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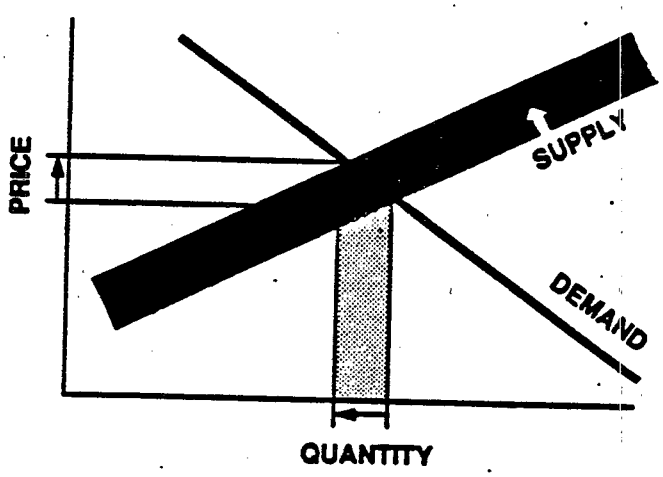
Re-Evaluation of the Economic Impact Analysis of Effluent Limitations Guidelines for the Organic Chemicals, Plastics, and Synthetic Fibers Industry Using Revised Compliance Costs



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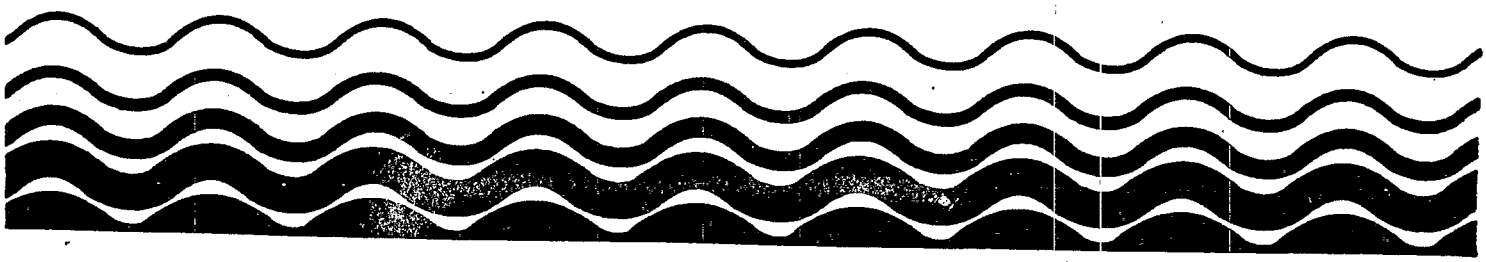

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Re-evaluation of the Economic Impact Analysis of Effluent Limitations Guidelines for the Organic Chemicals, Plastics, and Synthetic Fibers Industry using Revised Compliance Costs

Engineering and Analysis Division
Office of Science and Technology
Office of Water
U.S. Environmental Protection Agency
Wahsington, DC 20460

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PREFACE

This report summarizes the effects that revised compliance cost estimates have on the economic impact analysis (EIA) of effluent limitations guidelines for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Industry. The original EIA was prepared for the final OCPSF rule which was promulgated in November 1987. The primary purpose of revisiting the economic impact analysis is to determine if, in light of the compliance cost revisions, the OCPSF rule remains economically achievable. The analyses and results reported below cover all cost revisions and corrections available as of August 1991.

The handwritten revisions in this document reflect the corrections that were identified in a Federal Register notice of January 21, 1992 (57 FR 2238). This report now covers all cost revisions and corrections available as of January 1992.

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A. Background

In November 1987, the U.S. Environmental Protection Agency (EPA) promulgated effluent limitations guidelines for the OCPSF manufacturing point source category. As a result of a settlement stemming from several lawsuits, certain portions of the OCPSF regulation were remanded to EPA for further rulemaking proceedings. One consequence of these actions is that the costs for particular control technologies were revised. The Chemicals Industry Branch (CIB) is responsible for developing revised compliance cost estimates. The Economic and Statistical Analysis Branch (ESAB) in the Office of Water's Engineering and Analysis Division is responsible for re-evaluating all elements of the EIA carried out in support of the 1987 OCPSF rulemaking to determine if the selected control options remain economically achievable given the compliance cost revisions. Abt Associates assisted ESAB in re-evaluating the economic impact analysis for the OCPSF effluent limitations guidelines.

ESAB considers a re-evaluation of the EIA to be important because alteration of the compliance cost estimates could substantially alter the results of the economic impact analyses that were conducted as part of the promulgated effluent limitations guidelines for the OCPSF industry (EPA 440/2/87-007). Three types of analyses were undertaken as part of this project:

- a revised plant impact analysis
- a revised regulatory flexibility analysis (RFA)
- a revised cost-effectiveness (CE) analysis

The plant impact analysis is used as the primary basis for evaluating economic achievability. The regulatory flexibility analysis provides information with which to determine if small plants are disproportionately affected by the revised cost estimates. The cost-effectiveness analysis provides information for (1) determining if the selected option remains the most cost-effective in reducing pollutant discharges; and (2) comparing the cost-effectiveness ($/amount of pollutant removed) of the selected control option to other effluent limitations guidelines promulgated by the Agency.

B. Changes in Compliance Cost Estimates

Two types of compliance cost changes are included in this analysis. The first type of cost change covers revisions and corrections that were made after the final rule was promulgated. These changes were not incorporated in the EIA conducted for the final OCPSF rule, but are evaluated here as a Revised Baseline. The second type of change relates to the re-estimate of compliance costs for in-plant biological treatment as ordered by the federal court. Costs for three control options designed to meet the court-ordered remand (Options 1, 2, and 3) were evaluated in the economic impact analysis.

The revised economic impact analysis reported below used the EIA of the final OCPSF rule as a baseline. That is, the impact analysis examined the costs of the revisions and control options (to meet the remanded portion of the rule) together. Such an analysis facilitates a consistent comparison of revised control options to the EIA that accompanied the final rule.

B.1 Revisions and Corrections to Compliance Cost Estimations

Revised Baseline - The Agency's Industrial Technology Division revised and corrected compliance cost estimates for particular plants as additional information (regarding plant wastewater processes and treatment technologies) became available. These cost revisions reflect the addition of steam stripping and chemical precipitation upgrades as well as correction of some errors (such as inaccurate wastewater flow and treatment technologies). The revised BAT Option II-B included changes for 23 out of ~~386~~ 389 direct dischargers. The revised PSES Option IV-B included changes for 51 out of 365 indirect dischargers.

B.2 Remanded Portions of the Final OCPSF Rule

Option 1 - The Agency's Industrial Technology Division recosted in-plant biological treatment to account for greater residence times (3 to 17 days depending upon plant-specific parameters). Increasing the residence time of the biological treatment system also expands the land requirements. This constraint is addressed as part of Option 3. The costs reported for Option 1 are cumulative; they include the cost revisions attributed to the Revised Baseline. A total of ~~43~~ 45 direct dischargers and 250 indirect dischargers incur cost changes under Option 1. One plant was dropped from the analysis of Option 1 following determination of zero discharge status.

Option 2 - The Agency's Industrial Technology Division costed alternative activated carbon treatment for all indirect discharging plants that were projected to close under Option 1. Control technologies for other indirect discharging plants remain as in Option 1. The costs reported for Option 2 are cumulative; they include the cost revisions attributed to Revised Baseline. A total of 250 indirect dischargers incur cost changes under Option 2. This option was not considered for direct dischargers.

Option 3 - The Agency's Industrial Technology Division costed alternative activated carbon treatment for all plants that are assumed to be unable to obtain sufficient land for larger in-plant biological treatment systems called for under Option 1 (i.e., land requirements are greater than 1.0 acres). The costs reported for Option 3 are cumulative; they include the cost revisions attributed to Revised Baseline. A total of 250 indirect dischargers incur cost changes under Option 3. This option was not considered for direct dischargers.

C. Plant Impact Analysis

The plant impact analysis is conducted separately for direct and indirect dischargers.[1] Several measures are used to summarize the impact of the regulations on OCPSF plants. They include: total annualized cost of the selected option, number of plants expected to close, number of product lines expected to close, number of plants with significant sales or profit impacts, and expected job losses (associated with closures). Additional information regarding the calculation of impact measures, and their significance can be found in the EIA prepared for the final OCPSF rule (EPA 440/2/87-007).

Total Incremental Annualized Costs

The costs subject to revision in this analysis are the costs of controlling priority pollutants. These costs are incremental to the cost of removing conventional pollutants, such as biological oxygen demand (BOD) and total suspended solids (TSS), from the wastestream. Tables 1 and 3 include costs for ~~286~~ 359 direct dischargers. Tables 2, 4, 5, and 6 include costs for 365 indirect dischargers. Slightly fewer plants are analyzed for impact

[1] Compliance costs for joint dischargers include the costs to control both their direct and indirect wastewater discharges under the selected control options (BAT II-B for direct discharges and PSES IV-B for indirect discharges). In this analysis, the results for joint dischargers are reported with the results for direct dischargers.

measures because some plants did not provide sufficient financial information with which to calculate impacts. The costs (and impacts) for joint dischargers are reported in Table 1 along with direct dischargers.

Plant and Product Line Closures

A closure is expected where the liquidation value of the plant exceeds the present value of cash flow minus annualized compliance costs. The entire plant is expected to close if the OCPSF employment is 80 percent or more of total plant employment. Otherwise the plant is expected to remain open but the OCPSF product line will close.

Profit or Sales Impacts

Even if a plant is not expected to incur a plant or product line closure, it may still incur a significant adverse impact due to compliance costs. Adverse impacts on both profit and sales measures are included in the economic impact model. If post-compliance plant profitability falls below the lowest decile of the industry segment or compliance costs exceed 5 percent of sales, then the impact is considered significant.

Employment Reduction

Employment losses are expected at plants where the cost of compliance results in a plant or product line closure. In plants where less than 80 percent of the employees work on OCPSF product lines, a closure is assumed to affect only the OCPSF product lines. The employment reduction of a product line closure is, therefore, equal to the plant's OCPSF employment. However, in plants where 80 percent or more of the employees work on OCPSF product lines, a closure is assumed to affect the entire facility and the employment reduction is equal to total plant employment.

The percentage reduction in employment is calculated using the total OCPSF employment for all plants consider within scope. Total OCPSF employment does not include plant workers who work on non-OCPSF product lines. Employment reductions associated with controls for both direct and indirect dischargers are compared to total OCPSF employment of 180,739.

C.1 Plant Impact Analysis Results

Two types of comparisons are made between the impacts of the OCPSF rule as promulgated and the impacts of the rule including the cost revisions:

- the absolute change in the impact measure (e.g., the number of direct discharging plants expected to close rises from *a* to *b*); and
- the change in the percentage of the industry subject to a specific impact (e.g., the percentage of all direct dischargers that are expected to close rises from *x* to *y* percent).

Both types of measures are considered when comparing the impacts of the revisions to the impacts of the OCPSF rule as promulgated.

Revised Baseline: Revisions and Corrections

Direct Dischargers (Table 1). Compliance costs for 23 of the ~~286~~ 289 direct dischargers have been revised since the OCPSF rule was promulgated. The total annualized cost of the revised BAT option increased by $2.0 million (less than 1 percent) to $208.0 million. There are no incremental impacts associated with these cost changes. Consequently, the change in compliance costs would not alter the findings of the EIA of the rule as promulgated.

Table 1
Direct Dischargers - Revised Baseline

Impact Measure	Promulgated BAT Option	Revised Baseline	Incremental Change of Revised Baseline
Plants Analyzed/Plants Costed	283/~~286~~ 289	283/~~286~~ 289	n.a.
Total Annualized Cost (1982 $, millions)	$206.0	$208.0	$2.0
Plant Closures (% of direct discharging plants)	11 (3.8%)	11 (3.8%)	0 (0%)
Product Line Closures (% of direct discharging plants)	9 (3.1%)	9 (3.1%)	0 (0%)
Profit or Sales Impacts (% of direct discharging plants)	17 (5.9%)	17 (5.9%)	0 (0%)
Employment Reduction (% of total OCPSF employment)	1,359 (0.8%)	1,359 (0.8%)	0 (0%)

Indirect Dischargers (Table 2). Compliance costs for 51 of the 365 indirect dischargers have been revised since the OCPSF rule was promulgated. The total annualized cost increased by $7.9 million (4 percent), from $182.7 million to $190.6 million. The cost revisions result in one additional product line closure, 3 additional sales/profit impacts, and an additional employment reduction of 19 workers. Across the base of 365 plants, such changes do not change the findings of the economic impact analysis of the rule as promulgated.

Table 2
Indirect Dischargers - Revised Baseline

Impact Measure	Promulgated PSES Option	Revised Baseline	Incremental Change of Revised Baseline
Plants Analyzed/Plants Costed	362/365	362/365	n.a.
Total Annualized Cost (1982 $, millions)	$182.7	$190.6	$7.9
Plant Closures (% of indirect discharging plants)	25 (6.8%)	25 (6.8%)	0 (0%)
Product Line Closures (% of indirect discharging plants)	27 (7.4%)	28 (7.7%)	1 (0.3%)
Profit or Sales Impacts (% of indirect discharging plants)	63 (17.3%)	66 (18.1%)	3 (0.8%)
Employment Reduction (% of Total OCPSF employment)	2,190 (1.2%)	2,209 (1.2%)	19 (<0.1%)

Option 1: Revised Baseline + Revised Costs for In-Plant Biological Treatment

Direct Dischargers (Table 3). For the ~~286~~ 289 direct dischargers with cost information, the compliance costs associated with revisions and the remanded portions of the OCPSF rule under Option 1 total ~~$221.6~~ 215.8 million. This is a ~~$15.6~~ 9.8 million (~~8~~ 5 percent) increase over the cost of the rule as promulgated. The cost of Option 1 is significantly less than that of other control options evaluated but not selected in the EIA for the promulgated rule.

There ~~are no~~ is one incremental ~~impacts (i.e., plant closures,~~ product line closures~~, profit/sales impacts, or employment losses)~~ associated with this cost increase. ~~Because the cost increases are estimated for specific plants in the impact model, increased costs are not necessarily associated with increased impacts.~~ Under Option 1, costs increased for specific plants but did not trigger their impact measures' thresholds (~~38~~ 37 cases) or the costs increased for plants that were previously projected to incur an economic impact (8 cases). One plant changed from a profit/sales impact to a product line closure and another product line closure was removed from the analysis. The total number of closures, therefore, does not change.

Table 3

Direct Dischargers - Option 1

Impact Measure	Promulgated BAT Option	Option 1	Incremental Change of Option 1
Plants Analyzed/Plants Costed	283/~~286~~ 289	~~283/286~~ 282/289	n.a.
Total Annualized Cost (1982 $, millions)	$206.0	~~$221.6~~ 215.8	~~$15.6~~ 9.8
Plant Closures (% of direct discharging plants)	11 (3.8%)	11 (3.8%)	0 (0%)
Product Line Closures (% of direct discharging plants)	9 (3.1%)	9 (3.1%)	0 (0%)
Profit or Sales Impacts (% of direct discharging plants)	17 (5.9%)	~~17~~ 16 ~~(5.9%)~~ (5.6%)	~~0~~ -1 ~~(0%)~~ (-0.3%)
Employment Reduction (% of Total OCPSF employment)	1,359 (0.8%)	~~1,359~~ 1,135 ~~(0.8%)~~ (1.0%)	~~0~~ 376 ~~(0%)~~ (0.2%)

Indirect Dischargers (Table 4). For the 365 indirect dischargers with cost information, compliance costs increased from $182.7 (as promulgated) to ~~$220.3~~ 233.0 million under Option 1 -- an increase of ~~$37.6~~ 50.3 million (~~21~~ 28 percent). The revised cost of controls for indirect dischargers remains less than any other control option evaluated in the EIA for the promulgated rule.

Unlike the cost revisions for direct dischargers, plant impacts increase under Option 1. The number of plant and product line closures rises from 52 (14 percent of the indirect dischargers analyzed) for the rule as promulgated to 56, an increase of 4 plants -- another 1 percent of the indirect discharging plants and product lines are expected to close. The number of profit/sales impacts also increases, from 63 (17 percent) to 66 (18 percent). For the rule as promulgated, 32 percent of the indirect dischargers were expected to incur some type of significant impact. The revised costs raise the percentage of significantly affected plants to 33 percent. The employment reduction associated with these closures increases from 2,190 (1.2 percent of total OCPSF employment) to 3,396 (1.9 percent of total OCPSF employment) under Option 1.

Table 4
Indirect Dischargers - Option 1

Impact Measure	Promulgated PSES Option	Option 1	Incremental Change of Option 1
Plants Analyzed/Plants Costed	362/365	362/365	n.a.
Total Annualized Cost (1982 $, millions)	$182.7	233.0 ~~$220.3~~	50.3 ~~$37.6~~
Plant Closures (% of indirect discharging plants)	25 (6.8%)	27 (7.4%)	2 (0.5%)
Product Line Closures (% of indirect discharging plants)	27 (7.4%)	29 (7.9%)	2 (0.5%)
Profit or Sales Impacts (% of indirect discharging plants)	63 (17.3%)	66 (18.1%)	3 (0.8%)
Employment Reduction (% of Total OCPSF employment)	2,190 (1.2%)	3,396 (1.9%)	1,206 (0.7%)

Option 2: Option 1 with Activated Carbon Treatment for Plants Projected to Close under Option 1

Direct Dischargers. Option 2 modified the costs only for plants that closed under Option 1. Costs were not revised for direct dischargers under Option 2 since no plants sustained significant adverse impacts to due to the incremental costs of Option 1 (over the promulgated BAT option).

Indirect Dischargers. (Table 5). Option 2 resulted in cost changes for 8 plants that sustained impacts under Option 1. Under Option 2, the total annualized cost is $215.9 million -- a decrease of $4.4 million from Option 1. The annualized cost of Option 2 is, however, $33.2 million (18 percent) more than the selected option for the final OCPSF rule. Despite the fact that Option 2 costs are lower than Option 1 costs, there is no substantial difference in the impacts (one fewer profit/sales impact under Option 2). Under Option 2: 56 plants and product lines are expected to close (1 percent more than the rule as promulgated); 65 plants are expected to incur a profit or sales impact (less than 1 percent more than the rule as promulgated); and employment losses increase by 1,206 workers (55 percent more than the rule as promulgated).

Table 5

Indirect Dischargers - Option 2

Impact Measure	Promulgated PSES Option	Option 2	Incremental Change of Option 2
Plants Analyzed/Plants Costed	362/365	362/365	n.a.
Total Annualized Cost (1982 $, millions)	$182.7	$215.9	$33.2
Plant Closures (% of indirect discharging plants)	25 (6.8%)	27 (7.4%)	2 (0.5%)
Product Line Closures (% of indirect discharging plants)	27 (7.4%)	29 (7.9%)	2 (0.5%)
Profit or Sales Impacts (% of indirect discharging plants)	63 (17.3%)	65 (17.8%)	2 (0.5%)
Employment Reduction (% of Total OCPSF employment)	2,190 (1.2%)	3,396 (1.9%)	1,206 (0.7%)

Option 3: Option 1 with Activated Carbon Treatment for Plants with Land Constraints

Direct Dischargers. Option 3 modified the treatment technologies assumed for indirect discharging plants that may not have sufficient land available to build the appropriately sized biological treatment plant assumed under Option 1. Consequently, costs were not revised for direct dischargers under Option 3.

Indirect Dischargers (Table 6). Option 3 resulted in cost changes for twelve indirect dischargers due to constraints on land availability. Under Option 3, the total annualized cost is $240.2 million -- an increase of $19.9 million over Option 1 costs. The annualized cost of Option 3 is $57.5 million (31 percent) more than the selected PSES option for the final OCPSF rule. Despite this increase in costs, there is little change from Option 1 in impact measures. In fact, the expected employment reduction is smaller. Under Option 3 -- 56 plants and product lines are expected to close (1 percent more than the rule as promulgated); 67 plants (1 percent more than the rule as promulgated) are expected to incur a profit or sales impact; and the employment losses increase by 1,143 workers (52 percent more than the rule as promulgated, but lower than Option 1).

Table 6

Indirect Dischargers - Option 3

Impact Measure	Promulgated PSES Option	Option 3	Incremental Change of Option 3
Plants Analyzed/Plants Costed	362/365	362/365	n.a.
Total Annualized Cost (1982 $, millions)	$182.7	$240.2	$57.5
Plant Closures (% of indirect discharging plants)	25 (6.8%)	27 (7.4%)	2 (0.5%)
Product Line Closures (% of indirect discharging plants)	27 (7.4%)	29 (7.9%)	2 (0.5%)
Profit or Sales Impacts (% of indirect discharging plants)	63 (17.3%)	67 (18.4%)	4 (1.1%)
Employment Reduction (% of Total OCPSF employment)	2,190 (1.2%)	3,333 (1.8%)	1,143 (0.6%)

D. Cost-Effectiveness Analysis

The revised cost-effectiveness (CE) analysis can be used to determine:

- if the selected option remains the most cost-effective manner by which to achieve the reduction in pollutant discharges; and

- the relative cost-effectiveness ($/amount of pollutant removed) of the selected control option, compared to other effluent limitations guidelines promulgated by the Agency.

Typically, a cost-effectiveness value, expressed as the cost of treatment (in 1981 dollars) per copper pound-equivalent of pollutant removed, is calculated separately for BAT and PSES controls. The revised CE analysis follows the same methodology to calculate CE values for each control option evaluated. The CE analysis includes only plants with both cost information and pollutant removal (in copper pounds-equivalent) information. Pollutant removals are aggregated using toxic weighting factors (relative to copper) developed by the Standards and Applied Science Division (formerly the Assessment and Watershed Protection Division). Compliance costs are converted to 1981 dollars using the Engineering News Record's Construction Cost Index for 1981 and 1982.[2] While compliance costs are revised in this analysis, no changes are made to the pollutant removals of the control options selected at promulgation (noted as control options BAT II-B and PSES IV-B respectively in the economic impact analysis accompanying the promulgated rule).

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[2] ENR's CCI 1981/ENR's CCI 1982 = 3535/3825 = 0.924.

D.1 Cost-Effectiveness Analysis Results

Direct Dischargers:

The CE value for the selected BAT option for the final OCPSF rule was $4.23/lb-eq. removed ($ 1981).[3] This is calculated as the cost of BAT controls for all plants with pollutant removal information ($203.9 million x .924) divided by the total pollutant removals (44,489,543 lb-eq.) for those plants. Table 7 presents the CE values for the re-evaluation of BAT options. The CE value for the Revised Baseline increases by less than 1 percent from the value for the selected BAT option as promulgated to $4.27/lb-eq. removed. The CE value for Option 1 is ~~$4.56~~ 4.44/lb-eq. removed, ~~an 8~~ 5 percent increase over the selected BAT option. Because other BAT options evaluated for the final OCPSF rule were costlier (BAT II-A and BAT V) or removed less pollutant loading from OCPSF wastestreams, Option 1 remains a cost-effective BAT control. BAT controls are also relatively cost-effective when compared to the CE values for other effluent limitations guidelines (Table 8).

Table 7
Cost-Effectiveness Values for BAT Options

	Annualized Cost for Plants with Removals (1982 $MM/year)	Annualized Cost for Plants with Removals (1981 $MM/year)	Pollutant Removals (lb-eq.)	Cost-Effectiveness Value ($/lb-eq. removed)
Promulgated BAT Option	203.9	188.4	44,489,543	4.23
Revised Baseline	205.8	190.2	44,489,543	4.27
Option 1	~~213.6~~ 197.4	~~197.4~~ 182.4	44,489,543	~~4.80~~ 4.44

[3] The CE value for the selected BAT option was reported as $4.58/lb-eq. removed. The difference is attributable to the adjustment of control costs to 1981 dollars. The actual value, calculated as $203.9 million * .924 / 44,489,543 lb eq. removed = $4.23/lb-eq. removed, is used in this analysis to compare CE values of revised BAT options to the CE value of the selected option of the rule as promulgated.

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Table 8
Industry Comparison of Cost Effectiveness for Direct Dischargers
(Toxic and Nonconventional Pollutants Only)
Copper Based Weights
(1981 Dollars)

Industry	Pounds Equivalent Currently Discharged (000's)	Pounds Equivalent Remaining at Selected Option (000's)	Cost Effectiveness Selected Option(s) ($/lb-eq. removed)
Aluminum Forming	1,340	90	121
Battery Manufacturing	4,126	5	2
Canmaking	12	0.2	10
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	++
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
Nonferrous Metals Forming	34	2	69
Nonferrous Metals Mfg I	6,653	313	4
Nonferrous Metals Mfg II	1,004	12	6
OCPSF*	54,225	9,735	5
Pesticides	2,461	371	15
Pharmaceuticals	208	4	1
Plastics Molding & Forming	44	41	BAT=BPT
Porcelain Enameling	1,086	63	6
Petroleum Refining	BAT=BPT	BAT=BPT	BAT=BPT
Pulp & Paper**	1,330	748	18
Textile Mills	BAT=BPT	BAT=BPT	BAT=BPT

++ Less than a dollar.

* Reflects costs and removals of both air and water pollutants.

** PCB control for Deink subcategory only.

Indirect Dischargers:

The CE value for the selected PSES option for the final OCPSF rule was $31.13/lb-eq. removed (1981 dollars).[4] This is calculated as the cost of PSES controls for all plants with pollutant removal information ($173.1 million x .924) divided by the total pollutant removals (5,138,182 lb-eq.) for those plants. Table 9 presents the CE values for the re-evaluation of PSES options. Under Option 3, the costliest control option evaluated in this analysis, the CE value increases to $41.43/lb-eq. removed, a 33 percent increase. Because other PSES options evaluated for the final OCPSF rule were more costly (PSES IV-A, and PSES VII) or removed less pollutant loading from OCPSF wastestreams, any of Options 1, 2, and 3 remain the most cost-effective PSES controls. PSES controls are also relatively cost-effective when compared to the CE values for other effluent limitations guidelines (Table 10).

Table 9
Cost-Effectiveness Values for PSES Options

	Annualized Cost for Plants with Removals (1982 $ MM/year)	Annualized Cost for Plants with Removals (1981 $ MM/year)	Pollutant Removals (lb-eq.)	Cost-Effectiveness Value ($/lb-eq. removed)
Promulgated PSES Option	173.1	159.9	5,138,182	31.13
Revised Baseline	181.0	167.2	5,138,182	32.55
Option 1	~~223.2~~ ~~240.6~~	~~206.2~~ ~~192.6~~	5,138,182	~~40.14~~ ~~37.87~~
Option 2	206.2	190.5	5,138,182	37.08
Option 3	230.4	212.9	5,138,182	41.43

[4] The CE value for the selected PSES option was reported as $33.69/lb-eq. removed. The difference is attributable to the adjustment control costs to 1981 dollars. The actual value, calculated as $173.1 million * .924 / 5,138,182 lb eq. removed = $31.13/lb-eq. removed, is used in this analysis to compare CE values of revised options to the CE value of the selected PSES option of the rule as promulgated.

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Table 10
Industry Comparison of Cost Effectiveness for Indirect Dischargers
(Toxic and Nonconventional Pollutants Only)
Copper Based Weights
(1981 Dollars)

Industry	Pounds Equivalent Currently Discharged (To Surface Waters) (000's)	Pounds Equivalent Remaining at Selected Option (To Surface Waters) (000's)	Cost Effectiveness Selected Option(s) Beyond BPT* ($/lb-eq. removed)
Aluminum Forming	1,602	18	155
Battery Manufacturing	1,152	5	15
Can Making	252	5	38
Coal Mining**	N/A	N/A	N/A*
Coil Coating	2,503	10	10
Copper Forming	34	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	++
Iron & Steel	5,599	1,404	6
Leather Tanning	16,830	1,899	111
Metal Finishing	11,680	755	10
Nonferrous Mtls Forming	189	5	90
Nonferrous Metals Mfg I	3,187	19	15
Nonferrous Metals Mfg II	38	0.41	12
OCPSF	5,210	72	34
Pesticides	9,522	162	3
Pharmaceuticals	340	63	1
Plast. Molding&Forming	N/A	N/A	N/A
Porcelain Enameling	1,565	96	14
Pulp & Paper	N/A	N/A	N/A

* N/A: Pretreatment Standards not promulgated, or no incremental costs will be incurred.

** Reflects costs and removals of both air and water pollutants.

*** Industry has no known or expected indirect dischargers.

++ Less than a dollar.

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E. Regulatory Flexibility Analysis

A Regulatory Flexibility Analysis (RFA) allows the Agency and other reviewers to specifically address the burden of regulatory actions on small business entities. In the cases of the effluent limitations guidelines for the OCPSF industry, the RFA examined whether small plants (as defined by annual organic chemical production thresholds of 5, 10, and 15 million pounds) were disproportionately affected by the regulations. Regulatory relief for small entities must also be balanced against greater pollutant discharges that would result from relaxed or no controls. The RFA is conducted separately for direct and indirect dischargers.

As a result of the original RFA, BAT controls were not required for small (5 million pounds ore less of annual production) direct dischargers. Small indirect dischargers were required to comply with PSES controls to remove priority pollutants.

E.1 Regulatory Flexibility Analysis Results

The RFA for this re-evaluation is limited to evaluating the effects of cost changes on small indirect dischargers since there are no incremental impacts of direct dischargers, large or small. Table 11 summarizes the impacts on small indirect dischargers for the OCPSF rule as promulgated and for Options 1, 2, and 3 (plant impacts on small dischargers are the same for all of these options). For the selected option under the OCPSF rule as promulgated, 65 of the 106 small indirect dischargers (61 percent) sustained significant impacts, which include closures and sales or profit impacts. Another 3 small plants (revised total equals 68 plants, 64 percent of the 106 small plants) are significantly affected by Options 1, 2, and 3. Most of the cost changes associated with Options 1, 2, and 3 affect larger facilities (greater than 5 million pounds of production).

When compared to the impacts on small direct dischargers (for whom less stringent regulatory requirements were promulgated), a number of other differences are evident. Most significant is that the percentage of indirect discharging plants adversely affected rises from 61 to 64 percent due to the revisions and remand, but is well below the 79 percent for the small direct dischargers. In addition, controls for small indirect dischargers remove a far greater amount of pollutants (619,000 lb-eq.) than do controls for small (exempted) direct dischargers (44,000 lb-eq.). Expanding the exemption from small direct dischargers to include small indirect dischargers would increase the amount of pollutant discharges exempted by fifteen fold.

In summary, plant impacts on small indirect dischargers (under revised Options 1, 2, or 3) are not significantly different than the impacts evaluated for the selected PSES option in the original RFA. Under Option 1, 2, or 3, the impacts remain less severe for small indirect dischargers than for the small directs and the amount of pollutant removals possible for small indirect dischargers is far greater than for small directs. An exemption would permit possible removals to be discharged untreated. The results of the revised RFA do not indicate that a change in the RFA findings is warranted.

Table 11

Comparison of Impacts for Small Indirect Dischargers and Direct Dischargers Exempted from BAT Controls

Impact Measure	Indirect Dischargers As Promulgated ≤ 5 MM lbs	Indirect Dischargers Options 1, 2, 3 ≤ 5 MM lbs	Direct Dischargers Given Relief from BAT Controls ≤ 5 MM lbs
Total Plants Under Threshold	106	106	19
Closures	27	28	9
Sales/Profit Impacts	38	40	6
Small Plants Affected (as % of Small Plants)	65 (61.3%)	68 (64.1%)	15 (78.9%)
% of Production Under Threshold	0.3%	0.3%	0.02%
% of Pollutant Removals Excluded from Controls	12%	12%	0.1%

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F. Overall Summary and Conclusions

After extensive review and comparison of the economic impact analyses, it appears that the cost revisions incorporated into the analyses reported above do not significantly alter the findings of economic achievability for the OCPSF effluent limitations guidelines. Cost revisions did not change the conclusions of the economic impact analysis for direct or indirect dischargers. The revised regulatory flexibility analysis revealed no change for direct dischargers and only a small increase in the percentage of small indirect dischargers plants that were substantially affected. Under the revised cost-effectiveness analysis, the CE value for direct dischargers rose by 5 percent. The CE value for controls on indirect discharges increased by a maximum of 33 percent. Even under the most costly control option evaluated, controls for both direct and indirect dischargers remain among the most cost-effective rules when compared to other effluent limitations guidelines promulgated by the Agency.

This cost increase moves one profit/sales impact to a product line closure (with incremental employment losses of 376).

Compliance costs of revised BAT Option 1 for direct dischargers increased by 5 percent. ~~However, there are no incremental impacts associated with this cost increase. Consequently,~~ The results of the plant impact analysis ~~did not change~~ are not significantly different than those of the promulgated rule. An increase of 5 percent in the CE value for BAT Option 1 does not substantially affect the relative cost-effectiveness of the BAT option when compared to other effluent limitations guidelines. Controls for direct discharging OCPSF plants rank in the lowest third of CE values (Table 8).

Compliance costs of Option 1 increase annualized PSES costs by 21 percent. As a result of the change in costs, an additional 7 plants (out of 362 plants analyzed) sustained significant adverse impacts under revised Option 1. Plant closures increased from 25 to 27. Product line closures rose from 27 to 29. Profit or sales impacts increased from 63 to 66. The expected employment reduction from closures increased by 3 percent, from 2,190 to 3,396 workers. In total, the percentage of indirect dischargers adversely affected rises from 32 percent to 33 percent. Such changes do not alter the original finding that PSES controls are economically achievable.

The regulatory flexibility analysis found that the revisions did not disproportionately affect small (5 million pounds or less of annual production) indirect dischargers. While the percentage of small indirect dischargers affected increased from 61 to 64 percent as a result of the cost revisions under PSES Option 3, this did not approach the percentage of small direct dischargers projected to be adversely affected (79 percent) which were granted an exemption from BAT controls. Another consideration in the RFA is that an exemption from PSES controls for small plants would also result in considerable uncontrolled discharge of pollutants. The possible

pollutant removals of small direct dischargers exempted account for 0.1 percent of all direct discharges, whereas the possible pollutant removals of small indirect dischargers account for approximately 12 percent of all indirect discharges. The change in compliance costs for PSES plants do not alter the original findings that alternative regulatory controls are warranted for small direct dischargers but not for small indirect dischargers.

Using revised compliance costs for PSES Option 1, the cost-effectiveness result for PSES controls (~~$37.87~~ 40.14/lb-eq. removed, 1981 $) remains well within the range of other promulgated rules (Table 10). Furthermore, no other PSES control option evaluated for the final OCPSF rule would have removed as much or more pollutants at the same or lower cost. Consequently, the changes in compliance costs for indirect discharging plants do not affect the findings of the original CE analysis.

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Appendix A

Calculation of Costs and Impacts Used in the Preamble

The costs reported in the preamble to the proposed rule differ in two respects from the compliance costs reported in the body of this report.[5] First, the preamble costs are reported in 1986 year dollars, whereas costs in the EIA are reported in 1982 year dollars. Second, the preamble reports impact measures for BAT options after removing costs and impacts associated with small direct dischargers (those with less than 5 million pounds annual organic chemical production) as a result of the original regulatory flexibility analysis. This appendix facilitates the comparison of impact measures reported in the preamble of the OCPSF rule as promulgated.

In Tables A-1 and A-2, compliance costs used in the EIA (1982 year dollars) are indexed to 1986 year dollars using Engineering News Record's Construction Cost Index (CCI) for 1986 and 1982. The inflation factor is calculated as follows:

1986 CCI/1982 CCI = 4295/3825 = 1.123

The compliance costs associated with small direct dischargers were removed prior to indexing the compliance costs for BAT options presented in Table A-1. The other impact measures in Table A-1 (e.g., closures and employment losses) were also adjusted to remove the impacts associated with the incremental cost of BAT for small directs. Indexed costs for PSES options are presented in Table A-2; all other impact measures are identical to those summarized in the body of this report.

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[5] While proposed amendments to the OCPSF rule have not been published as of the date of this report, the reference here is to the preamble to that proposed rule, based on EPA's draft of the Federal Register notice.

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Table A-1
Direct Dischargers
Costs and Impacts Used in the Preamble
Excluding Costs and Impacts Associated with 19 Small Plants

Impact Measure	Promulgated BAT Option	Revised Baseline	Option 1
Plants Costed	367 270	367 270	367 270
Total Annualized Cost (1986 $, millions)	$224.2	$226.9	235.8 ~~$242.1~~
Plant Closures (% of direct discharging plants)	5 (1.7%)	5 (1.7%)	5 (1.7%)
Product Line Closures (% of direct discharging plants)	6 (2.1%)	6 (2.1%)	7 ~~(2.1%)~~ (2.6%)
Profit or Sales Impacts (% of direct discharging plants)	11 (3.8%)	11 (3.8%)	10 ~~(3.8%)~~ (3.7%)
Employment Reduction (% of Total OCPSF employment)	1,197 (0.7%)	1,197 (0.7%)	1,585 ~~1,197~~ ~~(0.7%)~~ (0.9%)

Table A-2
Costs and Impacts Used in the Preamble
Indirect Dischargers

Impact Measure	Promulgated PSES Option	Revised Baseline	Option 1	Option 2	Option 3
Plants Costed	365	365	365	365	365
Total Annualized Cost (1986 $, millions)	$204.3	$214.0	261.7 ~~$247.4~~	$242.5	$269.7
Plant Closures (% of indirect discharging plants)	25 (6.8%)	25 (6.8%)	27 (7.4%)	27 (7.4%)	27 (7.4%)
Product Line Closures (% of indirect discharging plants)	27 (7.4%)	28 (7.7%)	29 (7.9%)	29 (7.9%)	29 (7.9%)
Profit or Sales Impacts (% of indirect discharging plants)	63 (17.3%)	66 (18.1%)	66 (18.4%)	65 (17.8%)	67 (18.4%)
Employment Reduction (% of Total OCPSF employment)	2,190 (1.2%)	2,209 (1.2%)	3,396 (1.9%)	3,396 (1.9%)	3,333 (1.8%)

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