium	11	2.21E-03	2.70E-02	3.30E-01	0.0
Iron	3,644	2.21E-03	5.60E-03	1.70E-01	0.0
Manganese	132	2.21E-03	1.40E-02	5.90E-01	0.0
Titanium	13	2.21E-03	2.90E-02	3.10E-01	0.0
Zinc	13	2.21E-03	5.10E-02	2.20E-01	0.0
Total	19,635 (43 pounds)				0.0

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-15
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE HOPPER SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor		
Aluminum	93,992	2.21E-03	6.40E-02	13.3	
Beryllium	29	2.21E-03	5.30E+00	0.3	
Calcium	1,721,537	2.21E-03	2.80E-05	0.1	
Chromium	775	2.21E-03	2.70E-02	0.0	
Iron	530,356	2.21E-03	5.60E-03	6.6	
Manganese	17,409	2.21E-03	1.40E-02	0.5	
Titanium	2,743	2.21E-03	2.90E-02	0.2	
Zinc	1,547	2.21E-03	5.10E-02	0.2	
Total	2,368,387 (5,234 pounds)			21.2	

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

TABLE B-16
BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES
BARGE HOPPER SUBCATEGORY
INDIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Conversion Factors			Pound Equivalents Discharged at Baseline
		Grams/Pounds	Toxic Weighting Factor	POTW Removal Factor	
Aluminum	22,992	2.21E-03	6.40E-02	1.20E-01	0.4
Beryllium	4	2.21E-03	5.30E+00	5.40E-01	0.0
Calcium	505,338	2.21E-03	2.80E-05	4.50E-01	0.0
Chromium	333	2.21E-03	2.70E-02	3.30E-01	0.0
Iron	121,664	2.21E-03	5.60E-03	1.70E-01	0.3
Manganese	4,416	2.21E-03	1.40E-02	5.90E-01	0.1
Titanium	442	2.21E-03	2.90E-02	3.10E-01	0.0
Zinc	441	2.21E-03	5.10E-02	2.20E-01	0.0
Total	655,629 (1,449 pounds)				0.8

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

APPENDIX C

SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: CONVENTIONAL POLLUTANT REMOVALS

TABLE C-1

CONVENTIONAL POLLUTANT REMOVALS
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)	Conversion Factor	Pollutants Removed (pounds)
	Option 1	Grams/Pounds	Option 1
5-Day Biochemical Oxygen Demand	ND	2.21E-03	ND
Total Suspended Solids	ND	2.21E-03	ND
Oil and Grease	ND	2.21E-03	ND
Total	ND		ND

ND: Not disclosed due to business confidentiality.

TABLE C-2

CONVENTIONAL POLLUTANT REMOVALS
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)			Conversion Factor (pounds)	Pollutants Removed (pounds)			
	Option 1	Option 2	Option 3		Grams/Pounds	Option 1	Option 2	Option 3
5-Day Biochemical Oxygen Demand	ND	ND	ND	2.21E-03	ND	ND	ND	ND
Total Suspended Solids	ND	ND	ND	2.21E-03	ND	ND	ND	ND
Oil and Grease	ND	ND	ND	2.21E-03	ND	ND	ND	ND
Total	ND	ND	ND		ND	ND	ND	

ND: Not disclosed due to business confidentiality.

TABLE C-3

CONVENTIONAL POLLUTANT REMOVALS
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Removed (grams)		Conversion Factor	Pollutants Removed (pounds)	
	Option 1	Option 2		Grams/Pounds	Option 1
5-Day Biochemical Oxygen Demand	222,484,929	273,899,313	2.21E-03	491,692	605,317
Total Suspended Solids	340,842,409	390,291,354	2.21E-03	753,262	862,544
Oil and Grease	2,311,473,304	2,312,344,711	2.21E-03	5,108,356	5,110,282
Total	2,874,800,641	2,976,535,377		6,353,309	6,578,143

TABLE C-4

CONVENTIONAL POLLUTANT REMOVALS
BARGE HOPPER SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Option 1	Grams/Pounds	Conversion Factor (pounds)	Pollutants Removed (grams)	Pollutants Removed (pounds)
Total Suspended Solids	3,903,193		2.21E-03	8,626	
Total	3,903,193			8,626	

APPENDIX D

**SUPPORTING DOCUMENTATION FOR
COST-EFFECTIVENESS ANALYSIS:
BASELINE CONVENTIONAL POLLUTANT DISCHARGES**

TABLE D-1

BASELINE CONVENTIONAL POLLUTANT DISCHARGES
TRUCK CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Grams/Pounds	Conversion Factor	Pollutants Discharged at Baseline (pounds)
5-Day Biochemical Oxygen Demand	425,538	2.21E-03	940	
Total Suspended Solids	1,567,047	2.21E-03	3,463	
Oil and Grease	110,586,227	2.21E-03	244,396	
Total	112,578,812			248,799

TABLE D-2

**BASELINE CONVENTIONAL POLLUTANT DISCHARGES
RAIL CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS**

Chemical	Pollutants Discharged at Baseline (grams)	Grams/Pounds Conversion Factor	Pollutants Discharged at Baseline (pounds)
5-Day Biochemical Oxygen Demand	185,055	2.21E-03	409
Total Suspended Solids	1,096,079	2.21E-03	2,422
Oil and Grease	288,134	2.21E-03	637
Total	1,569,268		3,468

TABLE D-3

BASELINE CONVENTIONAL POLLUTANT DISCHARGES
BARGE CHEMICAL SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Grains/Pounds Conversion Factor	Pollutants Discharged at Baseline (pounds)
5-Day Biochemical Oxygen Demand	276,953,881	2.21E-03	612,068
Total Suspended Solids	391,267,814	2.21E-03	864,702
Oil and Grease	2,313,256,074	2.21E-03	5,112,296
Total	2,981,477,768		6,589,066

TABLE D-4

BASELINE CONVENTIONAL POLLUTANT DISCHARGES
BARGE HOPPER SUBCATEGORY
DIRECT DISCHARGERS

Chemical	Pollutants Discharged at Baseline (grams)	Grams/Pounds Conversion Factor	Pollutants Discharged at Baseline (pounds)
Total Suspended Solids	8,573,754	2.21E-03	18,948
Total	8,573,754		18,948