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Supplement to the OCPSF Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category

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SUPPLEMENT TO THE OCPSF DEVELOPMENT DOCUMENT

FOR

EFFLUENT LIMITATIONS GUIDELINES
NEW SOURCE PERFORMANCE STANDARDS
AND
PRETREATMENT STANDARDS
FOR THE
ORGANIC CHEMICALS,
PLASTICS, AND SYNTHETIC FIBERS
POINT SOURCE CATEGORY

Engineering and Analysis Division
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I. INTRODUCTION

A. SUMMARY

This document describes the supporting information for the Agency's proposed responses to the U.S. Fifth Circuit Court of Appeals' remand decision related to the Organic Chemicals Plastics and Synthetic Fibers (OCPSF) regulation (40 CFR Part 414), Chemical Manufacturers Association v. Environmental Protection Agency, 870 F.2d 177 (5th Cir.), modified, 885 F.2d 253 (5th Cir. 1989).

The Court remanded three aspects of the OCPSF guidelines: (1) the subcategorization of the industry into two subparts imposing differing Best Available Technology Economically Achievable (BAT) limitations because the Agency did not provide sufficient notice for establishing "less stringent" BAT Subpart J limitations for approximately 23 direct-discharge plants without biological treatment, (2) limitations for 19 of the 20 BAT Subpart J pollutants [and 13 corresponding Pretreatment Standards for Existing Sources (PSES)] that were based upon in-plant biological treatment technology because the design of the model treatment system used to estimate the cost of compliance was inconsistent with the technical basis for the numerical limitations, and (3) the New Source Performance Standards (NSPS) and the Pretreatment Standards for New Sources (PSNS) for consideration of whether zero discharge limits would be appropriate for new plants in the OCPSF industry because of the existence of recycling of wastewater.

In reconsidering the BAT subcategorization scheme for Subpart I and Subpart J, the Agency decided to propose the approach that was promulgated in the final OCPSF guideline on November 5, 1987 (52 FR 42522; 40 CFR Part 414). The Agency concluded that this is the most appropriate approach for the OCPSF industry.

EPA also proposed the same numerical effluent limitations that were promulgated on November 5, 1987 for the 19 remanded BAT Subpart J and 13 corresponding PSES pollutants based on revised estimates for the cost of compliance derived from revised model in-plant biological treatment system designs.

EPA proposed the same NSPS and PSNS that were promulgated on November 5, 1987 because, among other things, EPA's database does not demonstrate that total recycle is a demonstrated technology.

B. LEGAL AUTHORITY

This regulation was promulgated under the authority of Sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1251 et seq., as amended) also referred to as "the Act" or "CWA". It was also promulgated in response to the Settlement Agreement in Natural Resources Defense Council, Inc. v. Train, 8 ERC 2120 (D.D.C. 1976), modified, 12 ERC 1833 (D.D.C. 1979), modified by Orders dated October 26, 1982; August 2, 1983; January 6, 1984; July 5, 1984; January 7, 1985; April 24, 1986; and January 8, 1987.

The Federal Water Pollution Control Act Amendments of 1972 established a comprehensive program to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Section 101(a)). To implement the Act, EPA was required to issue effluent limitations guidelines, pretreatment standards, and NSPS for industrial dischargers.

In addition to these regulations for designated industrial categories, EPA was required to promulgate effluent limitations guidelines and standards applicable to all discharges of toxic pollutants. The Act included a time-table for issuing these standards. However, EPA was unable to meet many of the deadlines and, as a result, in 1976, it was sued by several environmental groups. In settling this lawsuit, EPA and the plaintiffs executed a "Settlement Agreement" that was approved by the Court. This agreement required EPA to develop a program and adhere to a schedule for controlling 65 "priority" toxic pollutants and classes of pollutants. In carrying out this program, EPA was required to promulgate BAT effluent limitations guidelines, pretreatment standards, and NSPS for a variety of major industries, including the OCPSF industry.

Many of the basic elements of the Settlement Agreement were incorporated into the Clean Water Act of 1977. Like the Agreement, the Act stressed control

of toxic pollutants, including the 65 priority toxic pollutants and classes of pollutants.

Under the Act, the EPA is required to establish several different kinds of effluent limitations guidelines and standards. These are summarized briefly below.

1. Best Practicable Control Technology Currently Available (BPT)P

BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants of various sizes, ages, and unit processes within the category or subcategory for control of familiar (e.g., conventional) pollutants, such as BOD_5, TSS, and pH.

In establishing BPT effluent limitations guidelines, EPA considers the total cost in relation to the effluent reduction benefits, age of equipment and facilities involved, processes employed, process change required, engineering aspects of the control technologies, and non-water quality environmental impacts (including energy requirements). The Agency balances the category-wide or subcategory-wide cost of applying the technology against the effluent reduction benefits.

2. Best Available Technology Economically Achievable (BAT)

BAT effluent limitations guidelines, in general, represent the best existing performance in the category or subcategory. The Act establishes BAT as the principal national means of controlling the direct discharge of toxic and nonconventional pollutants to navigable waters.

In establishing BAT, the Agency considers the age of equipment and facilities involved, processes employed, engineering aspects of the control technologies, process changes, cost of achieving such effluent reduction, and non-water quality environmental impacts.

3. Best Conventional Pollutant Control Technology (BCT)

The 1977 Amendments to the Clean Water Act added Section 301(b)(2)(E), establishing "best conventional pollutant control technology" (BCT) for the discharge of conventional pollutants from existing industrial point sources.

Section 304(a)(4) designated the following as conventional pollutants: BOD_5, TSS, fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease a conventional pollutant on July 30, 1979 (44 FR 44501).

BCT is not an additional limitation, but replaces BAT for the control of conventional pollutants. In addition to other factors specified in Section 304(b)(4)(B), the Act requires that the BCT effluent limitations guidelines be assessed in light of a two part "cost-reasonableness" test [American Paper Institute v. EPA, 660 F.2d 954 (4th Cir. 1981)]. The first test compares the cost for private industry to reduce its discharge of conventional pollutants with the costs to POTWs for similar levels of reduction in their discharge of these pollutants. The second test examines the cost-effectiveness of additional industrial treatment beyond BPT. EPA must find that limitations are "reasonable" under both tests before establishing them as BCT. In no case may BCT be less stringent than BPT.

EPA has promulgated a methodology for establishing BCT effluent limitations guidelines (51 FR 24974, July 8, 1986).

4. New Source Performance Standards (NSPS)

NSPS are based on the performance of the best available demonstrated technology. New plants have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent numerical values attainable through the application of best available demonstrated control technology for all pollutants (i.e., toxic, conventional, and nonconventional).

5. Pretreatment Standards for Existing Sources (PSES)

PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. The Clean Water At requires pretreatment standards for pollutants that pass through POTWs or interfere with either the POTW's treatment process or chosen sludge disposal method. The legislative history of the 1977 Act indicates that pretreatment standards are to be technology-based and analogous to the BAT effluent limitations guidelines for removal of toxic pollutants. For the purpose

of determining whether to promulgate national category-wide PSES and PSNS, EPA generally determines that there is pass through of pollutants, and thus a need for categorical standards if the nationwide average percentage of pollutants removed by well-operated POTWs achieving secondary treatment is less than the percent removed by the BAT model treatment system. The General Pretreatment Regulations, which serve as the framework for categorical pretreatment standards, are found at 40 CFR Part 403. (Those regulations contain a definition of pass through that addresses localized rather than national instances of pass through and does not use the percent removal comparison test described above (52 FR 1586, January 14, 1987).)

6. Pretreatment Standards for New Sources (PSNS)

Like PSES, PSNS are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of a POTW. PSNS are to be issued at the same time as NSPS. New indirect dischargers, like new direct dischargers, have the opportunity to incorporate in their plant the best available demonstrated technologies. The Agency considers the same factors in promulgating PSNS as it considers in promulgating NSPS.

C. HISTORY OF THE OCPSF RULEMAKING EFFORTS AND LITIGATION

1. Summary through the 1987 Promulgation

EPA originally promulgated effluent limitations guidelines and standards for the organic chemicals manufacturing industry in two phases. Phase I, covering 40 product/processes (a product that is manufactured by the use of a particular process -- some products may be produced by any of several processes), was promulgated on April 25, 1974 (39 FR 14676). Phase II, covering 27 additional product/processes, was promulgated on January 5, 1976 (41 FR 902). The Agency also promulgated effluent limitations guidelines and standards for the plastics and synthetic fibers industry in two phases. Phase I, covering 13 product/processes, was promulgated on April 5, 1974 (39 FR 12502). Phase II, covering eight additional product/processes, was promulgated on January 23, 1975 (40 FR 3716).

These regulations were challenged, and on February 10, 1976, the Court in Union Carbide v. Train, 541 F.2d 1171 (4th Cir. 1976), remanded the Phase I

organic chemicals regulation. EPA also withdrew the Phase II organic chemicals regulation on April 1, 1976 (41 FR 13936). However, pursuant to an agreement with the industry petitioners, the regulations for butadiene manufacture were left in place. The Court also remanded the Phase I plastics and synthetic fibers regulations in FMC Corp. v. Train, 539 F.2d 973 (4th Cir. 1976) and in response EPA withdrew both the Phase I and II plastics and synthetic fibers regulations on August 4, 1976 (41 FR 32587) except for the pH limitations, which had not been addressed in the lawsuit. Consequently, only the regulations covering butadiene manufacture for the organic chemicals industry and the pH regulations for the plastics and synthetic fibers industry have been in effect to date. These regulations were superseded by the regulations described in this report.

In the absence of promulgated, effective effluent limitations guidelines and standards, OCPSF direct dischargers have been issued National Pollutant Discharge Elimination System (NPDES) permits on a case-by-case basis using best professional judgement (BPJ), as provided in Section 402(a)(1) of the CWA.

Subsequent to the withdrawal/suspension of the national regulations cited above, studies and data-gathering were initiated in order to provide a basis for issuing effluent limitations guidelines and standards for this industry. These efforts provided a basis for the March 21, 1983 proposal (48 FR 11828); the July 17, 1985 (50 FR 29071), October 11, 1985 (50 FR 41528), and December 8, 1986 (51 FR 44082) post-proposal notices of availability of information; and the final regulation.

On November 5, 1987, EPA promulgated a regulation establishing effluent limitations guidelines and standards for the OCPSF point source category based on the best practicable control technology currently available ("BPT"), the best available technology economically achievable ("BAT"), new source performance standards ("NSPS") for direct dischargers, and pretreatment standards for existing and new source indirect dischargers ("PSES" and "PSNS", respectively) (52 FR 42522; 40 CFR Part 414, Subparts A through J). Limitations based on best conventional pollutant control technology were reserved. The concentration based regulation initially controlled the discharge of 63 toxic and 3 conventional pollutants. The limitations generally apply at the end-of-pipe. However, for listed (Appendix A to Part 414) and designated metal- and cyanide-bearing wastestreams, the limitations apply in-plant at the process source of the metals

and cyanide. The technology bases for these limitations and standards include steam stripping, chemical precipitation, chemical oxidation, activated carbon, biological treatment, and chemically assisted clarification.

2. Summary of the Litigation

Twenty-eight industry petitioners, comprised of trade associations and individual companies, and the Natural Resources Defense Council (NRDC) challenged this regulation in several circuits of the U.S. Court of Appeals. The cases were consolidated and assigned to the Fifth Circuit Court of Appeals. The petitioners raised approximately 63 separate issues.

On March 30, 1989, the Fifth Circuit issued a decision that upheld the regulations against all industry challenges and all but two challenges brought by NRDC. With respect to the two challenges brought by NRDC, the Court remanded two aspects of the regulation to EPA for further consideration, but left these aspects of the rule in effect pending further rulemaking. These remands require the Administrator to provide an opportunity to comment on the BAT subcategorization scheme established in the guideline and to consider promulgating zero discharge new source performance standards based on recycling of wastewater (Chemical Manufacturers Association v. Environmental Protection Agency, 870 F.2d 177 (5th Cir. 1989).

Six petitioners or groups of petitioners filed petitions for rehearing on about 16 issues. On October 10, 1989, the Court granted rehearing in part and remanded two parts of the regulations to EPA for further rulemaking proceedings (885 F.2d 253 (5th Cir. 1989)). The first and more significant part consists of the effluent limitations for 19 of the 20 pollutants in BAT Subpart J (40 CFR 414.101) that were remanded based upon an error in EPA's costing of the model in-plant biological treatment technology. (The court left in effect the limitation for acrylonitrile that was based upon this technology.) This aspect of the remand in effect also remands the new source performance standards for these 19 pollutants for discharges that are subject to 40 CFR 414.101 limitations. In addition, it remands the PSES and PSNS standards for 13 pollutants that were based upon the remanded BAT Subpart J limitations. The second remanded part of the regulation consists of limitations and standards for pollutants discharged from three metal-bearing waste streams that EPA had erroneously listed in Part

414 Appendix A (Chemical Manufacturers Association v. Environmental Protection Agency, 885 F.2d 253 (5th Cir. 1989)).

Following the Fifth Circuit's decision on rehearing, one petitioner filed a petition for a Writ of Certiorari with the U.S. Supreme Court. On April 24, 1990, the Supreme Court denied the petition.

In response to the Fifth Circuit's decision, EPA revoked on June 29, 1990 (55 FR 26691) the remanded limitations and standards and deleted two of the three metal-bearing waste streams remanded by the Court. The third metal-bearing waste stream had previously been deleted on June 29, 1989 (54 FR 27351).

3. Partial Settlement Agreements, Other Negotiations, and Review of the OCPSF Regulation

On March 29, 1989, petitioners W.R. Grace & Company, Koppers Company, Inc., E.I. DuPont de Nemours & Company, and the Chemical Manufacturers Association (CMA) and respondent EPA entered into a Partial Settlement Agreement which resolved all issues raised by these petitioners with respect to EPA's decision not to list any complexed-cyanide wastestreams in 40 CFR 414 Appendix B, which exempts from guideline coverage certain wastestreams containing complexed metals. EPA agreed to propose specific preamble language and specific amendments to the OCPSF regulation and solicit comments regarding these proposed amendments.

During litigation of the OCPSF regulation, petitioners CMA and DuPont and respondent EPA achieved an understanding with respect to several issues. On June 22, 1988, EPA agreed to propose several regulatory changes which would 1) allow regulatory authorities to establish limitations and standards for incidental sources of metals in non-"metal-bearing wastestreams;" 2) modify Appendix A to delete the listing of five wastestreams that were incorrectly listed as cyanide-bearing wastestreams and delete three lead-bearing wastestreams that contain complexed-lead; and 3) publish one technical amendment to the regulation to include the BPT production-proportioning formula that was set forth in the October 1987 OCPSF Development Document (page IX-10).

In addition, as the result of many questions by permit writers, control authorities, and individual companies related to the applicability of the OCPSF

regulation, including Category Determination Requests submitted under the provisions of 40 CFR §403.6(a), EPA carefully reviewed the general applicability of each subcategory as well as the corresponding product and product group listings for each subcategory. Based on these reviews, EPA proposed corrections to the general applicability of three subcategories to reflect the rulemaking record and analyses, to delete one product and two product groups from coverage by this regulation, and to move the coverage of two products and one product group from the Bulk Organic Chemicals Subcategory (§414.70) to the Specialty Organic Chemicals Subcategory (§414.80).

These proposed amendments were published on October 18, 1990 (55 FR 42332). After the Agency completes its review of the public comments it will promulgate final amendments.

D. ORGANIZATION OF THE SUPPLEMENTAL DEVELOPMENT DOCUMENT

The following sections describe the technical analyses that provide the basis for the Agency's response to the Fifth Circuit's remand:

- BAT Subcategorization Scheme
- BAT Subpart J Limitations and PSES Standards
- New Source Performance Standards and Pretreatment Standards for New Sources

II. BAT SUBCATEGORIZATION SCHEME

A. INTRODUCTION

On November 5, 1987, the Agency promulgated two technology-based BAT subcategories for the control of toxic pollutants, one for any direct discharge point source that uses end-of-pipe biological treatment or installs end-of-pipe biological treatment to comply with BPT effluent limitations (Subpart I, §414.90) and one for any direct discharge point source that does not use end-of-pipe biological treatment or does not install end-of-pipe biological treatment to comply with BPT effluent limitations (Subpart J, §414.100). Subparts I and J set limits for 63 and 59 pollutants, respectively. A comparison of the 59 Subpart J Maximum for Monthly Average limitations to the corresponding Subpart I limitations demonstrates that 9 are identical, 20 are more stringent, and 30 are less stringent than Subpart I. Table II-1 presents a comparison of BAT Subpart I and J Maximum for Monthly Average Limitations.

NRDC challenged the BAT subcategorization scheme arguing that the Agency had failed to present its BAT subcategorization scheme for comment and also asserting that this type of BAT subcategorization violated the CWA because it allowed a discharger who chooses not to employ end-of-pipe biological treatment to be subject to fewer and less stringent BAT Subcategory J limitations, rather than the more stringent Subcategory I limitations which apply to plants with end-of-pipe biological treatment systems. NRDC also argued that, if it had had an opportunity to comment, it would have urged the EPA to establish a raw waste "floor" level below which biological end-of-pipe treatment is not appropriate or to limit the applicability of Subpart J to those categories of OCPSF production that tend to have low raw waste levels (NRDC 6/30/88, Brief p. 54).

On March 30, 1989, the Fifth Circuit Court of Appeals, without ruling on NRDC's substantive arguments, remanded the BAT subcategorization of the industry for notice-and-comment proceedings. However, the Court left the rule in effect pending further rulemaking, reasoning that the notice-and-comment proceedings may disclose that the BOD_5 floor urged by NRDC is neither necessary nor feasible, and that industry petitioners are not prejudiced by being subjected to BAT Subpart J limitations which, if anything, may be too lenient (870 F.2d at 236).

TABLE II-1

COMPARISON OF MAXIMUM MONTHLY AVERAGE BAT LIMITATIONS FOR THE 63 SUBPART I AND 59 SUBPART J REGULATED POLLUTANTS

POLLUTANT NUMBER	POLLUTANT NAME	BAT SUBPART I[1]	BAT SUBPART J[1]
1	Acenaphthene	22	19
3	Acrylonitrile	96	94
4	Benzene	37	57
6	Carbon Tetrachloride	18	142
7	Chlorobenzene	15	142
8	1,2,4-Trichlorobenzene	68	196
9	Hexachlorobenzene	15	196
10	1,2-Dichloroethane	68	180
11	1,1,1-Trichloroethane	21	22
12	Hexachloroethane	21	196
13	1,1-Dichloroethane	22	22
14	1,1,2-Trichloroethane	21	32
16	Chloroethane	104	110
23	Chloroform	21	111
25	1,2-Dichlorobenzene	77	196
26	1,3-Dichlorobenzene	31	142
27	1,4-Dichlorobenzene	15	142
29	1,1-Dichloroethylene	16	22
30	1,2-Trans-dichloroethylene	21	25
32	1,2-Dichloropropane	153	196
33	1,3-Dichloropropene	29	196
34	2,4-Dimethylphenol	18	19
38	Ethylbenzene	32	142
39	Fluoranthene	25	22
42	Bis(2-Chloroisopropyl)ether	301	196
44	Methylene Chloride	40	36
45	Methyl Chloride	86	110
52	Hexachlorobutadiene	20	142
55	Naphthalene	22	19
56	Nitrobenzene	27	2237
57	2-Nitrophenol	41	65
58	4-Nitrophenol	72	162
59	2,4-Dinitrophenol	71	1207
60	4,6-Dinitro-o-cresol	78	78
65	Phenol	15	19
66	Bis(2-ethylhexyl)phthalate	103	95
68	Di-n-butyl phthalate	27	20
70	Diethyl phthalate	81	46
71	Dimethyl phthalate	19	19
72	Benzo(a)anthracene	22	19
73	Benzo(a)pyrene	23	20
74	3,4-Benzofluoranthene	23	20
75	Benzo(k)fluoranthene	22	19
76	Chrysene	22	19

TABLE II-1 (Cont'd)

COMPARISON OF MAXIMUM MONTHLY AVERAGE BAT LIMITATIONS FOR THE 63 SUBPART I AND 59 SUBPART J REGULATED POLLUTANTS

POLLUTANT NUMBER	POLLUTANT NAME	BAT SUBPART I[1]	BAT SUBPART J[1]
77	Acenaphthylene	22	19
78	Anthracene	22	19
80	Fluorene	22	19
81	Phenanthrene	22	19
84	Pyrene	25	20
85	Tetrachloroethylene	22	52
86	Toluene	26	28
87	Trichloroethylene	21	26
88	Vinyl Chloride	104	97
119	Total Chromium	1110	1110
120	Total Copper	1450	1450
121	Total Cyanide	420	420
122	Total Lead	320	320
124	Total Nickel	1690	1690
128	Total Zinc	1050	1050
24	2-Chlorophenol	31	---
31	2,4-Dichlorophenol	39	---
35	2,4-Dinitrotoluene	113	---
36	2,6-Dinitrotoluene	255	---

[1] All units are micrograms per liter.

EPA proposed unchanged the subcategory approach adopted in the guideline. Anticipating that NRDC will raise in comment the same substantive objections to the subcategory scheme it raised in litigation, EPA explains below why it believes this approach is appropriate, and why NRDC's suggestions are neither necessary nor feasible.

B. BACKGROUND

The Agency originally proposed in 1983 to establish BAT limits for two product-based subcategories -- "plastics only" for plants that manufactured plastics and synthetic fibers only and "not plastics-only" for plants that manufactured at least some organic chemicals. The proposed technology basis for the BAT limits was in-plant physical/chemical technology (such as steam stripping) and end-of-pipe biological treatment for plants that have or need biological treatment to control biochemical oxygen demand (BOD_5), and in-plant physical/chemical technology for non-biological treatment plants (52 FR 42532). After the 1983 proposal, the Agency conducted sampling at 12 additional OCPSF plants in order to collect additional data that would characterize the effectiveness of in-plant treatment technologies.

EPA modified its proposed approach in its July 17, 1985 notice of availability of new information (50 FR 29068). Under the revised approach, the Agency proposed not to subcategorize the OCPSF category by product mix for BAT. The Agency noted that since OCPSF plants can economically achieve compliance with the reproposed BAT limitations for toxic priority pollutants through some combination of in-plant or end-of-pipe demonstrated technology irrespective of products produced, BPT and BAT product mix subcategorization are not necessary bases for establishing BAT limitations. The 1985 notice discussed three technology options that were under consideration for controlling toxic priority pollutants at BAT. Each of these BAT options included end-of-pipe biological treatment for the control of organic pollutants (50 FR 29079; 52 FR 42532).

Several commenters expressed concerns about the proposal not to subcategorize the industry for BAT purposes and noted that all the technology options included biological treatment. These commenters questioned whether EPA had addressed plants which have BOD_5 levels too low to allow for effective biological wastewater treatment. For example, several commenters noted that chlorosolvent wastestreams are more effectively treated by physical methods. One

commenter noted that, for stand-alone chlorosolvent plants, biological treatment methods are not used and would be ineffective if used and that the proposed BAT limits cannot be met by such plants now, nor could they be met at a reasonable cost by steam stripper technology alone. (Response to comments of the Halogenated Solvent Industry Alliance #254, #256, and #329 at R. 103473, 103475, and 103559; see also Response to Comments of Badische #412 at R. 103652-3; Vulcan #257 and #330 at R. 103476 and 103560; CMA #163 and #404 at R. 103369-71 and 103641; Exxon #164 at R. 103372; and Union Carbide #165 at R. 103373.)

The Agency agreed that certain OCPSF facilities, such as chlorosolvent plants, which cannot effectively operate end-of-pipe biological treatment and do not require end-of-pipe biological treatment to meet the final BPT effluent limitations, should not have their BAT effluent limitations based on the performance of in-plant controls and end-of-pipe biological treatment. Therefore, EPA promulgated the Subpart J BAT effluent limitations based solely on the performance of in-plant controls such as steam stripping for those OCPSF facilities which do not require biological treatment to meet BPT effluent limitations. (1987 Dev. Doc., p. IV-38) The result was the present scheme under which plants with end-of-pipe biological treatment must comply with the Subpart I limitations, whereas plants without end-of-pipe biological treatment must comply with the Subpart J limitations.

C. BAT SUBCATEGORIZATION ISSUE RESOLUTION

1. Assessment of "Raw Waste" Treatability

Upon review, EPA has determined that the present subcategorization of the OCPSF industry is the correct approach given the technical limitations of biological treatment and the complexity of the industry. As EPA explained in both the OCPSF proposal and the preamble to the final rule, a biological system cannot operate effectively without a sufficient mass of organic biodegradable material to sustain the microorganisms which consume the biodegradable waste (50 FR 29,076; 52 FR 42,548). Comments received from industry during the rulemaking support EPA's conclusion that plants without a sufficient raw waste BOD_5 level cannot sustain biological treatment. (8/17/83 Comments of the Halogenated Solvent Industry Alliance at 4-5, R. 098922-3; 12/23/85 Comments of the Halogenated Solvents Industry Alliance at 7-8, R. 071251-2; 12/16/85 Comments of PPG Industries, Inc. Chemical Group at 3, R. 068765.) One of the basic operational requirements for activated sludge biological treatment is the

maintenance of sufficient dissolved oxygen, substrate (food/organic matter), and nutrients (generally, nitrogen and phosphorus) in the aeration chamber to maintain necessary microbial cell growth and energy. "The most important factor for keeping any living system alive and healthy is the proper amount and type of food" (Operation of Wastewater Treatment Plants, Manual of Practice No. 11, Water Pollution Control Federation, 1976, pages 118-25). The Agency therefore agrees with industry commenters that in the absence of sufficient influent BOD_5 concentration (biodegradable food) biological systems will not operate effectively. Thus, for some dischargers in the industry, end-of-pipe biological treatment is not part of BAT because it is not an available technology which will operate under low BOD_5 influent conditions.

NRDC has agreed that a plant's ability to maintain biological treatment "might at least fall within the types of relevant factors that EPA may consider in creating BAT subcategories" (NRDC Brief at 51). However, NRDC has argued that EPA's record does not support the inability of plants with low BOD_5 to operate a biological treatment system and that, even if biological treatment systems are so limited, EPA should establish a BOD_5 floor above which plants may not qualify for Subpart J, or should limit Subpart J's applicability to plants in specific segments of the industry which generate wastewater with low BOD_5.

EPA has been unable to develop a technical basis for establishing a BOD_5 floor above which a biological treatment system can be operated effectively. A review of the technical literature has not provided a basis for establishing a floor. EPA has found no discussion in any of the literature of the operation of biological systems at low BOD_5 levels -- rather, the literature typically relates effluent quality to residence time in biological treatment, and assumes sufficient substrate to operate the system (1983 Dev. Doc. Vol. II, p. IV-10 describing design models developed by Eckenfelder, McKinney, Lawrence and McCarty, and Gaudy). Furthermore, the OCPSF database does not provide a basis to impose a floor.

The Agency has annual average influent BOD_5 data from 45 percent (98) of the 220 industry plants with end-of-pipe biological treatment. The influent BOD_5 concentrations ranged from 60 to 9,420 mg/l; 12 plants reported influent concentrations less than 125 mg/l. Table II-2 presents a listing of these 98 plants and their average influent and effluent BOD_5 data. All of these 98 plants

TABLE II-2
ANNUAL AVERAGE BOD_5 INFLUENT AND EFFLUENT DATA*

OBS	PLANT	BOD INF	BOD EFF	OBS	PLANT	BOD INF	BOD EFF
1	602	9420	1050	50	352	524	45
2	1698	4706	68	51	2692	510	4
3	296	4695	216	52	154	505	11
4	1766	3595	166	53	2430	496	8
5	866	3195	10	54	1717	490	38
6	908	3176	53	55	1643	483	18
7	2026	3155	40	56	1617	469	65
8	1656	2456	97	57	871	468	35
9	1911	2442	25	58	2242	456	16
10	2390	2317	57	59	2315	444	9
11	741	2271	96	60	2450	440	5
12	1438	2249	29	61	1753	435	37
13	394	2169	9	62	415	413	45
14	177	2046	126	63	1494	413	62
15	1609	1972	65	64	970	401	10
16	1133	1947	23	65	227	391	88
17	102	1908	7	66	1149	387	21
18	4021	1767	21	67	2536	386	3
19	1137	1698	23	68	1973	375	3
20	3033	1688	190	69	1407	366	28
21	254	1681	4	70	2181	351	4
22	83	1516	38	71	2626	349	14
23	2365	1385	40	72	2376	324	27
24	2573	1371	284	73	659	316	35
25	948	1366	12	74	883	300	20
26	2551	1305	11	75	2678	274	79
27	1	1237	91	76	2222	253	8
28	250	1212	127	77	2556	210	19
29	1647	1192	58	78	1695	206	17
30	2592	1187	27	79	1343	183	8
31	1572	1128	45	80	525	180	9
32	990	1057	16	81	63	175	6
33	2711	962	985	82	387	175	14
34	682	911	14	83	183	167	.
35	1062	878	24	84	399	163	24
36	1881	872	63	85	2763	150	4
37	1340	839	6	86	802	145	12
38	2394	829	57	87	1714	125	32
39	2816	785	10	88	1059	120	32
40	443	718	20	89	1769	115	10
41	2461	717	43	90	2471	110	17
42	2631	694	22	91	284	104	21
43	2528	679	35	92	2296	81	18
44	2445	668	48	93	1616	80	101
45	1977	664	27	94	1890	80	47
46	4051	645	27	95	2236	80	55
47	2313	577	244	96	683	79	12
48	2227	572	75	97	2447	71	15
49	851	565	30	98	2360	60	2

* All BOD_5 concentrations are in milligrams/liter

have end-of-pipe biological treatment in place. In addition, EPA was able to identify one facility from its 12 plant sampling program (Plant #725) with a two-week average influent BOD_5 of 37 mg/l prior to biological treatment; however, the Agency believes that this two-week value may not be representative of the plant's long-term average BOD_5 concentration.

Thus, among the plants for which EPA has influent BOD_5 data, almost 90 percent of those using biological systems have BOD_5 levels above 125 mg/l, with the remaining plants ranging as low as 60 mg/l. However, the Agency is not able to conclude that, because any particular plant employs biological treatment at a particular BOD_5 level, other plants could do the same. The effectiveness of a biological treatment system depends on a number of factors, including variability and composition of the influent to the system. Relatively minor changes in process conditions can lead to significant changes in wastewater composition, which can significantly affect treatability (1983 Dev. Doc. Vol. II, p. IV-28).

The OCPSF industry is large and diverse, and many plants in the industry are highly complex. This industry encompasses over 25,000 different organic chemicals, plastics, and synthetic fibers product/processes. As a result of the wide variety and complexity of raw materials and processes used and of products manufactured, an exceptionally wide variety of pollutants are found in the wastewaters of this industry. They include conventional pollutants (pH, BOD_5, TSS, and oil and grease), an unusually wide variety of toxic pollutants (both metals and organic compounds), and a large number of nonconventional pollutants. Many of the toxic and nonconventional pollutants are organic compounds produced by the industry for sale. Others are created by the industry as byproducts of their production operations (52 FR 42525-6).

Certain production factors may affect the concentration of BOD_5 or TSS in the raw wastewater generated by OCPSF processes. Factors contributing to relatively higher BOD_5 or TSS loading include: use of aqueous reaction media, use of vacuum jets or steam ejectors, absence of toxic material in the raw wastewater, and use of oxidation, esterification, or alkoxylation generic reaction chemistry. Other generic process chemistry may be expected to generate wastewaters of relatively low BOD_5 because refractory chemical species predominate in the wastewater (i.e., nitration, sulfonation, and halogenation -- chlorinated solvents), or because relatively few chemical species are present in

the wastewater (i.e., bulk and addition polymerization processes). (1983 proposed Dev. Doc. Vol. I, pp. 63 to 68)

In the OCPSF industry, production often varies from day to day, or even from hour to hour. This is particularly true in large, integrated plants producing a large variety of products as well as plants employing batch processing. A representative high-volume plant may produce a total of 45 high volume products with an additional 300 lower volume products. Smaller batch processing plants may produce a total of 1,000 different products with 70 to 100 of these being produced on any given operating day (1983 Dev. Doc. Vol. II, p. III-9). Variations in product mix and relative production volumes generally produce variations in the treatability of the wastewater -- depending on the biodegradability of the individual constituents (1983 Dev. Doc. Vol. II, pp. IV-7 to 10). Changes in product mix and relative production levels generally affect the treatability of the combined end-of-pipe wastewater because of subsequent variations in wastewater flow and characteristics such as individual pollutant mix, BOD_5 concentration, temperature, and pH (1987 Dev. Doc., pp. VII-75 to 9).

One of the principal problems associated with operating a biological system with varying influents is the effect of such variation on the system's ability to acclimate to toxic constituents in the wastewater. Although the primary purpose of biological treatment is usually to reduce the overall oxygen demand of a wastewater, biological treatment can also remove some specific toxic compounds from wastewater. Biodegradation converts complex chemicals into simpler compounds. Sometimes, however, the chemicals produced may be more toxic than the chemicals degraded (1983 Dev. Doc. Vol. II, p. VII-12). A primary limitation of biological treatment of OCPSF process wastewater is the great variability of toxic pollutant loadings experienced by plants in the industry. While microbial populations within a biological treatment system gradually acclimate to specific compounds in the waste streams from a given organic chemicals plant, the composition of a waste stream may rapidly change as different production processes are operated. The microbial population treating a complex waste stream of widely varying composition will not be as well acclimated as a microbial population treating a relatively constant waste stream (1983 Dev. Doc. Vol. II, p. IV-10). Acclimation can produce strains of organisms which are tolerant to normally toxic substances. However, once the specialized strain is established, major changes in wastewater composition or concentration can kill the acclimated organisms and cause failure of the treatment process.

Reestablishment of a suitable microbial population can require months (1983 Dev. Doc. Vol. II, p. VII-12). As the available substrate in a biological treatment system decreases, the health of the microorganisms and their ability to adapt to changing wastewater conditions will likely also decline. Due to the extraordinary complexity and variety in the OCPSF industry, it would be nearly impossible to analyze each plant's waste stream to determine a technically defensible BOD_5 floor, or series of floors for different plants with different operating and wastewater characteristics, especially when the literature does not provide a theoretical basis for a BOD_5 cutoff.

For the same reasons, EPA is also unable to limit the availability of Subpart J to specific industry segments. EPA's ability to identify segments of the industry which could qualify for Subpart J rests on its ability to set a floor. Because the Agency can not determine a technically defensible minimum BOD_5 level which can sustain biological treatment, it is not able to identify segments of the industry whose wastewater is characterized by BOD_5 levels above such a minimum level.

2. BAT Subpart J Applicability

Even if NRDC's suggestions to limit the availability of Subpart J were feasible, EPA does not believe that a limitation is necessary. The essence of NRDC's argument is the concern that companies which have a high enough BOD_5 to operate a biological treatment system will nonetheless choose an alternative method to comply with BPT in order to qualify for BAT Subpart J. This concern is unfounded. As EPA explained in its original promulgation, based on reported or modeled raw waste BOD_5 data and the methodology for estimating BPT compliance costs (1987 Dev. Doc., pp. VIII-2 to 7), EPA projected that 23 plants in the industry will decide not to employ end-of-pipe biological treatment, all based on considerations relating to compliance with the BPT limitations.

An assessment of the OCPSF record shows that 220 of the 304 direct discharging OCPSF facilities reported the use of end-of-pipe biological treatment in 1980. For the remaining 84 plants without end-of-pipe biological treatment (identified on pages VII-127 through VII-137 of the 1987 Dev. Doc.), the Agency estimated that 54 plants would install biological treatment to comply with the promulgated BPT effluent limitations and an additional 7 plants would comply

using contract hauling because of low flows (less than 500 gpd)(1987 Dev. Doc., pp. VII-127 to 37). The remaining 23 plants, identified in Table II-3, are the Agency's best estimate of the direct discharging plants to which BAT Subpart J would apply.

Common sense and economic considerations dictate that plants will not opt to install biological treatment in order to qualify for the Subpart J BAT limitations. As always, EPA encourages plants to carefully consider appropriate pollution prevention programs including good housekeeping practices, water conservation, and source reductions as a first step for reducing raw waste BOD_5 levels. EPA believes that, after implementation of a comprehensive waste management program, if a plant has a high enough BOD_5 level that it needs to treat its wastewater in order to comply with the applicable BOD_5 limitations and can effectively operate an end-of-pipe biological system, the plant will install an end-of-pipe biological system without regard to the fact that the system will subject the plant to the Subpart I limitations.

The most logical alternative end-of-pipe treatment system, in lieu of biological treatment, of which EPA is aware for achieving significant BOD_5 removals would consist of chemically assisted clarification followed by multi-media filtration and granular activated carbon. The chemically assisted clarification unit would function as initial solids control with the subsequent multi-media filtration unit protecting the activated carbon columns from solids overload. Table II-4 presents the capital and operation and maintenance costs associated with the installation of this type of system at the 54 plants projected to install end-of-pipe biological treatment to comply with the BPT limitations. The Agency estimates that these 54 plants would incur annual costs almost 15 times higher to comply with the BPT limitations if they chose instead to install an end-of-pipe activated carbon treatment system ($6.123 vs. $90.228 million, respectively). Thus, EPA believes that rational economic decision making will ensure that plants with BOD_5 levels which are sufficiently elevated to operate end-of-pipe biological treatment systems will install such systems.

Additionally, Subpart J will not result in significantly greater environmental loadings than Subpart I. As stated above, the Subpart I limitations are more stringent than their Subpart J counterparts for 30 pollutants. Table II-5 presents a listing of these 30 pollutants and indicates that 24 of these 30

TABLE II-3

TWENTY-THREE DIRECT DISCHARGE BAT SUBPART J PLANTS

OBS	PLANT NUMBER
1	76
2	105
3	114
4	260
5	373
6	657
7	663
8	709
9	814
10	877
11	913
12	991
13	1249
14	1569
15	1618
16	1774
17	1785
18	2030
19	2073
20	2590
21	2606
22	2735
23	2767

TABLE II-4
COST COMPARISONS FOR ALTERNATIVES TO BIOLOGICAL TREATMENT

PLANT #	FLOW(MGD)	BIOLOGIGAL COST CAPITAL	BIOLOGIGAL COST O & M	ALTERNATIVE COST CAPITAL (1)	ALTERNATIVE COST O & M (1)
33	0.56	749,380	68,731	4,087,033	573,740
87	0.29	265,566	42,407	1,381,505	2,301,032
155	0.483	338,881	47,365	1,861,823	3,929,436
159	0.0749	358,407	69,134	723,113	632,766
225	0.209	229,464	39,653	1,157,028	1,654,067
259	0.312	276,458	43,077	1,439,571	2,480,634
294	0.0362	106,642	33,670	567,923	345,084
412	0.045	117,697	33,793	605,224	410,839
446	0.02304	87,942	33,470	510,129	245,242
447	0.216	233,064	39,920	1,177,208	1,709,071
451	1.2622	834,724	62,589	5,955,339	999,688
502	0.0029	40,391	32,974	407,842	77,309
536	0.0073	56,877	33,157	435,236	118,280
569	0.157	200,730	37,442	1,001,109	1,250,915
601	0.014	72,640	33,317	468,524	174,208
614	0.0468	117,697	33,782	612,696	424,239
669	0.038	110,338	33,721	575,656	358,576
727	3	1,507,133	137,189	10,231,836	1,906,768
775	0.492	342,597	47,565	1,882,916	4,008,149
819	1.016	1,092,319	109,426	5,319,624	857,714
859	0.8	1,015,264	97,928	4,746,954	727,535
876	0.409	313,017	46,650	1,684,552	3,291,337
938	0.29	265,566	42,407	1,381,505	2,301,032
942	0.222	236,664	40,150	1,194,372	1,756,356
962	0.03	99,208	33,598	540,915	298,366
992	0.00862	60,872	33,204	442,298	129,686
1327	0.61	796,198	82,652	4,227,034	606,813
1439	0.225	236,664	40,244	1,202,909	1,780,046
1532	1.515	1,023,159	101,572	6,594,845	1,140,290
1593	0.14	189,968	36,598	947,384	1,121,182
1688	1.324	1,068,593	106,304	6,112,735	1,034,487
1776	0.012	68,749	33,280	459,050	157,947
1794	0.00066	22,597	32,694	387,754	51,177
1839	0.2403	243,874	40,790	1,246,011	1,901,358
1986	0.008	56,877	33,124	439,025	124,361
2047	0.2	225,869	39,313	1,130,827	1,583,603
2055	0.031	99,208	33,586	545,307	305,931
2062	0.014	72,640	33,317	468,524	174,208
2090	0.104	168,427	34,578	827,664	849,625
2206	0.04	110,338	33,703	584,186	373,539

(1) COST ESTIMATES INCLUDE CHEMICALLY ASSISTED CLARIFICATION , FILTRATION , AND ACTIVATED CARBON

TABLE II-4
COST COMPARISONS FOR ALTERNATIVES TO BIOLOGICAL TREATMENT

PLANT #	FLOW(MGD)	BIOLOGIGAL COST CAPITAL	BIOLOGIGAL COST O & M	ALTERNATIVE COST CAPITAL (1)	ALTERNATIVE COST O & M (1)
2268	0.047	117,697	33,781	613,523	425,727
2345	0.1608	204,318	37,634	1,012,910	1,280,051
2400	0.22	233,064	40,049	1,188,664	1,740,580
2419	0.138	189,968	36,510	940,956	1,105,984
2527	0.4	309,342	45,427	1,662,480	3,214,862
2531	0.225	236,664	40,244	1,202,909	1,780,046
2533	0.316	276,458	43,180	1,450,016	2,513,463
2647	1.697	952,532	78,105	7,049,244	1,238,995
2668	0.186	218,681	38,745	1,089,459	1,474,565
2680	0.11	172,020	34,947	848,265	894,603
2770	0.27	258,323	41,792	1,327,748	2,139,176
2771	0.454	327,767	46,704	1,793,198	3,677,418
2786	1.5513	995,226	88,807	6,685,824	1,160,130
4010	0.447	324,070	46,534	1,776,476	3,616,959
TOTALS		18,328,829	2,640,533	104,206,857	70,429,196

(1) COST INCLUDES CHEMICALLY ASSISTED CLARIFICATION , FILTRATION , AND ACTIVATED CARBON

ANNUAL COSTS = (O & M) + 0.19 (CAPITAL)

pollutants are volatile organics which are "stripped" into the atmosphere when discharged to the end-of-pipe biological treatment system used as part of the technology basis for Subpart I. Eighty to 95 percent of the wastewater loadings for 19 of the 24 volatile pollutants are projected to be emitted into the air (1987 Dev. Doc., pp. VIII-227 to 8). Thus, these pollutants are only "removed" by biological treatment in the sense that they are emitted into the air rather than being discharged into receiving water.

For four of the remaining six pollutants listed in Table II-5 (2,4-dimethylphenol, 2-nitrophenol, 4-nitrophenol, and phenol), the Subpart J limitations compared to the Subpart I limitations are based on identical or better performance (the same or lower long-term averages; 1987 Dev. Doc., pp. VII-208 to 10). However, the Maximum for Monthly Average limitations, derived from the long-term averages multiplied by the corresponding variability factors (1987 Dev. Doc., pp. VII-183 to 229), reflect only the different variability of different data sets for different combinations of in-plant and end-of-pipe treatment unit operations. Table II-6 presents the long-term averages and Maximum for Monthly Average variability factors for the Subpart I and Subpart J limitations for these four pollutants. Therefore, despite the differences in the limitations which set maximum permissible effluent levels, the long-term averages, and thus the long-term environmental loadings, of these pollutants will be the same under Subparts I and J. For the two remaining regulated pollutants (nitrobenzene and 2,4-dinitrophenol), the higher Subpart J limitations reflect greater actual environmental loadings. In addition, Subpart J is less stringent than Subpart I with respect to the four pollutants which Subpart J does not regulate. However, given the fact that Subpart J is more stringent than Subpart I for 20 pollutants, Subpart J is not significantly less stringent than Subpart I. The total net annual amount of pollutants that will be discharged by the 23 plants projected to be subject to Subpart J after meeting the Subpart J limits, beyond that which would be discharged under the Subpart I limits, is roughly 2,995 lbs/yr assuming that the four pollutants not regulated in Subpart J are discharged at current levels without incidental removals due to BAT controls; Table II-7 presents a summary of the loadings by pollutant used to calculate this difference and Table II-8 presents the summary of the additional loading of the four pollutants which are unregulated under Subpart J (the total industry estimated current loadings (before BAT and PSES) are 24,166,480 lbs/yr; projected loadings after compliance with BAT and PSES are 571,723 lbs/yr (1987 Dev. Doc.,

TABLE II-5

LIST OF 30 POLLUTANTS WITH THEIR SUBPART I LIMITATIONS
MORE STRINGENT THAN THEIR SUBPART J COUNTERPARTS

POLLUTANT NUMBER	POLLUTANT NAME	BAT SUBPART I[1]	BAT SUBPART J[1]
4*	Benzene	37	57
6*	Carbon Tetrachloride	18	142
7*	Chlorobenzene	15	142
8*	1,2,4-Trichlorobenzene	68	196
9*	Hexachlorobenzene	15	196
10*	1,2-Dichloroethane	68	180
11*	1,1,1-Trichloroethane	21	22
12*	Hexachloroethane	21	196
14*	1,1,2-Trichloroethane	21	32
16*	Chloroethane	104	110
23*	Chloroform	21	111
25*	1,2-Dichlorobenzene	77	196
26*	1,3-Dichlorobenzene	31	142
27*	1,4-Dichlorobenzene	15	142
29*	1,1-Dichloroethylene	16	22
30*	1,2-Trans-dichloroethylene	21	25
32*	1,2-Dichloropropane	153	196
33*	1,3-Dichloropropene	29	196
34	2,4-Dimethylphenol	18	19
38*	Ethylbenzene	32	142
45*	Methyl Chloride	86	110
52*	Hexachlorobutadiene	20	142
56	Nitrobenzene	27	2237
57	2-Nitrophenol	41	65
58	4-Nitrophenol	72	162
59	2,4-Dinitrophenol	71	1207
65	Phenol	15	19
85*	Tetrachloroethylene	22	52
86*	Toluene	26	28
87*	Trichloroethylene	21	26

[1] All units are micrograms per liter.

* Volatile pollutants with limitations based on steam stripping.

TABLE II-6

LONG-TERM AVERAGES (LTA) AND MAXIMUM MONTHLY VARIABILITY FACTORS (VF) FOR FOUR POLLUTANTS WITH SUBPART J LIMITS GREATER THAN SUBPART I

POLLUTANT NUMBER	POLLUTANT NAME	BAT SUBPART I		BAT SUBPART J	
		LTA	MONTHLY VF	LTA	MONTHLY VF
34	2,4-Dimethylphenol	10.794	1.59976	10	1.86249
57	2-Nitrophenol	27.525	1.4643	20	3.23479
58	4-Nitrophenol	50	1.4331	50	3.23479
65	Phenol	10.363	1.40602	10	1.86249

TABLE II-7

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J
PLANTS BEYOND BAT SUBPART I LIMITATIONS
FOR 23 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
1	1	7	17598.02	123.48	82.93	82.928	0.000
2	3	7	37787.45	624.27	421.50	421.503	0.000
3	* 4	16	95236.51	349.13	215.24	264.149	48.905
4	* 6	9	114245.99	1216.52	133.09	231.630	98.536
5	* 7	7	13787.95	124.85	86.30	126.853	40.553
6	* 8	5	5065.80	535.28	311.98	452.653	140.671
7	* 9	6	62816.34	200.00	113.94	200.004	86.059
8	* 10	8	584326.09	27153.78	1079.21	825.275	-253.931
9	* 11	8	671.18	124.86	86.30	86.303	0.000
10	* 12	4	204483.41	119.98	68.16	119.979	51.821
11	* 13	7	50144.01	167.52	126.96	126.963	0.000
12	* 14	7	134173.94	2129.84	126.96	126.963	0.000
13	* 16	8	31105.61	837.59	634.83	634.828	0.000
14	* 23	10	103071.77	1654.78	223.19	315.093	91.906
15	* 25	7	5058.04	832.58	363.26	484.911	121.656
16	* 26	7	1664.63	326.26	217.40	326.256	108.855
17	* 27	7	191669.35	514.80	86.96	151.690	64.729
18	* 29	7	524091.78	167.52	126.96	126.963	0.000
19	* 30	5	54354.99	1140.26	112.56	123.812	11.256
20	* 32	9	167029.75	2064.88	836.56	836.558	0.000
21	* 33	4	3234.54	234.11	156.76	234.114	77.350
22	34	7	30766.39	123.48	82.93	82.928	0.000
23	* 38	12	8381.42	185.09	144.53	185.087	40.553
24	39	8	1547.72	201.45	152.79	152.791	0.000
25	* 42	2	145.23	143.60	46.08	46.079	0.000
26	* 44	8	236552.89	3436.94	296.01	141.568	-154.439
27	* 45	8	710447.63	837.59	634.83	634.828	0.000
28	* 52	0	.	.	.	.	.
29	55	10	11462.03	125.38	84.82	84.824	0.000
30	56	5	221648.32	144.93	97.85	144.934	47.083
31	57	4	2252.95	285.01	190.84	136.316	-54.526
32	58	4	5293.44	508.94	340.79	340.791	0.000
33	59	6	5708.21	615.59	412.82	615.588	202.763
34	60	4	2999.10	244.29	163.58	163.579	0.000
35	65	17	579000.10	238.34	197.79	197.788	0.000
36	66	9	16358.05	762.06	418.88	392.147	-26.737
37	68	6	10893.25	221.61	148.62	107.334	-41.282
38	70	6	9829.00	529.41	355.03	198.156	-156.874
39	71	7	39755.90	129.27	86.96	86.961	0.000
40	72	4	382.40	101.79	68.16	68.158	0.000
41	73	5	132.33	101.79	68.16	68.161	0.000
42	74	4	112.83	101.79	68.16	68.158	0.000
43	75	4	197.96	101.79	68.16	68.158	0.000
44	76	7	2263.09	123.48	82.93	82.928	0.000
45	77	9	5077.49	233.29	192.74	192.738	0.000
46	78	7	5268.24	123.48	82.93	82.928	0.000
47	80	7	17203.90	123.12	82.57	82.567	0.000
48	81	7	17255.66	123.48	82.93	82.928	0.000
49	84	8	2914.17	135.83	91.22	82.930	-8.293

ALL DATA IN POUNDS PER YEAR

TABLE II-7

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J PLANTS BEYOND BAT SUBPART I LIMITATIONS FOR 23 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
50	* 85	9	40898.58	985.79	161.56	237.38	75.815
51	* 86	16	96087.45	251.55	210.99	235.45	24.457
52	* 87	8	169932.64	220.03	128.70	154.44	25.740
53	* 88	7	3866.69	3866.69	3866.69	3866.69	0.000
54	119	7	70707.39	10917.94	6602.53	6602.53	0.000
55	120	6	469556.15	9129.10	6196.69	6196.69	0.000
56	121	5	216506.34	1863.44	1258.09	1258.09	0.000
57	122	6	613976.30	2625.42	1626.53	1626.53	0.000
58	124	0	.	.	.	.	.
59	128	9	2868011.01	58142.39	11810.13	11810.13	0.000
			8897009.41	138447.44	42210.07	42872.69	662.625

* Volatile pollutants with limitations based on steam stripping.

ALL DATA IN POUNDS PER YEAR

TABLE II-8

ADDITIONAL ANNUAL LOADINGS DISCHARGED AT CURRENT LEVELS
FROM THE FOUR POLLUTANTS UNREGULATED BY BAT SUBPART J LIMITATIONS
FOR 23 PLANTS

CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD
24	6	41614.32	123.12
31	6	31505.36	221.61
35	5	12270.27	610.79
36	5	4419.67	1376.87
		89809.61	2332.40

ALL DATA IN POUNDS PER YEAR

pp. VIII-271 to 74)). Moreover, 561 pounds of the additional "removal" achieved by Subpart I is accomplished by volatilization of pollutants into the air during biological treatment, assuming an 80 percent volatilization rate (52 FR 42559-60; 1987 Dev. Doc., pp. VIII-275 to 279).

Even if none of the 84 plants were to comply with the BPT limits through the use of end-of-pipe biological treatment, then they would all be subject to BAT Subpart J limitations. In this case, the total annual amount of pollutants regulated in Subpart J that would be discharged by all 84 plants after meeting the Subpart J limits, beyond that which would be permitted under the Subpart I limits, is roughly 1,888 lbs/yr. Table II-9 presents a summary of the loadings by pollutant which were used to calculate this difference. Adding the additional loadings of the four pollutants which are unregulated under Subpart J, assuming they are discharged at current levels without incidental removals due to BAT controls, increases the loadings by 4,181 lbs/yr; Table II-10 presents the summary of additional loading of the four pollutants which are unregulated under Subpart J. The total difference in loadings between Subparts I and J would be 6,069 lbs/yr. Similarly, 1,202 pounds of the additional "removal" achieved by Subpart I is accomplished by volatilization of pollutants into the air during biological treatment.

In sum, because EPA believes that plants which are able to operate biological treatment systems to meet the BPT limitations will do so, and because Subpart J is not projected to produce significantly greater environmental loadings of pollutants than Subpart I, it is not necessary for EPA to limit the availability of Subjpart J.

3. Adverse Effects of Creating a BOD_5 Floor

Even if it were feasible to limit the availability of Subpart J, and even if plants were likely to make BPT treatment decisions based on the cost of BAT treatment, attempting to establish a BOD_5 floor would likely have the undesirable effects of undermining both EPA's policy of promoting pollution prevention and the application by industry of rational, integrated waste management and wastewater treatment systems.

TABLE II-9

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J PLANTS BEYOND BAT SUBPART I LIMITATIONS FOR 84 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
1	1	11	18563.43	1088.35	86.85	86.85	0.000
2	3	23	500661.76	4941.39	1905.43	1905.43	0.000
3	*4	51	435195.86	1282.19	574.14	919.35	345.207
4	*6	23	116259.01	1786.10	290.83	801.21	510.382
5	*7	19	27166.33	290.28	174.82	290.28	115.460
6	*8	8	5066.69	535.60	312.30	452.97	140.671
7	*9	9	62819.81	200.08	113.97	200.08	86.116
8	*10	19	1163043.88	37583.60	2173.76	1662.28	-511.472
9	*11	22	1866.18	565.71	230.12	230.12	0.000
10	*12	6	204494.35	119.98	68.16	119.98	51.821
11	*13	15	62615.34	269.34	159.00	159.00	0.000
12	*14	15	325347.04	2361.31	177.07	177.07	0.000
13	*16	15	125648.20	2331.56	1222.96	1222.96	0.000
14	*23	26	167197.26	3155.31	534.94	839.86	304.911
15	*25	15	12789.70	1669.59	948.13	1105.36	157.225
16	*26	10	1665.08	326.46	217.46	326.39	108.933
17	*27	10	191679.85	514.88	86.98	151.77	64.786
18	*29	20	533690.33	451.15	205.25	205.25	0.000
19	*30	10	54425.46	1144.61	112.94	124.23	11.291
20	*32	14	167499.30	2468.97	1051.49	1051.49	0.000
21	*33	6	3234.71	234.12	156.77	234.12	77.350
22	34	9	30767.06	123.48	82.93	82.93	0.000
23	*38	34	67185.88	499.39	332.73	486.71	153.974
24	39	12	2206.30	672.55	182.00	182.00	0.000
25	*42	4	145.30	143.62	46.10	46.10	0.000
26	*44	23	473467.85	4723.47	612.58	292.97	-319.605
27	*45	16	905780.92	1282.29	764.92	764.92	0.000
28	*52	0	.	.	.	.	.
29	55	30	26729.96	3259.89	259.57	259.57	0.000
30	56	15	1416139.25	537.88	206.81	537.88	331.065
31	57	9	3046.11	505.69	239.01	170.72	-68.288
32	58	8	5594.39	701.23	410.10	410.10	0.000
33	59	11	8092.62	1009.65	498.84	932.48	433.648
34	60	6	2999.26	244.30	163.59	163.59	0.000
35	65	48	14655943.38	2449.99	633.80	633.80	0.000
36	66	18	19301.61	1062.47	699.92	655.25	-44.676
37	68	14	14512.55	548.91	231.91	167.49	-64.420
38	70	9	24302.68	1086.97	432.84	241.59	-191.256
39	71	16	47707.39	312.07	134.20	134.20	0.000
40	72	7	446.24	185.61	71.16	71.16	0.000
41	73	7	132.33	101.79	68.16	68.16	0.000
42	74	7	157.74	146.69	71.16	71.16	0.000
43	75	7	242.87	146.69	71.16	71.16	0.000
44	76	10	2335.05	195.33	85.92	85.92	0.000
45	77	19	9984.61	406.05	255.85	255.85	0.000
46	78	11	5816.97	311.51	107.27	107.27	0.000
47	80	13	20701.21	684.35	180.77	180.77	0.000
48	81	11	19867.49	201.00	105.20	105.20	0.000
49	84	12	3315.50	474.37	118.00	107.27	-10.727

ALL DATA IN POUNDS PER YEAR

TABLE II-9

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J
PLANTS BEYOND BAT SUBPART I LIMITATIONS
FOR 84 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
50	* 85	21	41147.56	1081.87	230.90	316.31	85.41
51	* 86	54	945348.67	2369.32	633.07	716.04	82.97
52	* 87	17	176627.17	474.12	190.51	227.95	37.44
53	* 88	18	11242.31	6144.72	6144.72	6144.72	0.00
54	119	12	73165.20	12180.44	7865.02	7865.02	0.00
55	120	11	507700.55	24549.38	13313.68	13313.68	0.00
56	121	12	2373151.85	10492.64	2935.61	2935.61	0.00
57	122	11	778015.97	3143.25	1914.80	1914.80	0.00
58	124	0	.	.	.	.	.
59	128	17	2892078.33	62454.67	14036.66	14036.66	0.00
			29746549.67	208228.28	65134.81	67023.02	1888.21

* Volatile pollutants with limitations based on steam stripping.

ALL DATA IN POUNDS PER YEAR

TABLE II-10

ADDITIONAL ANNUAL LOADINGS DISCHARGED AT CURRENT LEVELS
FROM THE FOUR POLLUTANTS UNREGULATED BY BAT SUBPART J LIMITATIONS
FOR 84 PLANTS

CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD
24	14	42126.63	175.37
31	8	31506.97	221.62
35	13	19699.66	1455.68
36	11	6134.17	2327.84
		99467.43	4180.51

ALL DATA IN POUNDS PER YEAR

A review of waste management practices and well-designed and -operated wastewater treatment system configurations in use by the OCPSF manufacturing facilities reveals that there are numerous approaches for implementing effective pollutant control practices (1987 Dev. Doc., p. VII-4). In recognition of the extraordinary complexity of the OCPSF industry and the impracticability of developing a detailed knowledge of the production practices and the factors affecting wastewater treatment at each of the OCPSF plants, EPA based the BAT limitations on certain reasonable, simplifying assumptions and conclusions (e.g., effluent quality is independent of the product mix, size, and geographic location of a facility; treatment trains which achieve equivalent removal efficiencies are designed on a plant-by-plant basis (1983 Dev. Doc. Vol. II, Sec. IV; 1987 Dev. Doc. Sec. IV)). In the absence of such detailed knowledge, and in view of the fundamental, delicate inter-relationships among conventional, toxic, and non-conventional pollutant controls, the Agency developed and promulgated a regulatory scheme which gave the regulated community some degree of management discretion in selecting appropriate combinations of source controls or pollution prevention techniques as well as appropriate in-plant or end-of-pipe wastewater management and treatment techniques. EPA is concerned that the attempt to establish a BOD_5 floor would result in plants' making undesirable treatment decisions which the Agency did not intend; for example, a plant that has already installed or is considering installing in-plant product and by-product recovery may feel compelled to reduce the effectiveness of in-plant control to ensure that sufficient organic matter is available to be able to operate an end-of-pipe biological treatment system, or to operate such a system in a cost-effective fashion.

For each of the seven product-based BPT subcategories, the technology basis consists of biological treatment, which usually involves either activated sludge or aerated lagoons, followed by clarification and preceded by appropriate process controls and in-plant treatment to assure that the biological system may be operated optimally (52 FR 42536). In other words, the success of end-of-pipe conventional pollutant control often depends on the efficiency of in-plant waste management practices as well as toxic and non-conventional pollutant controls.

To control the wide variety of toxic pollutants and variable levels of conventional pollutants generated by the OCPSF industry, effective waste management practices typically include a broad range of in-plant controls,

process modifications, and end-of-pipe treatment techniques. Most plants have implemented programs that combine elements of both in-plant control and end-of-pipe wastewater treatment. The configuration of controls and technologies differs from plant to plant, corresponding to the differing mixes of products manufactured by different facilities (1987 Dev. Doc., pp. II-2 to 5). In-plant controls provide several advantages and perform varying functions at different plants. Some are capable of completely eliminating a waste stream, while others recover valuable products and by-products of the manufacturing process. In-plant control may reduce end-of-pipe treatment costs, which often offset the in-plant treatment costs. In-plant control can also remove pollutants inhibitory or not amenable to end-of-pipe treatment schemes. In-plant treatment is also used to take advantage of the more efficient treatment of low volume, concentrated and homogeneous waste streams generated by specific unit operations prior to commingling with other in-plant process wastewater flows (1983 Proposed Dev. Doc., pp. 119 to 122).

Furthermore, depending on the specific composition of the wastewater, many pollutants may be removed to a greater or lesser degree by a technology not designed for removal of that pollutant. For example, a physical-chemical treatment system designed to remove suspended solids will also remove a portion of the BOD_5 of a wastewater if the solids removed are organic and biodegradable. It is common in the OCPSF industry to use a combination of technologies adapted to the individual wastewater stream to achieve desired results (1983 proposed Dev. Doc., Vol 1 p. 96).

In a smaller, less complex industry, it might be possible for EPA to assess more completely the intricacies of each plant's or each plant category's treatment system. But the OCPSF point source category is simply too complex for the Agency to approach perfect plant-specific knowledge of the industry, and EPA is reluctant to impose a regulation which would likely result in irrational and undesirable treatment decisions, such as limiting source reduction or pollution prevention measures in order to operate an end-of-pipe biological treatment system in a cost-effective fashion.

Finally, NRDC argues that EPA's own rulemaking record indicates that plants with low BOD_5 levels can sustain biological treatment by adding "nutrient" to the influent, or by using "pure oxygen" or "extended aeration" biological systems,

citing the 1987 Dev. Doc. at VII-63, 127. NRDC misunderstands the record on this point. The Development Document merely indicates that these three solutions can reduce problems caused by low BOD_5 in certain wastestreams, not that they are universal, generally applicable solutions to low BOD_5 levels. These techniques can be used to maintain a healthy population of microorganisms as long as there is a sufficient basic substrate level on which the organisms can feed. In effect, NRDC suggests that EPA treat these techniques as "demonstrated technologies" which should form part of the basis of the BAT limitations. EPA is not aware of any demonstrated use of these techniques as a substitute for a sufficient substrate to operate a biological treatment system.

4. Conclusion

In conclusion, EPA believes that it is neither necessary nor feasible for the Agency to limit the applicability of Subpart J. As a result, the Agency proposes to leave the current subcategorization scheme unchanged.

III. BAT SUBPART J LIMITATIONS AND PSES STANDARDS

A. BACKGROUND

Subpart J established direct discharge toxic pollutant limitations for approximately 23 plants that were projected to comply with BPT limitations without the use of end-of-pipe biological treatment or contract hauling. The Subpart J toxic pollutant numerical limitations were based on the performance of in-plant wastewater treatment technology including steam stripping to remove volatile priority pollutants, chemical precipitation for metals, alkaline chlorination for cyanide, and in-plant biological treatment for removal of selected priority pollutants including polynuclear aromatics, phthalate esters, acrylonitrile, phenol, and 2,4-dimethylphenol (52 FR 42538 - 45, 1987 Dev. Doc. Vol. I, pp. II-8 to 11).

Numerical standards for 20 of the Subpart J pollutants were based on the performance of three biological treatment systems with detention times between 1.6 and 17.2 days. In contrast, detention times between 1 to 2.1 days were used to estimate the costs of compliance based on the model in-plant biological treatment systems [(1987 Dev. Doc., pp. VIII-189); OCPSF Record R. 93970-4020; EPA 9-23-88 Response Brief, pp. 244-59].

CMA challenged the Subpart J limitations based on in-plant biological treatment arguing, in part, that the plants used by EPA to derive the limitations based on in-plant biological treatment have more treatment in place than EPA's model treatment used to estimate costs of compliance and that EPA significantly underestimated the costs of installing in-plant biological treatment (CMA's 4-25-88 Brief, pp. 58-76).

After the Fifth Circuit initially upheld these Subpart J limitations (870 F.2d at 240-2), CMA petitioned for reconsideration, again arguing, in part, that the Agency underestimated the costs of compliance due to the differences between the detention times of the three plants that provided the basis for the numerical standards and the detention times of the model technology that provided the basis for estimating the engineering costs of compliance. (CMA's 5-3-89 Petition for Review Brief, pp. 8-11) The Court concluded that the detention time was a key variable in determining the effectiveness of biological treatment and that EPA

had failed to demonstrate a reasonable basis to conclude that biological systems with 2.1 days detention would control pollutants as effectively as the biological systems with longer detention times (885 F.2d at 265).

The decision remanded limitations for 19 of the 20 Subpart J pollutants based on in-plant biological treatment. The Court left in effect the limitations for acrylonitrile that were based upon the treatment system with the 1.6 days detention time. As noted in the June 29, 1990 revocation notice (55 FR 26691), the Agency also withdrew the corresponding NSPS, PSES, and PSNS standards which were based on the remanded Subpart J limits.

Since the remand was based on the designs of the model treatment systems used to estimate the costs of compliance rather than the technical basis for the numerical limitations, EPA has decided to repropose the same numerical standards with revised costs of compliance. As described below, the revised compliance costs are based on revised model in-plant biological treatment systems with increased residence times as a function of reported or projected raw waste toxic pollutant concentrations.

B. REVISIONS TO METHODOLOGY

In responding to the remand issues, the Agency initially reassessed its 1987 methodology in developing the estimated costs of compliance for the BAT and PSES limitations and standards. The Agency developed a revised cost "baseline" in addition to evaluating the increased costs of compliance for the redesigned in-plant biological model treatment systems. The Agency's review of the costing procedures used for the 1987 publication identified several errors in the technology selections and wastewater flows assumed by EPA as the basis to estimate engineering costs of compliance. Correction of these errors increased the costs for some plants and decreased the costs for others. In addition, estimated treatment upgrade costs which were described in the development document but not included in the final economic impact analysis are now included in the new baseline. Thus, EPA's revised estimated BAT and PSES costs of compliance rest on baseline figures which are about 2 and 5 percent higher than the respective BAT and PSES cost estimates reported at promulgation.

To these new baseline figures are added revised in-plant biological treatment costs of compliance, which were developed based on increased detention times as a function of reported or projected plant raw waste concentrations. Even though the estimated treatment costs change, the raw waste and effluent loadings as well as the numerical limitations for the 19 remanded pollutants remain unchanged from promulgation. The reassessment also considers potential land availability issues due to the increased size of the model biological treatment systems employing longer detention times.

The engineering costs of compliance are based on incremental compliance costs for each plant. Plant-specific compliance costs are based on one or more treatment unit operations selected from model steam stripping, chemical precipitation, chlorine oxidation, activated carbon, or in-plant biological treatment systems depending on the concentrations of individual priority pollutants at each plant. Annualized compliance costs are derived from the capital, operation and maintenance, and land costs for each wastewater treatment and sludge handling/disposal operation as well as monitoring costs. Contract hauling costs are used in lieu of treatment costs for flows less than 500 gpd (1987 Dev. Doc., Section VIII). With the exception of the baseline revisions described below, the changes in the estimated engineering costs of compliance and corresponding economic impact analyses are due only to the revised costs for the model in-plant biological treatment systems.

1. New Baseline Costs

The compliance cost estimates and corresponding economic impact analyses summarized in the November 5, 1987 Federal Register notice did not include estimated steam stripper and chemical precipitation upgrade costs. During development of the OCPSF guidelines, the steam stripper upgrade costs were developed for existing in-place treatment for three direct discharge plants without end-of-pipe biological treatment and nine indirect dischargers. The cost estimates associated with the steam stripping upgrades are presented in Table III-1.

The chemical precipitation upgrade costs were developed for 20 direct and nine indirect discharging plants with chemical precipitation in place. The cost estimates associate with these chemical precipitation upgrades are presented in Table III-2.

TABLE III-1

COMPLIANCE COST ESTIMATES FOR STEAM STRIPPING UPGRADES

BAT (Direct Plants)			PSES (Indirect Plants)		
Plant No.	Capital Cost ($)*	O&M Cost ($)*	Plant No.	Capital Cost ($)*	O&M Cost ($)*
105	4,350	70,000	72	2,600	9,000
913	18,000	600,000	283	9,000	420,000
1785	3,800	48,000	494	7,800	240,000
			702	3,000	20,000
			1657	8,600	295,000
			1740	3,300	30,000
			2635	9,000	420,000
			4014	2,600	5,500
			4047	2,600	5,500

* Cost estimates are presented in 1982 dollars

1987 Dev. Doc. p. VIII-120

TABLE III-2

COMPLIANCE COST ESTIMATES FOR CHEMICAL PRECIPITATION UPGRADES

BAT (Direct Plants)		PSES (Indirect Plants)	
Plant No.	O&M Cost* ($/year)	Plant No.	O&M Cost* ($/year)
63	4,750	72	1,000
190	1,700	206	1,000
485	3,500	212	1,000
695	60,000	293	1,600
775	4,750	905	1,000
871	3,750	1126	1,600
1059	14,500	1357	1,000
1348	1,000	1534	3,500
1522	48,000	1848	1,000
1572	25,000		
1769	29,000		
1785	7,000		
2030	1,600		
2292	1,000		
2429	1,000		
2447	1,000		
2474	2,850		
2692	1,000		
2739	1,000		

PLANT NO.	CAPITAL COST* ($)	O&M COST* ($/YEAR)	LAND COST* ($)
399	2,000,000	335,000	9,100

* Cost estimates are presented in 1982 dollars.

1987 Dev. Doc. p. VIII-181

In addition, another BAT (direct) plant, Plant 399, was costed for a complete lime precipitation system since its in-place precipitation unit utilizes sodium hydroxide to facilitate the recovery of zinc; therefore, the plant would not be able to improve its system with the methods used for costing other plants. The costs associated for the complete lime precipitation system for this plant are shown in Table III-2 also.

Prior to promulgation a separate economic impact assessment of these upgrade costs generally demonstrated insignificant incremental economic impacts for these plants (1987 Dev. Doc., pp. VIII-118 to 120 and VIII-174 to 181). However, at this time, EPA is including these upgrade costs in the new baseline analysis cost estimates for the current remand study.

The revised total cost estimates for all the plants affected by the steam stripping and chemical precipitation upgrades along with the total cost estimates at promulgation are presented in Table III-3.

The Agency also reassessed the procedures used to estimate the BAT and PSES costs of compliance. The procedures generally included the use of reported or projected raw waste concentrations for each toxic pollutant present in each plant's product/process waste streams. Then, depending on the pollutant groups and pollutant concentrations, the Agency selected in-plant and/or end-of-pipe treatment technology for cost estimating purposes (1987 Dev. Doc. pp. VIII-7 to 28). For example, steam stripping was costed for volatile pollutants above selected concentrations and chemical precipitation, for metals above selected concentrations. The treatment technology reassessment, which discovered several errors in transferring individual unit operation costs into the final economic impact analysis, resulted in revised plant costs for one direct discharge plant and 22 indirect discharge plants. These corrections increased costs for some plants and decreased costs for others. For example, the technology basis for plant 1718's cost estimate was a combination of in-plant biological treatment and contract hauling at promulgation (1987 Dev. Doc. pp. VIII-B71), but should have been based on contract hauling alone. The basis for plant 2057's cost estimate was steam stripping and in-plant biological treatment at promulgation (1987 Dev. Doc. pp. VIII-B72), but should have been based on steam stripping alone.

TABLE III-3

REVISED PLANT-BY-PLANT COST ESTIMATES FOR PLANTS WITH STEAM STRIPPING AND CHEMICAL PRECIPITATION UPGRADES

BAT (Direct Plants):

	COST ESTIMATES AT PROMULGATION			REVISED COST ESTIMATES(1)		
PLANT NO.	TOTAL CAPITAL COST ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COST ($)*
63	0	0	0	0	4,750	0
105	1,079,744	2,052,382	319,782	4,350	70,000	0
190	731,177	1,071,083	66,000	731,177	1,072,783	66,000
399	0	0	0	2,000,000	335,000	9,100
485	1,866,959	2,951,008	114,488	1,886,959	2,954,508	114,488
695	2,383,893	184,490	94,475	2,383,843	244,440	94,475
775	540,068	644,016	3,151	540,068	648,766	3,151
871	451,103	39,242	6,002	451,103	42,992	6,002
913	965,727	195,760	38,423	983,727	795,760	38,423
1059	0	0	0	0	14,500	0
1348	0	0	0	0	1,000	0
1522	811,772	4,092,048	22,573	811,772	4,140,048	22,573
1572	0	0	0	0	25,000	0
1769	7,875,173	9,689,672	157,155	7,875,173	9,718,672	157,155
1785	804,353	136,003	19,563	808,155	191,003	19,563
2030	1,312,598	1,387,596	79,420	1,312,598	1,389,196	79,420
2292	623,152	160,108	35,602	623,152	161,108	35,602
2429	577,550	116,539	62,203	577,550	117,539	62,203
2447	0	0	0	0	1,000	0
2474	740,217	423,814	28,735	740,217	426,664	28,735
2692	0	0	0	0	1,000	0
2739	117,139	86,578	8,235	117,139	87,578	8,235

PSES (Indirect Plants):

	COST ESTIMATES AT PROMULGATION			REVISED COST ESTIMATES(1)		
PLANT NO.	TOTAL CAPITAL COST ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COST ($)*
72	108,989	107,576	21,252	111,589	117,576	21,252
206	529,234	47,464	13,519	529,234	48,464	13,519
212	33,247	31,778	949	33,247	32,778	949
283	1,929,490	153,681	68,756	1,938,440	573,681	68,756
293	694,026	180,783	7,103	694,026	182,383	7,103
494	320,686	44,996	5,493	328,486	284,996	5,493
702	45,804	31,778	1,315	48,804	51,778	1,315
905	511,629	81,770	10,353	511,629	82,770	10,353
1126	1,264,676	2,361,477	53,330	1,264,676	2,363,077	53,330
1357	492,562	42,073	8,574	492,562	43,073	8,574
1534	509,230	42,080	4,139	509,230	45,580	4,139
1657	2,124,901	295,903	25,893	2,133,501	590,903	25,893
1740	547,859	101,476	20,347	550,859	131,476	20,347
1848	43,397	25,019	289	43,397	26,019	289
2635	2,287,933	193,123	50,626	2,296,933	613,123	50,626
4014	352,094	63,076	1,328	354,694	68,576	1,328
4047	432,268	88,173	1,892	434,868	93,673	1,892

(1) Cost estimates include both steam stripping and chemical precipitation upgrades cost where applicable.
* Cost estimates are presented in 1982 dollars

However, in the case of other plants such as plant 293, cost estimates were based on steam stripping, in-plant biological, activated carbon, and chlorine oxidation treatment at promulgation (1987 Dev. Doc. pp. VIII-B68), but should have also included chemical precipitation. These technology corrections were also included in the new baseline analysis for the current remand study and are presented in Table III-4. The revised total cost estimates based on these corrections versus the cost estimates at promulgation for the plants that were affected by the corrections and are shown in Table III-5.

The Agency also reassessed the flow basis used to estimate costs of compliance and found several errors and inconsistencies in rounding off or truncating reported flows. For the new baseline analysis, the Agency corrected the flows used to estimate costs of compliance for 14 indirect discharge plants. Corrections of these errors also increased costs for some plants and decreased costs for others. For example, the flow for plant 249 was truncated to 0.0162 MGD at promulgation, but should have been 0.01623 MGD; and for plant 438, the flow was rounded off to 0.051 MGD at promulgation, but should have been 0.0508 MGD. The flow, corrections for all the 14 indirect plants are presented in Table III-6. The revised cost estimates for these 14 plants affected by the flow corrections versus the as promulgated cost estimates are also shown in Table III-6.

2. Revised In-plant Biological Treatment Costs

Revised compliance costs for BAT subpart J direct dischargers and PSES indirect dischargers were developed based on in-plant biological treatment systems with 3.5 to 17.2 day detention times (84 hrs. to 413 hrs.). The principal basis for the revised designs includes an analysis of the OCPSF record support related to biological treatment design and performance for pollutant phenol. OCPSF facilities with biological treatment in-place and with relatively high pheol raw waste concentrations were identified from the verification, 5 CMA/EPA Plant Study, and the EPA 12 Plant Sampling Studies as well as the 308 Questionnaire Data Base. When available; the aeration basin detention time, and the average influent and affluent phenol concentration for each of these plants were identified. Table III-7 presents the results of this analysis. Based on the information obtained it was determined that plants with raw phenol concentrations of up to 50 mg/l would comply with the numerical phenol limitations with biological treatment system with detention time up to 72 hours

TABLE III-4

TECHNOLOGY CORRECTIONS

A. Direct (BAT) Plants:

PLANT NO.	TECHNOLOGIES COSTED AT PROMULGATION(1)	TECHNOLOGIES COSTED FOR REVISED BASELINE COST(1)
488	CP, SS, PB	CP, SS, PB, AC, CN

B. Indirect (PSES) Plants:

PLANT NO.	TECHNOLOGIES COSTED AT PROMULGATION(1)	TECHNOLOGIES COSTED FOR REVISED BASELINE COST(1)
58	PB	Monitoring Only
161	SS, CP	CP, AC, SS, CN, PB
293	SS, CP, PB, CN	CP, AC, SS, CN, PB
417	PB	Monitoring Only
607	CP, AC	CP, AC, SS, CN, PB
797	CP, AC	CP, AC, SS, CN, PB
1172	SS, CP	SS, PB
1191	SS, CP, PB	CP, AC, SS, CN, PB
1320	SS, CH	SS, PB, CH
1659	CP, AC	CP, AC, SS, CN, PB
1666	CP, AC	CP, AC, SS, CN, PB
1716	CP, AC	CP, AC, SS, CN, PB
1718	PB, CH	CH
1838	SS, BP, CH	CH
1848	CH Cost = $592,249	CH Cost = $396,317
2057	SS, PB	SS
2129	CP, AC	CP, AC, SS, CN, PB
2232	Monitoring Cost=$29,539	Monitoring Cost=$26,827
2507	PB	Monitoring Only
2677	SS, CP, PB	CP, AC, SS, CN, PB
4042	PB	Monitoring Only
4072	SS, CP	CP, AC, SS, CN, PB

(1) CP = Chemical Precipitation
SS = Steam Stripping
AC = Activated Carbon
CN = Cyanide Destruction
PB = In-Plant Biological
CH = Contract Hauling

TABLE III-5

REVISED COST ESTIMATES BASED ON TECHNOLOGY CORRECTIONS

A. Direct (BAT) Plants:

PLANT No.	COST ESTIMATES AT PROMULGATION			REVISED COST ESTIMATES(1)		
	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*
488	893,795	109,571	34,598	1,154,248	468,093	109,650

B. Indirect (PSES) Plants:

PLANT No.	COST ESTIMATES AT PROMULGATION			REVISED COST ESTIMATES(1)		
	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*
58	34,492	31,778	1,342	0	0	0
161	845,849	185,652	16,526	1,578,954	2,291,710	78,272
293(1)	694,026	180,783	7,103	1,247,793	2,292,150	26,785
417	91,684	33,044	23,250	0	0	0
607	418,470	258,962	19,007	988,390	336,991	29,710
797	358,393	82,077	6,596	892,176	149,820	11,198
1172	787,371	91,247	8,989	686,681	205,649	14,714
1191	839,997	78,013	3,581	941,311	228,119	91,402
1320	454,324	10,583	2,988	488,265	42,435	4,327
1659	488,007	521,563	32,462	1,093,815	618,591	49,392
1666	408,385	225,344	105,779	972,755	301,179	166,578
1716	455,843	394,172	29,601	1,044,991	481,746	45,385
1718	74,324	32,282	1,784	0	0	0
1838	454,719	10,410	8,460	0	0	0
1848(1)	43,397	25,019	289	43,397	26,019	289
2057	525,695	62,236	11,176	454,324	29,682	7,056
2129	407,442	222,266	24,552	971,267	297,915	38,692
2232	1,050,903	396,647	18,899	1,050,903	396,647	18,899
2507	73,357	32,245	3,489	0	0	0
2677	913,257	123,267	5,026	1,194,141	920,690	14,997
4042	88,716	32,902	5,308	0	0	0
4072	204,416	74,951	4,316	905,710	170,314	10,817

NOTES:

* Cost estimates presented in 1982 dollars.
(1) Revised cost estimates include upgrades cost also.

TABLE III-6

FLOW CORRECTIONS

PLANT NO.	FLOW AT PROMULGATION (MGD)	FLOW AT REVISED BASELINE COST (1990) (MGD)
249	0.0162	0.01623
310	0.0214	0.02143
438	0.051	0.0508
1194	0.0017	0.00179
1237	0.007	0.00702
1326	0.0161	0.01612
1891	0.233	0.2326
1971	0.016	0.0161
2288	0.00179	0.0018
2293	0.0053	0.00526
2341	0.455	0.4547
2495	0.12	0.1201
2501	0.00794	0.00795
2776	0.00543	0.00551

REVISED COST ESTIMATES BASED ON FLOW CORRECTIONS

PLANT No.	COST ESTIMATES AT PROMULGATION			REVISED COST ESTIMATES		
	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($)*	TOTAL CAPITAL COSTS ($)*	TOTAL O&M COSTS ($/YEAR)*	LAND COSTS ($/YEAR)*
249	858,441	86,674	6,528	858,497	86,676	6,529
310	538,978	60,478	7,994	539,026	60,480	7,995
438	579,776	87,484	3,957	579,571	87,473	3,955
1194	486,918	42,078	11,555	487,507	42,078	11,562
1237	508,835	46,872	51,844	508,894	46,872	51,852
1326	530,181	43,045	3,403	530,218	43,047	3,404
1891	734,548	290,010	5,986	734,356	290,000	5,984
1971	858,066	84,780	3,676	858,254	84,787	3,678
2288	487,507	42,354	10,208	487,571	42,354	10,209
2293	503,406	46,420	51,142	503,268	46,420	51,125
2341	1,162,583	335,800	29,891	1,162,478	335,795	29,886
2495	985,375	222,026	21,924	985,442	222,029	21,927
2501	839,491	77,377	5,048	840,018	77,377	5,048
2776	927,294	207,907	33,901	928,028	209,287	33,983

* Cost estimates presented in 1982 dollars.

TABLE III-7

DETENTION TIME VERSUS AVERAGE INFLUENT PHENOL CONCENTRATION ANALYSIS

PLANT NO.	AVERAGE INFLUENT PHENOL CONCENTRATION (ppb)	AVERAGE EFFLUENT PHENOL CONCENTRATION (ppb)	DETENTION TIME (HOURS)	SOURCE DOCUMENT FOR DETENTION TIME
1650 V	117.33	10.9	72 to 1008 hours	308 supplemental
2430 V	157.50	11.17	4.5 hours	308 supplemental
948 F	239.24	10.2	72 hours	Verification report
384 T	266.18	ND (Not Detected)	16.6 hours	12 plant report
2221 V	487.00	ND	30.6 to 35.7 hours	308 questionnaire C12
2536 T	501.13	ND	25.2 hours	12 plant report
948 V	509.67	ND	72 hours	Verification report
2631 V	709.00	ND	45 hours*	Verification report
296 V	730.67	ND	136.8 hours	Verification report
12 F	760.71	14.9	62/41 (summer/winter)	308 questionnaire C12
267 F	1,645.55	10.7	8.4 hours	308 supplemental
2394 T	1,847.25	58.5	129.6 hours	12 plant report
1609 V	1,864.50	ND	24 hours	12 plant report
1769 P	2,108.33	--	8 hours	308 supplemental
1890 V	2,917.00	10.8	360 hours	Verification report
2445 P	5,810.00	--	6 hours	308 questionnaire C12
1494 V	18,500.00	ND	18 hours	308 supplemental
306 V	53,916.70	13.3	36 hours	Verification report
2711 V	237,500.00	ND	130 hours	308 questionnaire C12
1293 T	836,292.77	ND	412.8 hours	12 plant report

* Detention time calculated based on system volume and average of flow reported in report

(however, 84 hours or 3.5 days was used as a safety factor), plants with raw waste phenol concentrations up to 300 mg/l would comply with detention times up to 130 hours (5.4 days), and plants with raw waste phenol concentrations over 300 mg/l would comply with detention times up to 413 hours (17.3 days).

Similar assessments for the remaining 18 remanded pollutants were conducted to determine necessary detention times as a function of reported or modeled raw waste concentrations. Table III-8 presents the analysis of this assessment. The largest detention time required by any OCPSF plant to control one or more of these pollutants was determined to be 72 hours. However, an 84 hour or 3.5 day detention time was used to estimate conservative compliance costs for all non-phenol-bearing wastestreams containing only the remaining 18 remanded pollutants.

Raw waste concentrations for phenol and the remaining 18 remanded pollutants were then obtained for each BAT Subpart J and PSES plants from the plant-by-plant pollutant loading estimates described in Chapter VIII of the 1987 Development Document.

Based on the analyses described above, a detention time then was assigned to each BAT Subpart J and PSES plant for purposes of estimating the revised cost of compliance for the remanded pollutants. As a result of these assessments, ~~17~~ 14 BAT Subpart J and 100 PSES plants were assigned 84 hour detention times, ~~8~~ 2 BAT Subpart J and 77 PSES plants were assigned 130 hours detention time, and 4 BAT Subpart J and 65 PSES plants were assigned a 413 hour detention time. The detention times assign for each BAT Subpart J and PSES plants are shown in Table III-9.

The Agency then developed cost estimates based on the new detention times using the same methodologies as those used at promulgation (1987 Dev. Doc. pp. VIII-40 to 44, VII-187 to 196). All costs estimates were generated using the CAPDET design program and are presented in Table III-10. The cost curves presented in Figures I to XII are based on the CAPDET generated data shown in Table III-10.

TABLE III-8

DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS

Pollutant Noo.	Plant No.	Average Influent Concentration (ppm)	Average Effluent Concentration (ppm)	Detention Times (hours)	Source Document for Detention Time
1 (Acenaphthene)	12 F	0.102	ND (Not Detected)	62	308 questionnaire C12
	306 V	3.850	0.013	36	Verification report
34 (2,4-Dimethylphenol)	12 F	0.697	0.013	62	308 questionnaire C12
	3033 T	4.592	0.014	NA	--
	306 V	9.967	0.0102	36	Verification report
39 (Fluorathene)	851 V	0.133	0.0102	34	Verification report
	306 V	5.225	0.0158	36	Verification report
55 (Naphthalene)	2631 V	0.232	0.017	45	Verification report
	695 V	0.250	ND	--	--
	2430 V	0.327	0.0112	4.5	308 supplemental
	3033 T	0.520	ND	--	--
	384 T	1.040	ND	17	12 plant report
	1650 V	1.411	ND	72	308 supplemental
	851 V	2.255	ND	34	Verification report
	12 F	2.275	0.012	62	308 questionnaire C12
66 (Bis[2-Ethylhexyl] phthalate)	948 F	1.097	0.043	72	Verification report
	948 V	4.396	0.053	72	Verification report
68 (Di-n-Butylphthalate)	948 F	0.377	0.013	72	Verification report
	948 V	2.265	0.03	72	Verification report
70 (Diethylphthalate)	948 V	0.433	0.061	72	Verification report
	948 F	1.220	0.023	72	Verification report
71 (Dimethylphthalate)	948 V	0.134	0.037	72	Verification report
	948 F	0.207	ND	72	Verification report
72 (Benzo(a)Anthracene)	306 V	1.585	0.056	36	Verification report
76 (Chrysene)	384 T	0.312	ND	17	12 plant report
	306 V	1.082	ND	36	Verification report
77 (Acenaphthylene)	1650 V	0.641	ND	72	308 supplemental
	306 V	9.758	0.013	72	Verification report

TABLE III-8 (CONTINUED)

DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS

Pollutant No.	Plant No.	Average Influent Concentration (ppm)	Average Effluent Concentration (ppm)	Detention Times (hours)	Source Document for Detention Time
78 (Anthracene)	851 V	0.494	0.0107	34	Verification report
	306 V	2.105	ND	36	Verification report
80 (Fluorene)	1650 V	0.167	ND	42	308 supplemental
	851 V	0.475	ND	34	Verification report
81 (Phenanthrene)	1650 V	0.166	ND	72	308 supplemental
	2313 T	0.612	0.025	72	12 plant report
	851 V	2.452	ND	34	Verification report
	306 V	8.450	0.017	36	Verification report
84 (Pyrene)	851 V	0.246	0.0165	34	Verification report
	306 V	3.083	0.016	36	Verification report

TABLE III-9

PLANT-BY-PLANT DETENTION TIME ASSIGNMENT

A. BAT Plants:

84 HOURS			130 HOURS	413 HOURS
76	~~1247~~	~~2200~~	~~930~~	260
105	1249	2735	~~1768~~	611
114	1569	2767		877
~~912~~	1618			2590
~~946~~	~~2050~~			
814	1785			
913	2073			

651
709
1774
2030
667

B. PSES Plants:

84 HOURS			130 HOURS			413 HOURS	
10	1047	1974	51	1313	2741	22	1667
33	1052	2004	72	1352	4001	119	1764
49	1083	2018	94	1356	4006	122	1773
52	1086	2070	110	1357	4026	206	1833
79	1094	2084	149	1361	4070	220	1853
93	1194	2093	161	1426	4072	240	1899
120	1195	2232	196	1478		257	1931
143	1219	2311	212	1560		310	1993
163	1220	2341	214	1608		458	2176
199	1223	2348	221	1622		492	2184
203	1224	2359	249	1657		543	2241
266	1234	2442	262	1659		592	2293
283	1237	2469	293	1666		702	2300
292	1249	2495	326	1716		706	2459
297	1277	2517	334	1744		724	2485
302	1310	2539	354	1793		791	2498
321	1314	2634	433	1876		975	2501
430	1326	2635	522	1894		987	2646
438	1507	2641	567	2007		997	2714
468	1539	2666	607	2037		1053	2748
494	1575	2736	658	2117		1117	2776
624	1595	2756	661	2129		1163	2793
717	1628	2796	768	2191		1172	4003
722	1706	4014	797	2243		1173	4007
743	1740	4022	814	2250		1197	4008
749	1742	4032	862	2259		1202	4024
771	1743	4044	905	2261		1320	4027
830	1751	4050	1057	2288		1322	4047
887	1788		1085	2318		1351	4057
929	1805		1091	2350		1432	
944	1826		1126	2465		1437	
958	1832		1181	2487		1450	
976	1891		1191	2524		1504	
992	1904		1236	2548		1528	
1006	1936		1264	2565		1534	
1018	1971			2677		1545	

TABLE III-10

REVISED CAPITAL AND O&M COST FOR
IN-PLANT BIOLOGICAL TREATMENT SYSTEMS

FLOW (MGD)	td = 84 hours		td = 130 hours		td = 413 hours	
	CAPITAL COST ($)	O&M COST ($/YEAR)	CAPITAL COST ($)	O&M COST ($/YEAR)	CAPITAL COST ($)	O&M COST ($/YEAR)
SMALL FACILITIES: FLOW < 0.5 MGD						
0.001	36,102	33,207	44,601	33,598	72,640	34,870
0.005	72,640	33,858	87,942	34,238	139,568	35,733
0.01	95,471	34,021	114,023	34,477	189,968	36,762
0.05	193,556	34,953	233,064	35,540	406,610	37,876
0.1	261,944	35,524	324,073	36,245	576,732	38,810
0.5	581,049	49,322	733,979	50,239	1,470,963	53,588
LARGE FACILITIES: FLOW ≥ 0.501 MGD						
0.75	6,565,929	341,867	8,963,250	429,486	25,426,593	982,196
1.0	8,351,329	422,220	11,444,568	531,214	33,663,672	1,234,987
1.5	11,802,309	573,540	16,720,920	730,876	50,522,129	1,719,570
2.0	15,397,620	722,754	21,699,793	918,061	67,338,461	2,182,090
3.0	22,195,087	1,001,554	31,808,299	1,278,526	102,813,111	3,052,376
4.0	29,445,593	1,277,468	42,173,774	1,629,747	138,458,709	3,912,749
5.0	36,097,246	1,538,101	51,645,705	1,960,910	170,742,915	4,709,662

NOTE: Cost estimates are presented in 1982 dollars.

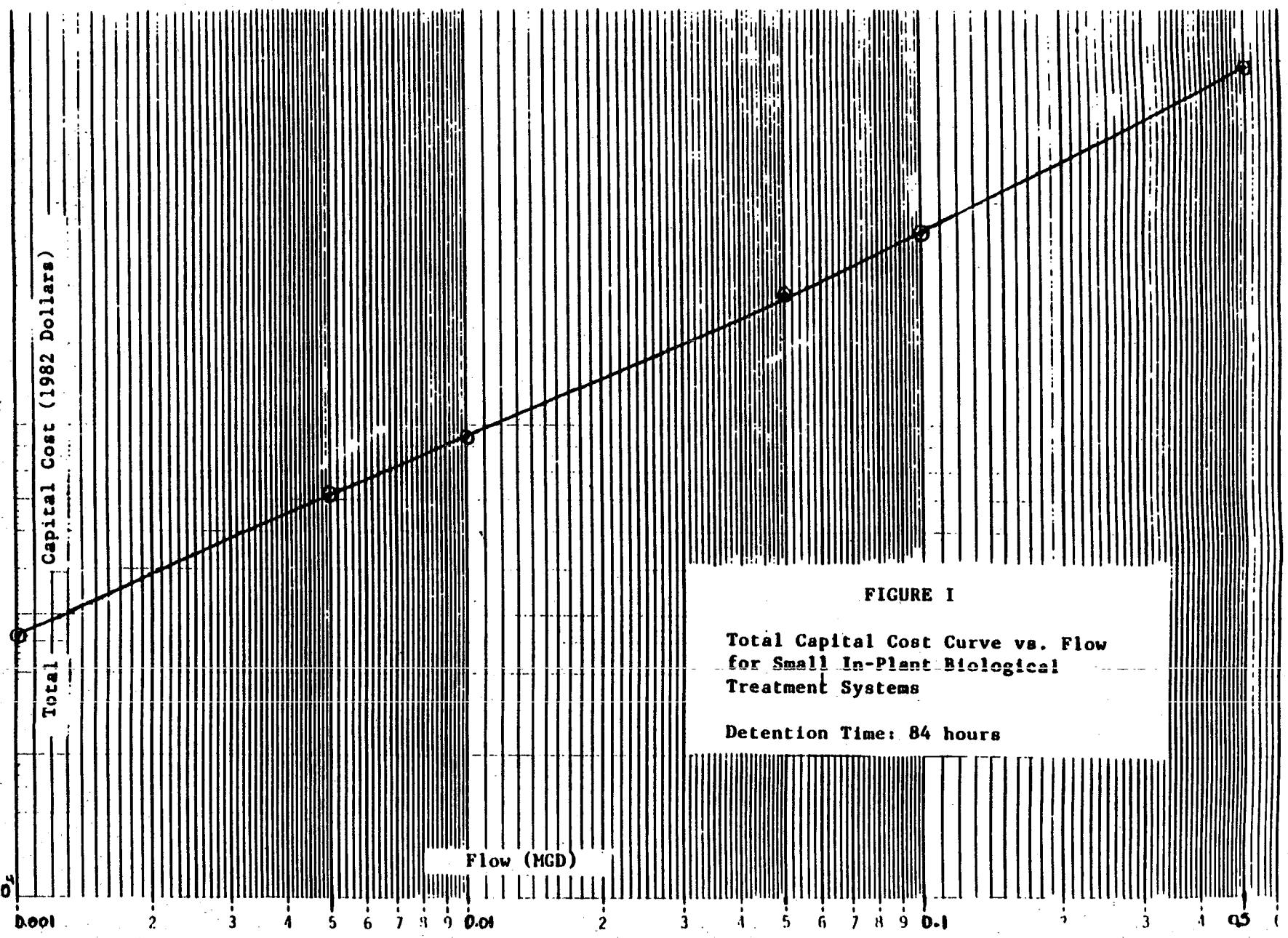

FIGURE I

Total Capital Cost Curve vs. Flow for Small In-Plant Biological Treatment Systems

Detention Time: 84 hours

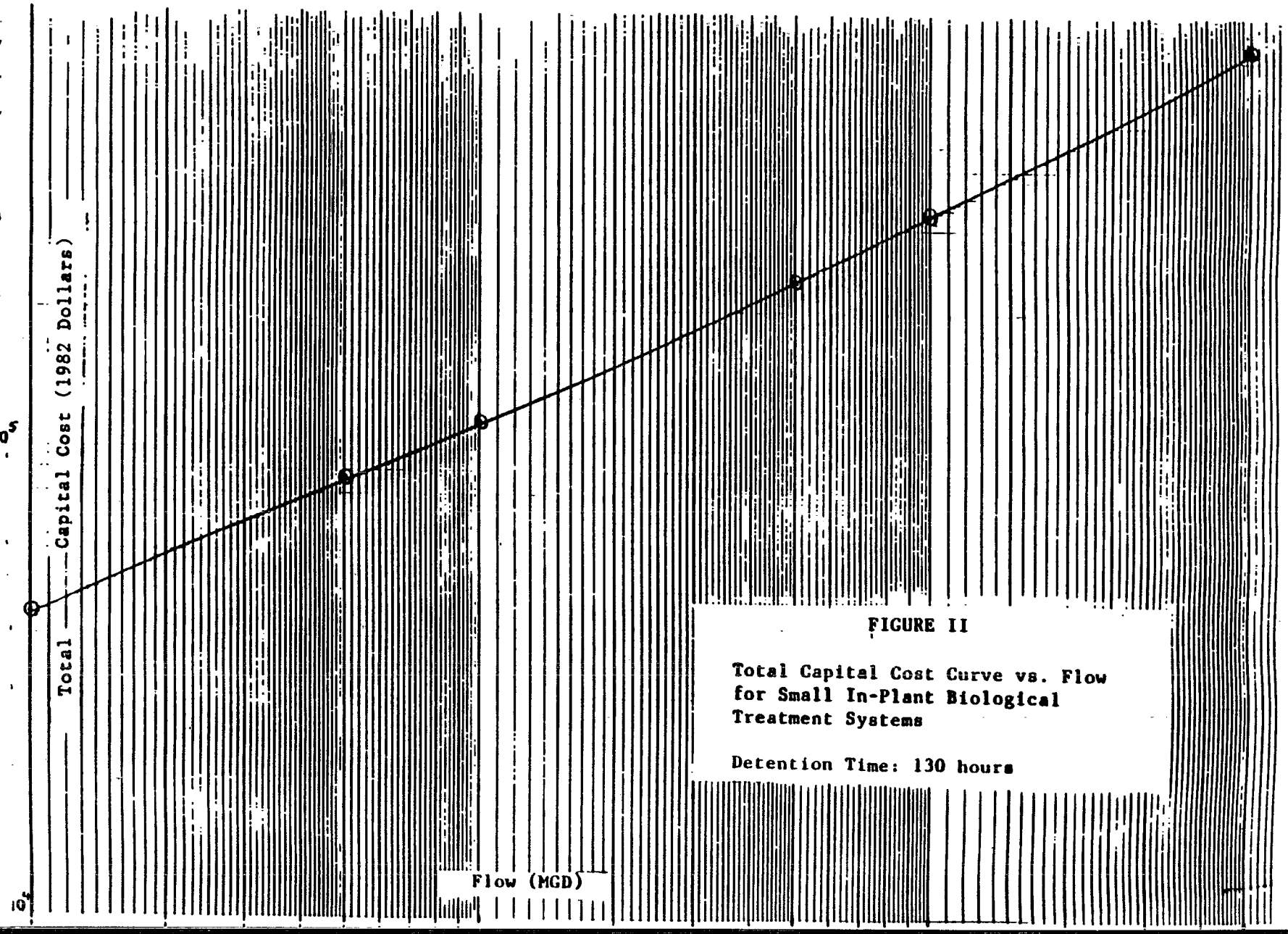

FIGURE II

Total Capital Cost Curve vs. Flow for Small In-Plant Biological Treatment Systems

Detention Time: 130 hours

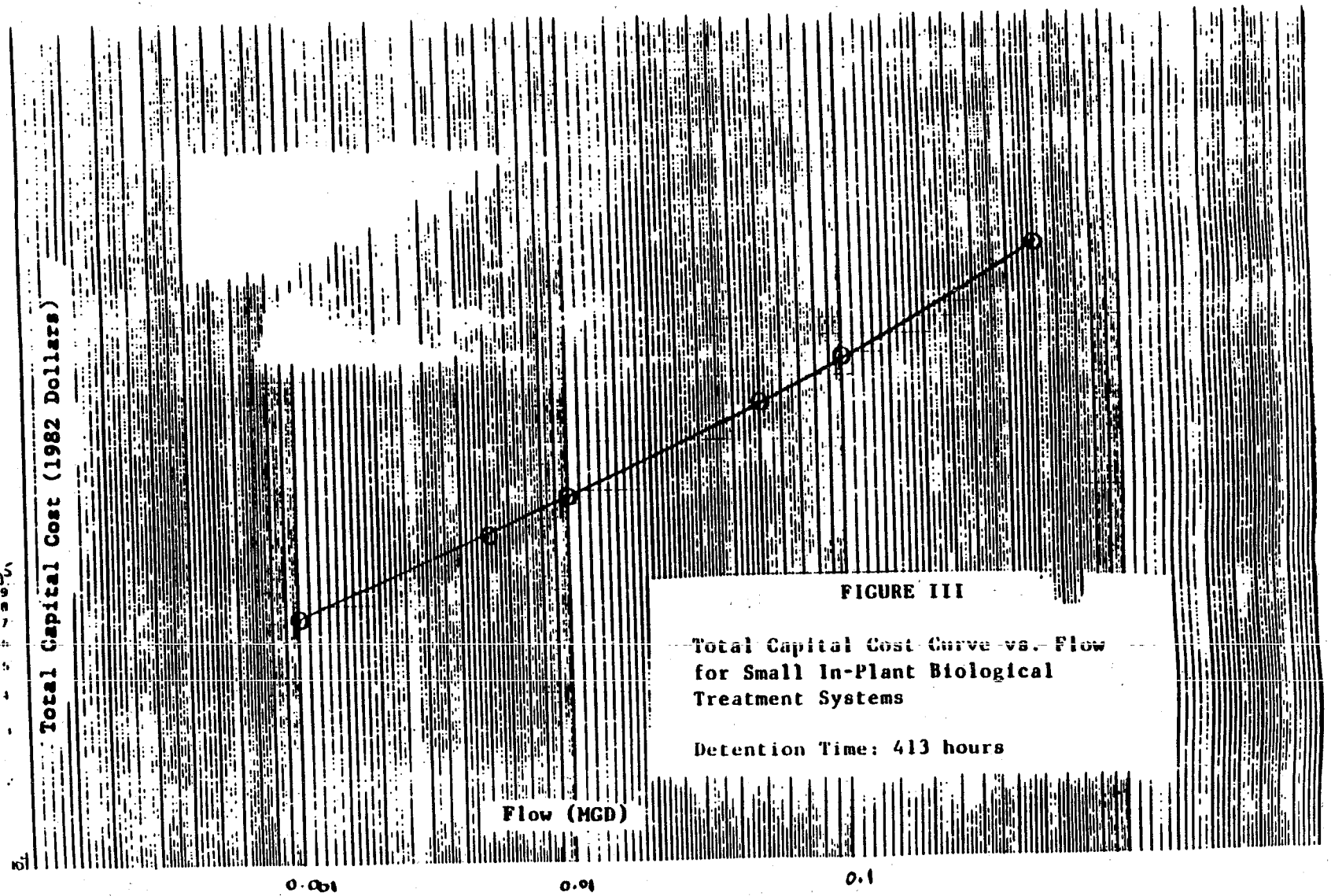

FIGURE III

Total Capital Cost Curve vs. Flow for Small In-Plant Biological Treatment Systems

Detention Time: 413 hours

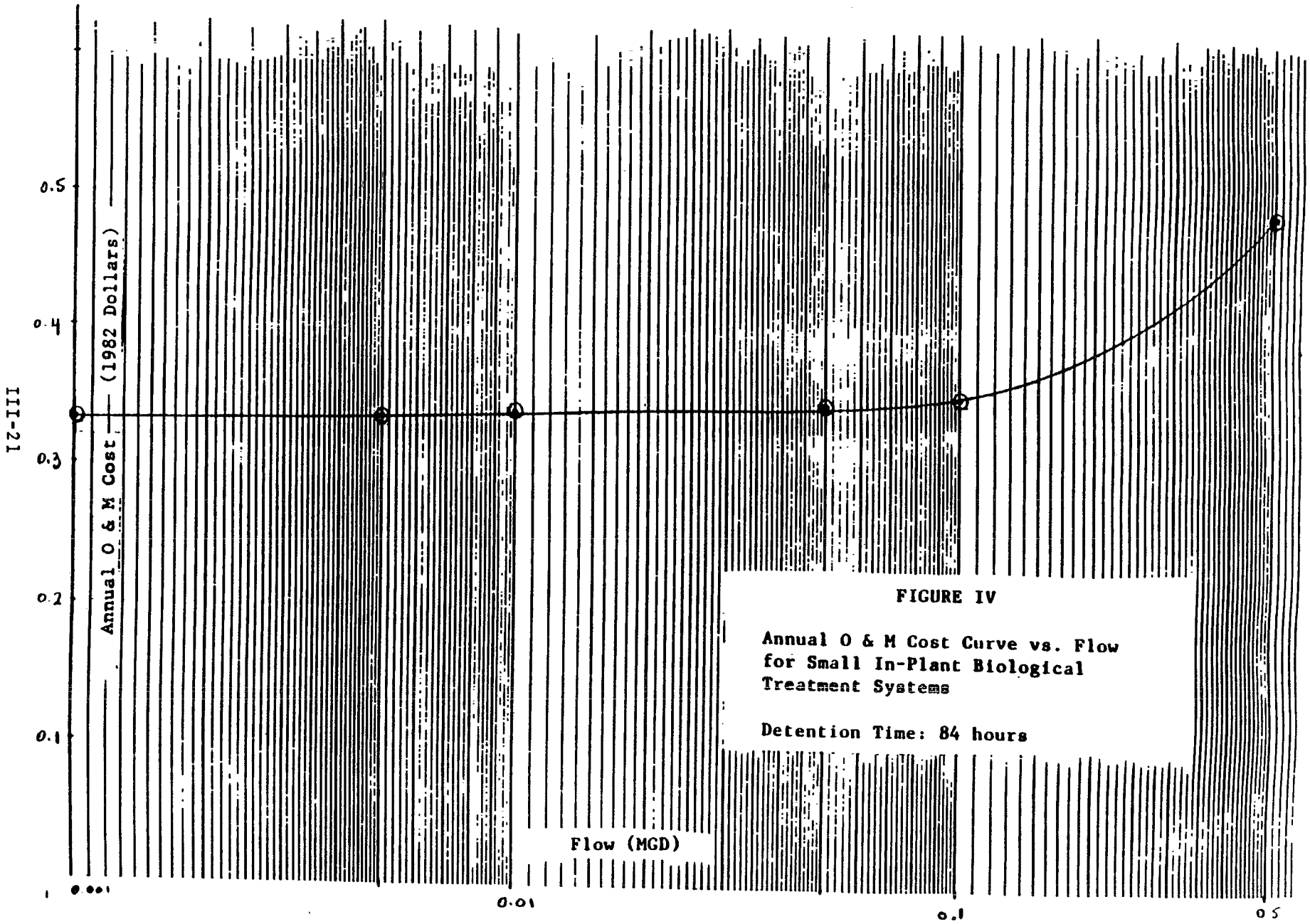

FIGURE IV

Annual O & M Cost Curve vs. Flow for Small In-Plant Biological Treatment Systems

Detention Time: 84 hours

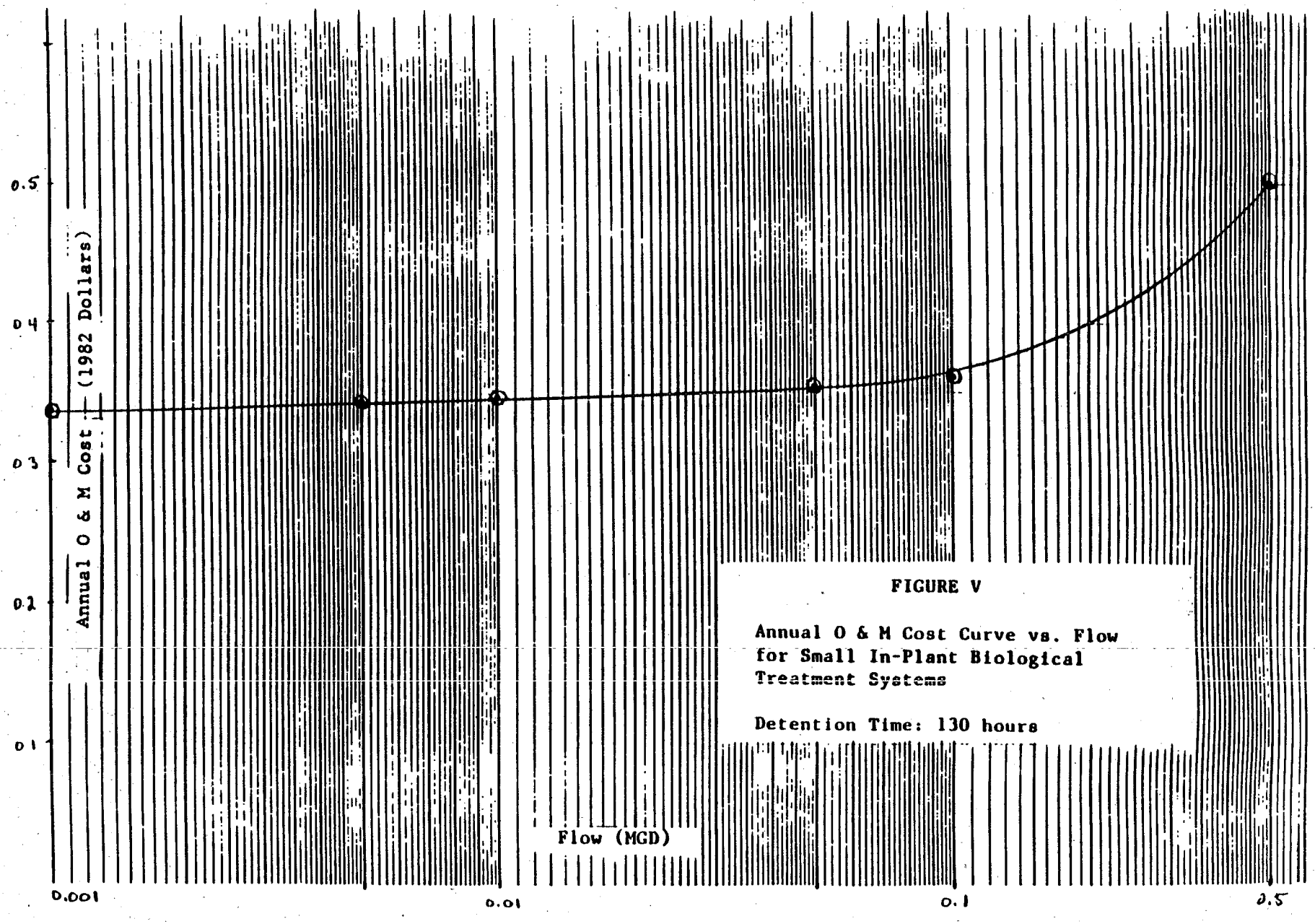

FIGURE V

Annual O & M Cost Curve vs. Flow for Small In-Plant Biological Treatment Systems

Detention Time: 130 hours

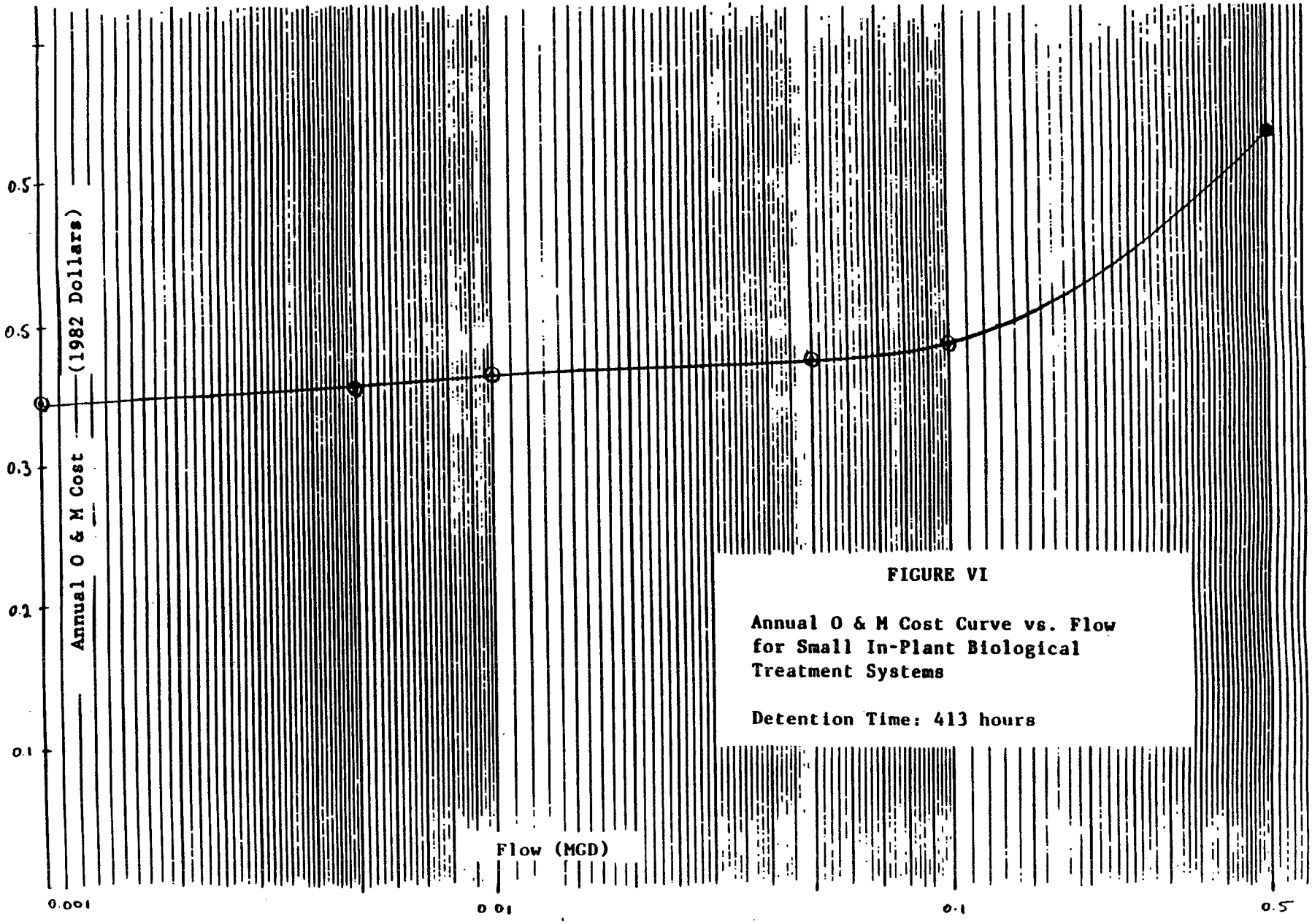

FIGURE VI

Annual O & M Cost Curve vs. Flow for Small In-Plant Biological Treatment Systems

Detention Time: 413 hours

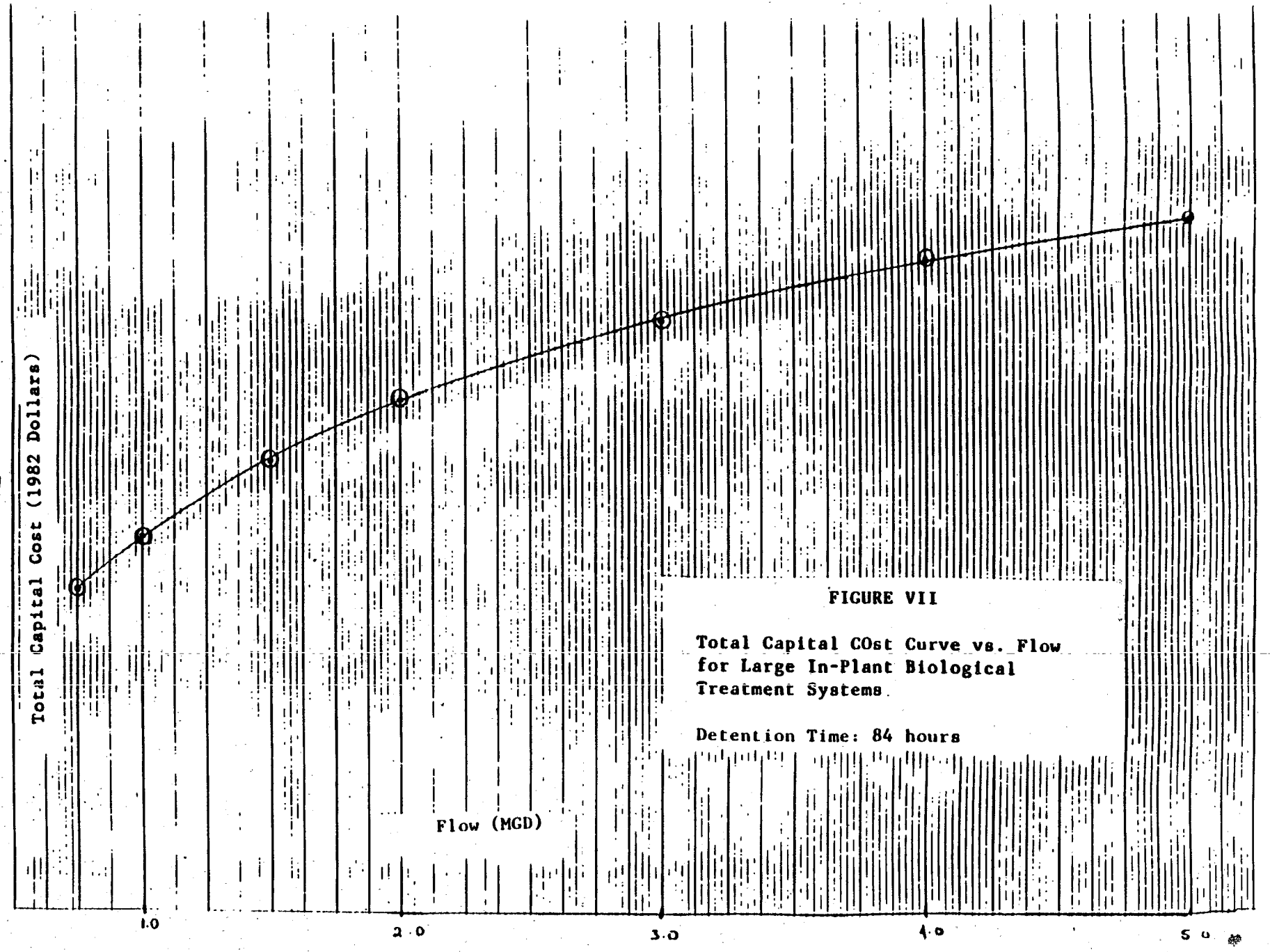

FIGURE VII

Total Capital COst Curve vs. Flow for Large In-Plant Biological Treatment Systems.

Detention Time: 84 hours

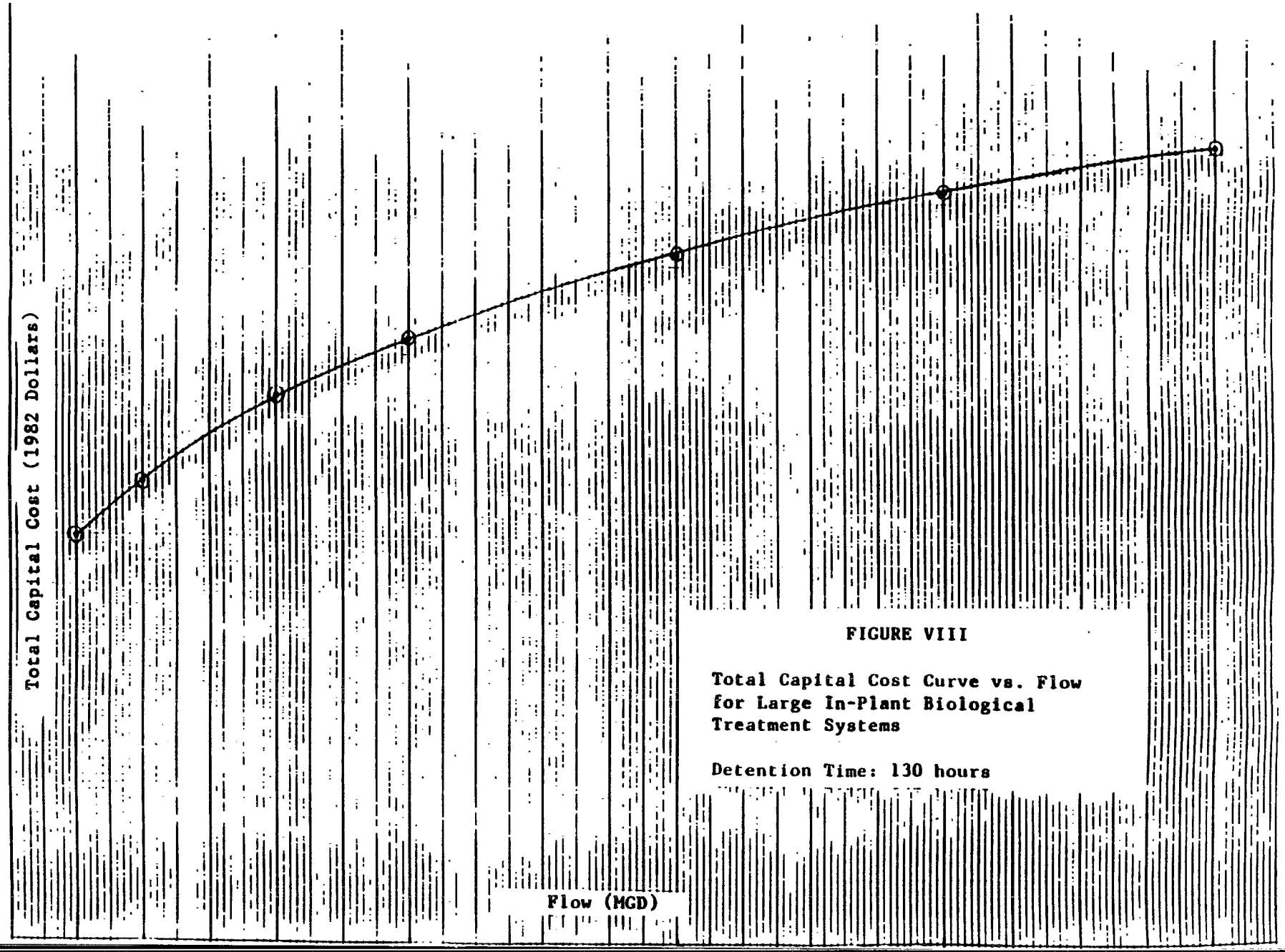

FIGURE VIII

Total Capital Cost Curve vs. Flow for Large In-Plant Biological Treatment Systems

Detention Time: 130 hours

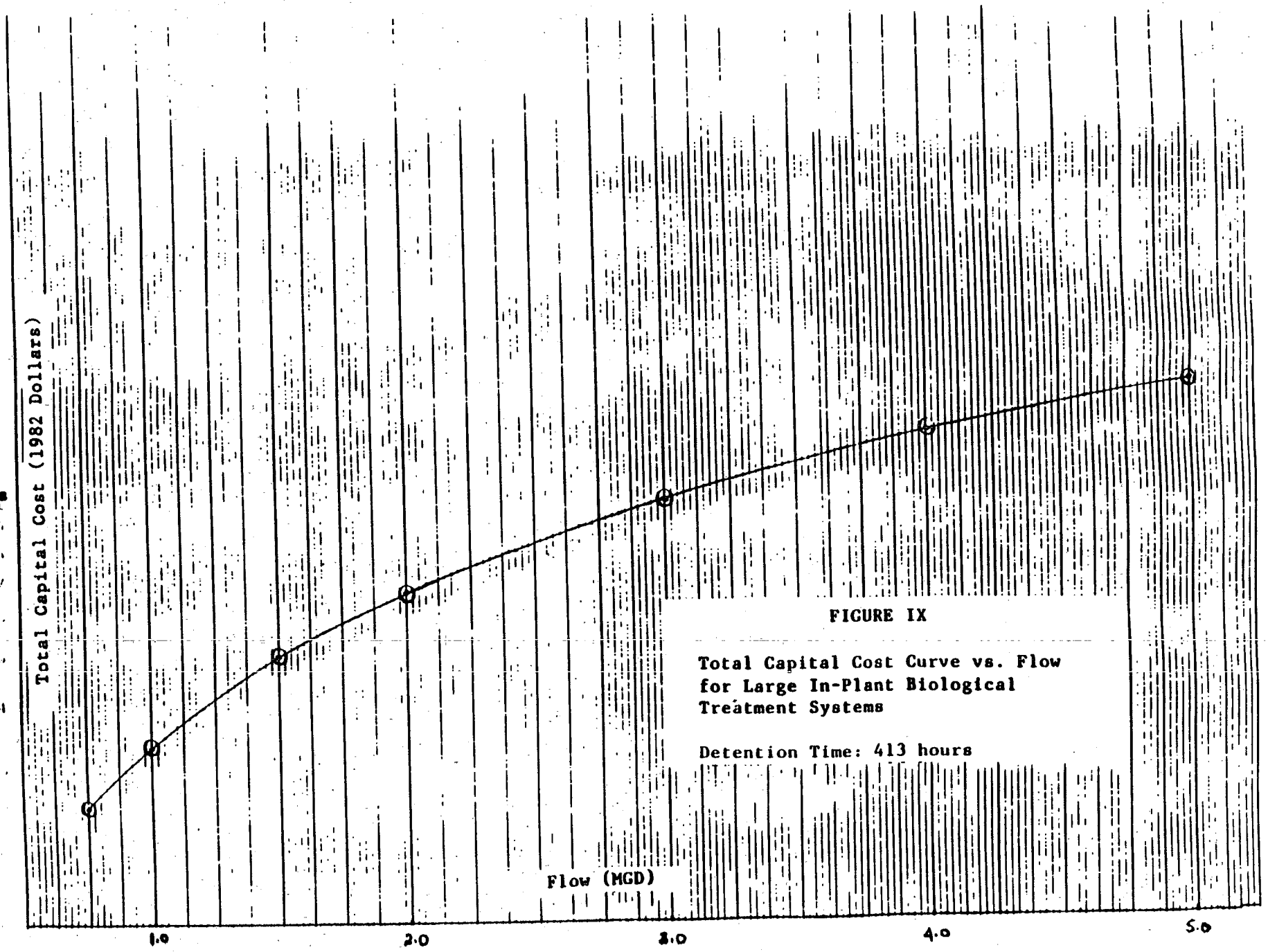

FIGURE IX

Total Capital Cost Curve vs. Flow for Large In-Plant Biological Treatment Systems

Detention Time: 413 hours

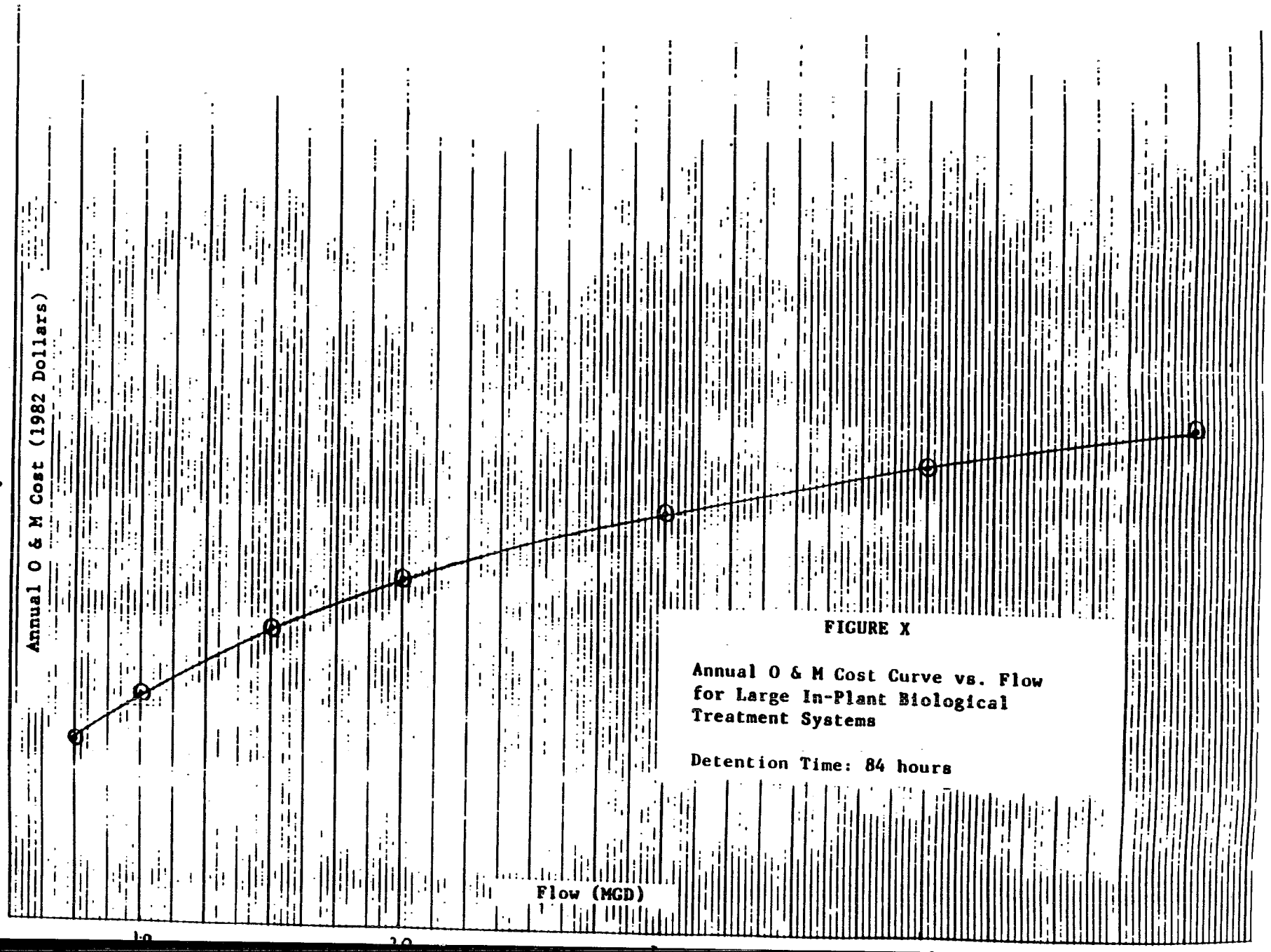

FIGURE X

Annual O & M Cost Curve vs. Flow for Large In-Plant Biological Treatment Systems

Detention Time: 84 hours

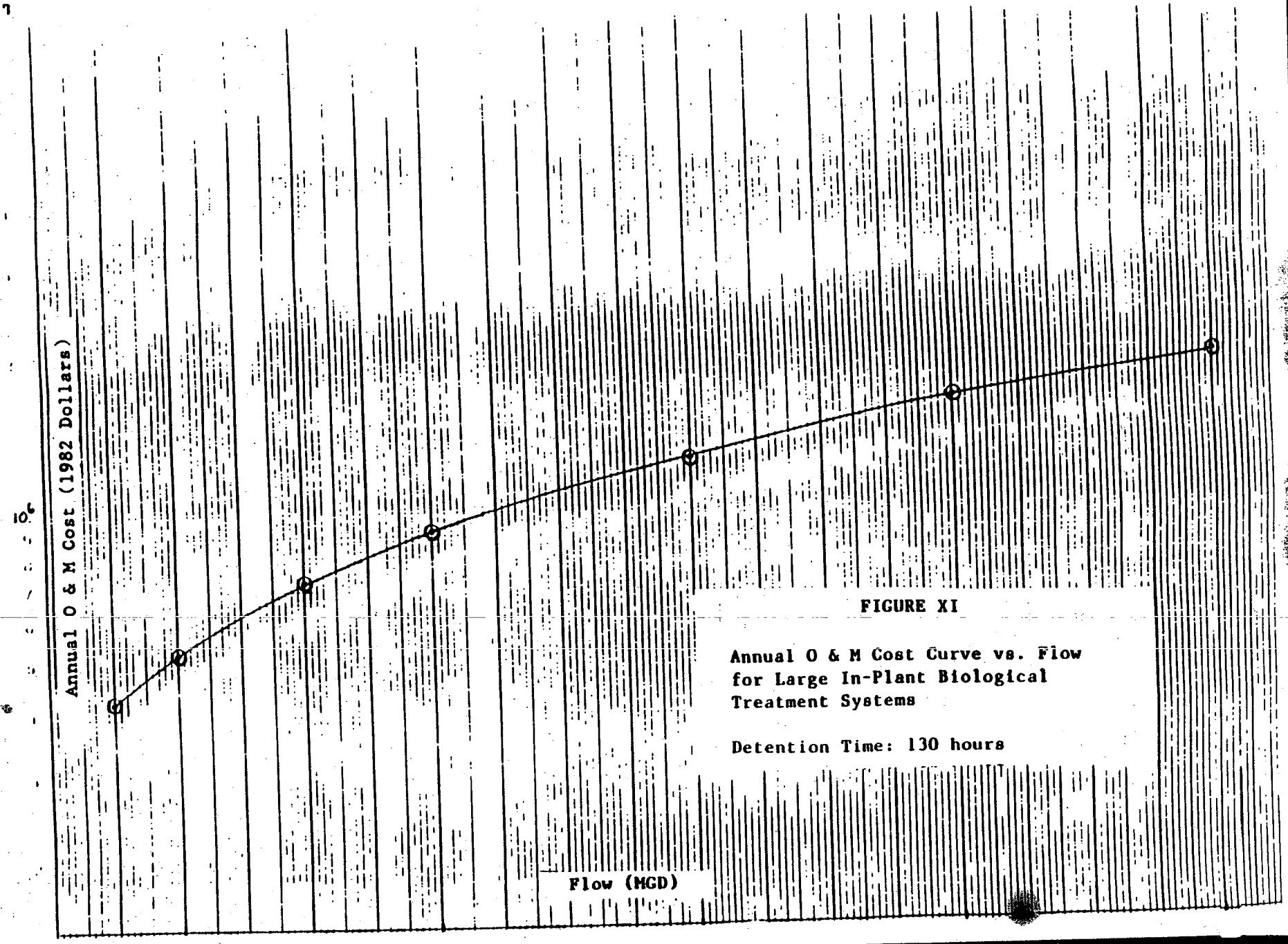

FIGURE XI

Annual O & M Cost Curve vs. Flow for Large In-Plant Biological Treatment Systems

Detention Time: 130 hours

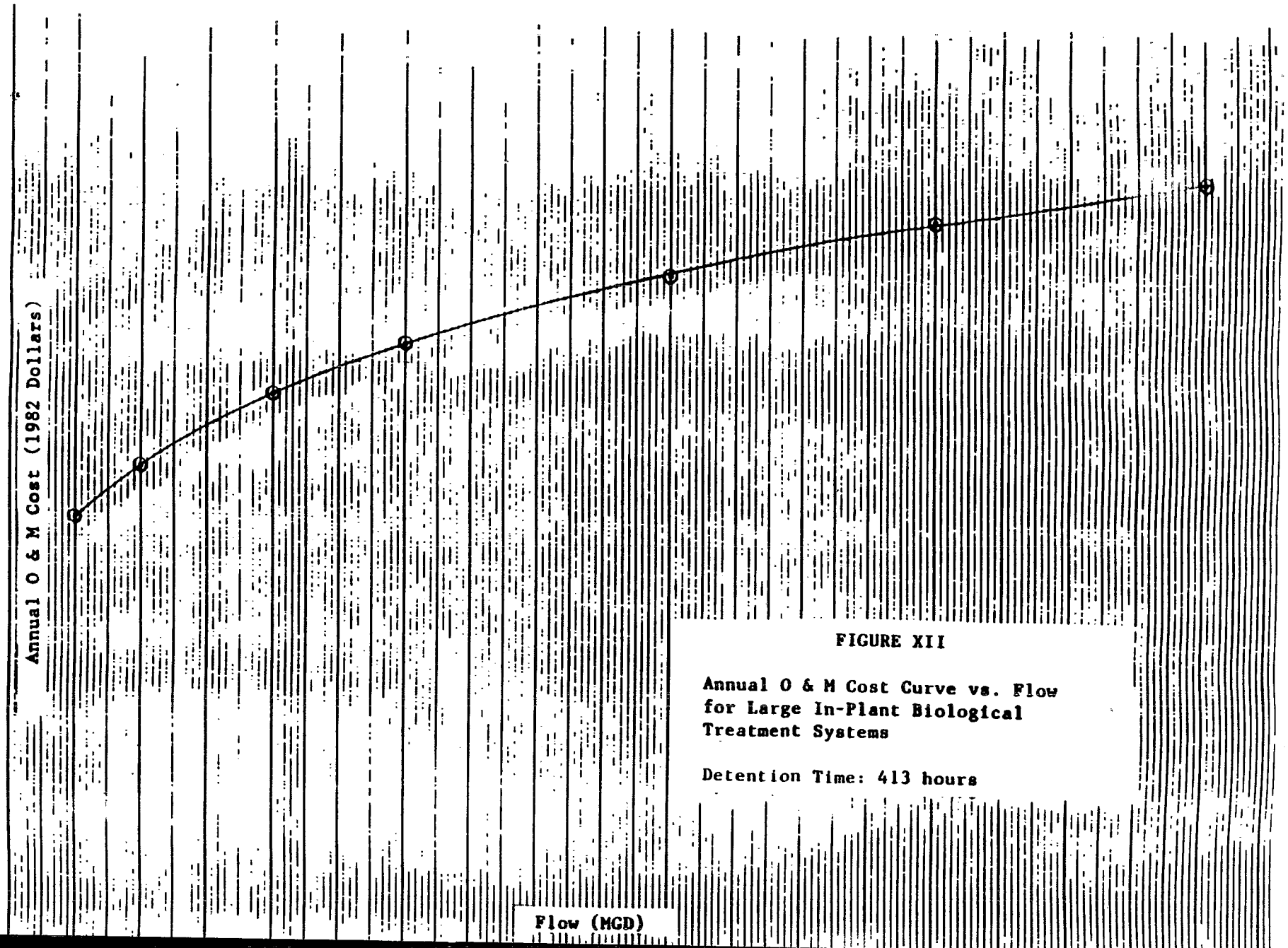

FIGURE XII

Annual O & M Cost Curve vs. Flow for Large In-Plant Biological Treatment Systems

Detention Time: 413 hours

The Agency then estimated the costs associated with the revised inplant biological treatment for all the BAT and PSES that were affected by the new detention time assignment as stated in the previous section. The revised in-plant biological cost estimates for these plants versus the in-plant biological cost estimates for the 1987 promulgation are presented in Appendix III-A. The plant-by-plant revised BAT and PSES cost estimates which include the steam stripping and chemical precipitation upgrades, the technology and flow corrections, as well as the new in-plant biological treatment costs based on the new detention times, and the corresponding technology basis costed for each plant are presented in Appendix III-B. It should be noted that the cost estimates presented in Appendices A and B are based on 1982 dollars.

3. Land Availability

The Agency also investigated the effect of higher detention times on the land requirements for estimating the land costs associated with the revised model in-plant biological treatment systems. Land requirements for small facilities (flow ≤0.5 mgd) and costs were estimated applying the same methodologies used at promulgation (1987 Dev. Doc. pp. VIII-35 to 56 and VIII-187 to 196).

For the large facilities (flow ≥ 0.501 mgd) the land requirement calculated applying the same methodologies used at promulgation were considered excessively high (104 acres for a 5.0 mgd flow).

An alternative way for estimating land requirement for large plants was considered. A search of the literature[1] revealed that modern design of aeration tanks requires that the width of the tank be at least 1.5 times its depth and widths as great as 2.15 times the depth have been successfully used. The length of the aeration tanks although not critical are generally 8 to 18 times their widths. Furthermore, for tanks using diffusers, greater widths are permissible.

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[1] "Sewage Treatment Plant Design" American Society of Civil Engineers and Water Pollution Control Federation (WPCF Manual of Practice No. 8 pg.129-134).

Most diffused-air aeration tanks in the United States have liquor depths of about 15 feet, but it appears that there probably is not much difference in power requirements per million gallons per day of wastewater treated over a practical range in depths. In addition, it has been shown that the transfer efficiency increases with diffuser depth because of increased oxygen partial pressure and increased contact time between the bubble and mixed liquor. Selection of the most economical depth for aeration design must then take into consideration available area, land cost and the difficulty and cost of construction. The most economical depth, especially for large facilities, may be considerably more than 15 feet.

Based on this information, land requirements for large in-plant biological treatment systems were calculated based on 20 feet deep by 45 feet wide diffused aeration tanks. The revised in-plant biological treatment land requirements are presented in Table III-11. From all of the plants with cost estimates based on modeled raw waste concentrations and the revised, higher-detention-time, only 20 facilities were projected to require more than one acre of land. The Agency then estimated revised land cost estimates based on the increased detention time. Appendix III-A presents the revised in-plant biological land cost estimates.

To assess the availability of land, the Agency visited eight indirect discharge OCPSF plants with the largest projected land requirements (1.25 to 8.77 acres based on modeled raw waste concentrations) in the New Jersey, New York, and Delaware area. Indirect discharge facilities were selected because their general location in urban areas makes them more likely than direct dischargers to have land-availability constraints. This effort indicated that five of the eight plants had sufficient land to install the model biological treatment system on-site. The remaining three plants had from 78 to 96 percent of the projected land requirements based on modeled raw waste concentrations. However, sufficient land is available based on land projections developed from designs based on <u>reported</u> rather than modeled raw waste concentrations. The available land for these three plants is 1.9 to 3.7 times more than that required for treatment systems designed from reported pollutant concentrations. One plant suggested that its land may

TABLE III-11

REVISED LAND REQUIREMENT ESTIMATES FOR IN-PLANT BIOLOGICAL TREATMENT SYSTEMS

REVISED LAND REQUIREMENTS FOR IN-PLANT BIOLOGICAL TREATMENT SYSTEMS			
A. Small Faciliites: Flow < 0.5 MGD			
	td = 24 hours*	td = 130 hours*	td = 143 hours*
FLOW (MGD)	Land Requirement in Acres	Land Requirement in Acres	Land Requirement in Acres
0.001	0.075	0.075	0.075
0.005	0.075	0.100	0.150
0.010	0.100	0.125	0.200
0.050	0.200	0.250	0.500
0.10	0.275	0.375	0.850
0.5	0.350	1.25	3.25
B. Large Facilities: Flow ≥ 0.501 MGD			
0.75	2.2	3.1	8.9
1.0	2.8	3.9	11.7
1.5	4.1	5.7	17.3
2.0	5.3	7.5	22.9
3.0	7.7	10.9	34.2
4.0	10.1	14.4	45.1
5.0	12.5	17.9	56.2

td = detention time

not be suitable for construction because of possible hazardous waste contamination. A summary of the results from the site visits is presented in Table III-12.

Based on this assessment, the Agency concludes that land availability is not a constraint for installing the model treatment technology and, generally, would not provide a basis for requests for alternative limitations and standards based on fundamentally different factors (see 40 CFR Part 125, Subpart D and 40 CFR 403.13).

4. Proposed Regulatory Amendments

In each of §§ 40 CFR 414.25, 414.35, 414.45, 414.55, 414.65, 414.75, and 414.85, the table for pretreatment standards is proposed to be amended by adding the names and limitations for the following 13 pollutants:

Effluent Characteristics	Pretreatment Standards (micrograms per liter) Maximum for any one day	Maximum for monthly average
Acenaphthene	47	19
2,4-Dimethylphenol	47	19
Fluoranthene	54	22
Naphthalene	47	19
Phenol	47	19
Bis (2-ethylhexyl) phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Dimethyl phthalate	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20

In 40 CFR § 414.101, the table for BAT Subpart J limitations is proposed to be amended by adding the names and limitations for the following 19 pollutants:

Effluent Characteristics	BAT Effluent Limitations and NSPS (micrograms per liter) Maximum for any one day	Maximum for monthly average
Acenaphthalene	47	19
2,4-Dimethylphenol	47	19
Fluoranthene	54	22
Naphthalene	47	19
Phenol	47	19
Bis(2-ethylhexyl)phthalate	258	95
Di-n-butyl phthalate	43	20
Diethyl phthalate	113	46
Deimethyl phthalate	47	19
Benzo(a)anthracene	47	19
Benzo(a)pyrene	48	20
3,4-Benzofluoranthene	48	20
Benzo(k)fluoranthene	47	19
Chrysene	47	19
Acenaphthylene	47	19
Anthracene	47	19
Fluorene	47	19
Phenanthrene	47	19
Pyrene	48	20

TABLE III-12

LAND AVAILABILITY OF SELECTED OCPSF PLANTS

PLANT NO.	LOCATION	ESTIMATED LAND REQUIREMENT REVISED IN-PLANT BIOLOGICAL TREATMENT	LAND AVAILABLE (ACRES)
257	New Jersey	1.93/(0.55)*	1.5
2756	New Jersey	1.61	5
1853	New Jersey	8.77/(2.16)*	8
2300	Delaware	1.93	11
1706	Delaware	1.8	5.2
1667	New Jersey	1.25/(0.38)*	1.2
2485	New Jersey	6.64	>20
814	New York	2.19	13

* ( ) - land requirement calculated based on reported raw waste concentrations.

IV. NEW SOURCE PERFORMANCE STANDARDS AND PRETREATMENT STANDARDS FOR NEW SOURCES

A. INTRODUCTION

The Agency promulgated NSPS standards that reflected the use of best available demonstrated technology for all direct discharging sources. NSPS was established for conventional pollutants (BOD_5, TSS, and pH) on the basis of BPT model treatment technology and for 63 priority pollutants on the basis of BAT model treatment technology. The numerical standards are equivalent to the BPT and the BAT limitations (52 FR 42545). EPA also promulgated PSNS on the same technology basis as PSES and issued equivalent numerical standards for 47 priority pollutants that were determined to pass through or otherwise interfere with the operation of Publicly Owned Treatment Works (52 FR 42549).

NRDC challenged the final NSPS and PSNS new source standards arguing, in part, that the Agency failed to give serious consideration to better pollution control technologies that could be used by new sources. NRDC claimed that the Agency ignored its own data which demonstrated that 26 percent of the OCPSF industry are zero or alternative discharge plants due to disposal methods such as deep well injection, contract hauling, incineration, evaporation ponds, surface impoundments, land application, and recycling of process wastewater. NRDC stated that "not all of the methods used to achieve zero discharge to <u>surface waters</u> are necessarily environmentally acceptable. However, the record indicates that <u>36 plants</u> achieve zero discharge by recycling their wastestreams. 1987 Dev. Doc. at VII-146." (NRDC's June 30, 1988 Brief pp. 86-89 (emphasis in original)).

On March 30, 1989, the Fifth Circuit rejected all but one of NRDC's new source challenges and remanded the new source standards to EPA "for consideration of whether zero discharge limits would be appropriate for new plants in the OCPSF industry because of the existence of recycling" (870 F.2d at 264).

The Agency has reconsidered the issues related to establishing new source zero discharge standards based on process wastewater recycle and has decided to propose that no revisions be made to existing NSPS and PSNS standards. The Agency has concluded that it has no basis and that it would be impracticable to

impose a zero discharge standard on a meaningful segment of the industry. First, the "concentration-based" approach which forms the framework of the OCPSF guideline limits the opportunities for the promotion of recycling and re-use of wastewater through a national guideline, in contrast to the "mass-based" approach adopted in other guidelines. The Agency explicitly recognized this limitation during the guideline development process, but opted for this approach nonetheless because it provided the basis for a guideline with more expansive coverage. This was a rational regulatory decision made by the Agency. Moreover, because the OCPSF record was imprecise with regard to its use of the term "recycle", both NRDC and the Fifth Circuit in its remand order misinterpreted the support in the database for zero discharge through recycling. In fact, the record contains very few examples of complete recycle and does not demonstrate that recycle is a demonstrated technology on which EPA can base a zero discharge standard.

B. BACKGROUND

At the time of the 1983 proposal, the Agency provided notice of the rationale for developing effluent limitations and standards in terms of concentration (mg/l) rather than mass (lbs of pollutant/unit of production). The Agency concluded that the benefits of selecting the concentration-based regulatory approach -- coverage of a larger number of OCPSF plants and a larger proportion of individual plants' production -- outweighed the costs, including the diminished opportunity, through the national OCPSF guideline, to promote the "recycling and reuse of wastewater and by-products" (48 FR 11838). Under the selected concentration-based approach, opportunities for recycle are evaluated at the plant level by individual permit writers, rather than at the national level through guideline limitations.

The selected concentration-based approach established limitations generally from end-of-pipe data that reflected total treatment system performance. The Agency described its preference for mass limitations (lbs of pollutant/unit of production), where feasible, to encourage flow reduction and to prevent the substitution of dilution for treatment. However, concentration-based limitations are used where production and achievable wastewater flow cannot be correlated. In the OCPSF industry, such correlations do not exist, and EPA proposed, for the reasons summarized below, concentration-based limitations (48 FR 11834).

In the OCPSF industry, production often varies from day to day or even hour to hour. This is particularly true in large integrated plants producing a large variety of products as well as plants employing batch processing. Wastewater regulatory problems associated with these production characteristics could only be mitigated if mass-based limits could be set on individual process lines prior to end-of-pipe biological treatment, with credit given for percent reductions across the biological system. Such an approach would have required the development of separate mass limitations for each of hundreds or thousands of product/process discharges. The Agency would have had to determine what mass limitations could be achieved for each product/process through the use of in-plant control. Each product/process would have been considered a separate subcategory, and the regulation would have contained separate mass-based limitations for each such subcategory. Monitoring would have been separately required for each product/process effluent. However, credit could have been provided for removals by an end-of-pipe (usually biological) treatment system if sampling before and after that system demonstrated a percent reduction through the biological segment of the system.

While pursuing this goal between 1976 and 1981, the Agency examined the nature and treatability of 176 individual high-volume product/process wastewater effluents. EPA sampled the raw waste load of individual production lines, determined the rate of production, and sampled the discharge from in-plant physical/chemical treatment systems used to treat those product/process effluents either singly or in combination with other product/process effluents. The mass-based regulatory option, if supported by sufficient technical information, would have provided some potential advantages over an end-of-pipe, concentration-based regulation including an emphasis on process controls and in-plant physical/chemical treatment, thereby promoting the recycling and reuse of wastewater and by-products (48 FR 11838).

Despite the theoretical advantages, the Agency concluded that the mass-based option was both technically and administratively infeasible. Even though EPA could have regulated 176 of the high-volume products out of thousands of commercial product/processes, control authorities would typically have been faced with the arduous task of characterizing and developing effluent limitations for those product/processes at each plant that were not explicitly addressed by the

regulation. Monitoring for compliance with individual product/process limitations would have been enormously expensive.

One of the most significant technical difficulties related to establishing mass-based standards was determination of an appropriate flow to production volume ratio (F/P) for each product/process representative of good industry practice. (Multiplying F/P by concentration yields a mass of pollutant loading per unit of production.) Out of the 176 product/processes sampled, EPA had 27 product/processes with F/P data from more than one plant. The data show that wide variations in F/P ratios often occur -- 14 of the 27 product/process flow to production ratios vary by factors of 5 to 74 (1983 Public Record R701249-65). To establish F/P ratios, EPA would practically have had to establish design and operating practices for each product/process. As EPA concluded at the time, this was far beyond the reasonable scope of the BAT project (48 FR 11838).

Therefore, the Agency concluded that the benefits of selecting the concentration-based regulatory approach -- coverage of a larger number of OCPSF plants and a larger proportion of individual plants' production -- outweighed the costs, including the diminished opportunity, through the national OCPSF guideline, to promote the recycling and reuse of wastewater and by-products (48 FR 11838). Promotion of recycle and reuse through the guideline would be limited because, as explained in the next section, it would require the same attempt to regulate on a product/process-by-product/process basis that the Agency determined to be impracticable, and rejected, as the basis for the guidelines.

The adoption of a concentration-based approach, however, did not mean that recycling and reuse of wastewater would not be promoted at individual plants. Rather, the guideline is structured so that recycling and reuse evaluations will be made on a facility-specific basis by the permit writer or control authority, rather than through the national guideline. The permit writer or control authority must use a reasonable estimate of plant process wastewater flow and the concentration limitations to develop appropriate mass limitations for each NPDES or industrial user permit. In cases where the process wastewater flow claimed by a plant may be excessive, the permit writer or control authority may develop a more appropriate process wastewater flow for use in computing the mass effluent or internal plant limitations. The site-specific factors that should be

considered by the permit or control authority in developing appropriate process wastewater flow include a review of plant operations to ensure that sound water conservation practices are being followed. Examples are: minimization of process water uses; cascading or countercurrent washes or rinses, where possible; reuse or recycle of intermediate process waters or treated wastewaters at the process area and in wastewater treatment operations (48 FR 11839, March 21, 1983; 52 FR 42566, November 5, 1987). Guidance issued by the EPA to control authorities notes that OCPSF "permit writers should use flow reduction as a basis for establishing mass limits in permits where appropriate" (February 8, 1988 Memorandum from EPA's Director, Office of Water Enforcement and Permits to Regional Water Management Division Directors and NPDES State Directors).

EPA believes that it was within the Agency's regulatory discretion to evaluate the advantages and disadvantages of the concentration-based and mass-based approaches and to opt for the greater coverage made possible by the former approach, thereby minimizing the opportunity to promote recycling through the national guideline and relying on the control authorities to exploit opportunities for recycle and reuse of wastewater.

For the reasons outlined above, during the course of the OCPSF rulemaking activity (1976 to 1987), EPA never proposed to base NSPS on recycling options and never received any comments urging Agency consideration of zero or alternative discharge methods as a basis for promulgating NSPS (EPA's 9-23-88 Response Brief, p. 401).

C. FACTORS AFFECTING COMPLETE RECYCLE OF PROCESS WASTEWATER

Recycle of process and non-process wastewater is an important consideration and often an integral element of a plant's waste management (materials recovery) and water conservation program. Nearly all OCPSF facilities currently use some recycle and reuse techniques. However, recycle techniques alone, while reducing the total volume of wastewater discharged, seldom achieve the goal of zero discharge of process wastewater. Many problems associated with complete recycle and reuse of wastewater must be solved before it can be demonstrated to be a practical application in most OCPSF manufacturing plants. ("Complete Water Reuse

-- Industry's Opportunity," AICHE/EPA Technology Transfer National Conference, 1973, pp. 2 & 303)

By their nature, successful OCPSF recycle techniques would tend to be limited to specific product/processes or to specific wastestreams within product/processes. Recycle techniques are not generalized technologies which can be applied over broad categories of dischargers. Even if the record provided a basis to believe that zero discharge of wastewater could be achieved for a significant number of the 25,000 product/processes in the OCPSF industry (and, as explained in the next section, it does not), the development of a technology basis would require precisely the same exercise in establishing design and operating practices for each affected product/process that EPA considered and rejected in 1983. NRDC's basic challenge to the promulgated new source standards amounts to a challenge to the Agency's decision in proposing the OCPSF guideline to adopt a concentration-based approach.

Plant-level process wastewater recycle techniques may be segmented into several broad categories -- general water conservation practices, reuse of end-of-pipe or combined process wastewater within a particular product/process, and recycle of product/process wastewater within the same product/process. Each of these options provides very limited theoretical opportunity for achieving the goal of zero discharge of process wastewater.

A significant component of water conservation generally includes treatment or process unit operation changes from an "open," single pass to a "closed," recycle system. In typical cases such as chemical process equipment vent or air scrubbers and pump seal systems as well as contact and non-contact cooling systems, many facilities recycle the scrubber, seal, or cooling wastewater to reduce the consumption of water as well as the discharge of wastewater. However, recycle of the wastewater leads to higher dissolved solids, particulate, and soluble pollutant concentrations which reduce the efficiency of the unit operation. To maintain optimal operation and performance, a portion of the closed system concentrated wastewater is periodically discharged as blowdown and replaced by clean water. The process wastewater blowdown generally requires treatment prior to discharge or disposal (1987 Dev. Doc. pp. V-24 to 29; 1990 Standard Handbook of Environmental Engineering, Robert A. Corbitt, pp. 4.26-4.35

& 4.49-4.52). Thus, recycle of scrubber, seal, or cooling wastewater does not eliminate discharge of process wastewater.

Recycle techniques related to the reuse of combined process wastewater are limited by the capacity of specific process or reaction chemistry to tolerate chemical contaminants and, even if they were demonstrated to be achievable for individual product/processes, could be promulgated only through zero discharge limitations for those specific product/processes. They are limited by the ability to establish design and operating parameters for both the individual product/processes and the accessory treatment systems necessary to reclaim wastewater of sufficient purity for recycle or reuse in the chemical processes. A large portion of OCPSF process wastewater is derived from product and by-product separation unit operations. The combined plant wastewater typically contains pollutants that prevent reuse or recycle within particular chemical processes. Chemical processes almost never convert 100 percent of the feedstocks to the desired products; that is, the chemical reactions/processes never proceed to total completion; moreover, undesirable by-products are often unavoidably generated due to alternate reaction pathways and raw material contamination. This results in mixtures of unreacted raw materials and products that must be separated and recovered by unit operations that are not 100 percent efficient (1987 Dev. Doc. pp. V-49-50). Finally, like chemical processes, wastewater treatment/recondi-tioning processes are almost never 100 percent efficient. Therefore, most trace contaminants in untreated or treated recycled/reused process wastewater are undesirable because they foul catalysts, lead to the formation of undesirable waste products, and could result in a net increase in pollution ("Complete Water Reuse -- Industry's Opportunity," pp 297-303). Therefore, maximizing the probability of developing successful recycle techniques (i.e., minimizing potential chemical process contaminants) requires recycling wastewater within a specific product/process rather than reusing the wastewater from one product/process or a group of product/processes as makeup or raw material for another product/process.

Individual product/processes differ in feasibility of internally recycling their respective process wastewaters. Total recycle or reuse of process wastewater from chemical reactions is theoretically possible for only a few product/processes. Unless a plant operates a combination of these unique

product/processes for which total recycle is practicable, however, the plant will be capable of recycling only a portion of its process wastewater.

In certain instances, it may be possible to recycle wastewater to process feed. Recovered wastewater being recycled to process feed may have to be pretreated (i.e., vacuum stripped of water to raise the concentration of soluble reactants to a level required by the process and/or treated to remove undesirable trace contaminants). As already noted recycling to process feed is not feasible for many product/processes, because the process chemistry will not tolerate even low concentrations of contaminants. Contaminants often affect the reaction rate, reduce process efficiency, produce undesirable side reactants, or make product recovery and purification uneconomical. For such product/processes to avoid discharge, the volume of contaminated wastewater must be accommodated by on-site reuse/disposal techniques or other discharge alternatives.

Thus, there are numerous theoretical and practicle limitations to achieving zero discharge through recycle. As the next section demonstrates, the OCPSF record reflects that few, if any, plants actually achieve zero discharge through recycle.

D. ANALYSIS OF THE USE OF RECYCLE TECHNIQUES BY OCPSF FACILITIES

As stated in the above sections, the fifth circuit remanded the NSPS and PSNS standards on the basis of NRDC's assertations that the OCPSF rulemaking record contains 36 plants which achieve zero discharge through the recycling of their wastestreams. To assess the litigation issues raised by NRDC, the Agency conducted a thorough review of the OCPSF Record with respect to zero discharge and recycling practices at OCPSF facilities. During this review, analyses were conducted on the use of recycle techniques by OCPSF facilities. The following sections present the results of these analyses.

1. Identification of Complete Recycle Plants and Product/Processes

During the OCPSF rulemaking effort, the Agency studied a variety of water conservation and reuse practices including recycle techniques among primary OCPSF producers that discharged process wastewater (1987 Dev. Doc. pp. V-23 to V-29). Since this analysis excluded zero and alternate discharge plants which may be

achieving zero discharge through recycling, the Agency reexamined the reported use of recycle techniques among zero and alternate discharge as well as direct and indirect discharge OCPSF facilities.

A review of the 234 zero or alternate discharge plants was first conducted; the Agency produced a listing of plants and their disposal methods from Question A.15.d of the Section 308 Questionnaire. Question A.15.d lists specific disposal options for reporting purposes; since no specific disposal option for recycling was listed in Question A.15.d, the disposal methods listed under "Other-Type I" and "Other-Type 2" designations were reviewed. This review revealed that nine OCPSF plants reported complete recycling to dispose of all process wastewater generated at their facilities to achieve zero discharge while an additional two plants reported a combination of recycle and other disposal methods to achieve zero discharge of process wastewater. These plants are identified in Table IV-1. All the plants in Table IV-1 answered only Part A of the 308 Questionnaire, and hence no product/process specific information was available for further review. However, as described in Section D below, the Agency used the SRI Directory of Chemical Producers to identify candidate products that could achieve zero discharge of process wastewater through the use of recycle techniques.

2. Identification of Partial Recycle Plants and Product/Processes

NRDC misread the OCSPF record in asserting "that 36 plants achieve zero discharge by recycling their wastestreams" because the Agency's 1987 development document (Table VII-48 on p. VII-146) did not comprehensively describe the source of the "Frequency of Waste Stream Final Discharge and Disposal Techniques" tabulation. The development document omitted the clear statement that the Table VII-48 tabulation characterizes the multiple disposal and discharge practices only for 697 direct and indirect discharge plants. Therefore, the table actually reports that 36 direct and indirect discharge plants use recycle techniques for only a portion of their wastestreams. All of these 36 plants discharge wastewater.

Moreover, as detailed below, these 36 wastestreams included non-aqueous product recovery wastestreams in addition to process wastewater streams, and the wastewater streams often include only a portion of the discharges from an individual product/process. EPA's remand analysis found that only three of the

TABLE IV-1

9 PLANTS THAT REPORT COMPLETE RECYCLING OF THEIR WASTEWATER*

53
344
489
968
1385
1909
2143
2540
2583

2 PLANTS THAT REPORT PARTIAL RECYCLING*

1491
2656

* All these plants are Part A plants

697 plants in the OCPSF database that discharge process wastewater reported complete recycle of process wastewater generated by a total of six product/processes.

The 308 Questionnaire Database was used to identify all the plants which used the "Recycle" Disposal Code (H10). A 308 Questionnaire search was conducted on each of these plants to obtain the following information:

- The product/process wastestream(s) recycled
- The total number of process/non-process wastestreams generated by that product/process
- Fate of each wastestream along with its type (aqueous, non-aqueous, product recovery, or washdowns, etc.)
- The ratio of flow recycled to the total product/process flow.

The results of this search are presented in Table IV-2. There are 34 OCPSF plants (Plant Numbers 101 and 1936 were excluded from the earlier list of 36 plants, as there was no recycling activity found at these plants) employing recycle/reuse techniques on at least some fraction of their process wastewaters. Of these plants, only 3 plants reported complete recycling of process wastewater generated by a total of 6 product/processes. The remaining plants reported partial recycling or partial reuse (only a portion of the wastestreams from a product/process) for 65 product/processes. Of these 65 product/processes, 51 have been completely identified and explained as shown in Table IV-2. The reported information on the remaining 14 product/processes was incomplete and could not be utilized.

3. Analysis of Extent of Raw Material and Product Recovery at Complete and Partial Recycle Plants by Product/Process

In the process of identifying the OCPSF facilities practicing recycle techniques, the Agency studied the nature of the reported wastestream recycled. Even though the recycling of a wastestream is process specific, a general pattern may emerge from a large number of examples.

For the product/processes where only part of the process wastestreams is recycled, a pattern can be seen from Table IV-2.

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.		TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
1		I	Potassium Acetate - 0075-06	1	Completely Recycled	Only Aq.waste stream from reactor, completely recycled
			Anhydrous Sodium Acetate - 0075-01	1	Completely Recycled	Only Aq.waste stream from reactor, completely recycled
			Sodium Diacetate - 0075-04	1	Completely Recycled	Only Aq.waste stream from reactor, completely recycled
2	a	D/I	Acrylic Latex and Acrylic Resins (0153-01) (0155-04)	2+2	Completely Recycled	A total of 4 aq.streams (washdown waters from 2 separate product processes) are recycled
	b		Methylmethacrylate - 2665-03	2	0.005/0.0052	After product separation 2 streams are generated. One non-aq. stream is recycled and the other is an aq. stream-sent to POTW.
	c		Acrylic Resins - 0155-03	2+1	0.0025/0.116 0.114/0.116	One non-aqueous stream is recycled; one aq.stream and sent to POTW. Contact cooling water(aq.) is recycled.
	d		Acrylic Resins - 0155-05	---	---	----
3		D	Rayon Fibre-viscose - 3145-01			----
4		I	Formaldehyde - 2040-03	---	---	----
5		D	Acrylonitrile - 0170-01	3	0.144/0.144+0	Out of 3 streams, 1 is contaminated storm water, and is recycled; other 2 streams are aqueous floor washdowns, and are deep well injected.
6	a	I	Ethylene Oxide - 1980-01	5	0.086/0.307	After product seperation, only 1 of 5 aqueous streams is recycled, the other 4(aq.) are deep well injected or sent to POTW.
	b		Butyl Acrylate - 0165-09	2	0.008/0.011	Out of 2 streams, 1 aqueous stream is recycled and one is incinerated (non aq).

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
c		Ethyl Acrylate - 0165-16	4	0.035/0.04	All are non-aqueous streams, 2 are recycled after product separation and the remaining 2 are incinerated.
d		Ethyl Acrylate - 0165-16			
e		Methanol - 2500-02	4	0.061/0.174	All are aq. streams, one goes through filtration and recycling. The remaining 3 streams are washdowns, and are sent to POTW.
7	I	2,6-Di-T-Butylphenols and 1612-01 p-pheylene Diamines - 2942-01	2	0.0001/0.0044	Both are non-aqueous streams. One is recycled after the raw material recovery and the other one is sent to POTW.
8	I	Vinyl Acetate Emulsion - 3043-06	2	0.0001>	One stream is stormwater (aq.)and is recycled; other one is process aq. waste stream, and is sent to POTW.
9	D	Caprolactum Concentration/Evaporation - 0785-07	1	Completely Recycled	After distillation the only aq. stream produced is recycled.
10 a	D	(PET) Resins and Fibres - 3006-33	8	0.65/164	Group of non-aqueous streams; part of it recycled, and the remaining are sent to incineration.(exact # of streams not clear)
b		(PET) Resins and Fibres - 3006-33	8	16/16.4	All are aq.streams; only contact cooling water is recycled and the remaining 7 go through biological treatment, and are directly discharged.
11 a	I	Styrene-Divinylbenzene Resins - 3232-01	2	0.004/1.62	After product separation, 2 streams are generated; one(non-aq.) is recycled and the other is (aq.) sent to POTW.
b		Acrylic Resins - 0155-10	2	0.005/0.015	After product separation, 2 streams are generated; one (non-aq.) is recycled and the other(aq.) is sent to POTW.

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
c		Alkyd Resins - 0189-02	1	Completely Recycled (non-aq.)	Only non-aq.stream is generated from reactors, and is completely recycled.
12	D	Low Density Polyethylene - 3008-04	5	0.092/0.19	All are aq. waste streams; one stream is recycled after product separation, and the remaining 4 streams are sent to POTW after treatment.
13	D	PET Resin/Fibre - 3006-33	6	0.00007/0.9	All are non-aq. streams generated from product seperation; one is recycled, and the remaining 5 go to other types of disposal.
14	I	Petroleum Hydrocarbon Resin - 2856-04	---	---	----
15	D	Phenolic Resin Manufacture - 2905-01	2	0.001/0.006	One is floor washdown(aq.), and is recycled; the remaining one is (aq.stream) directly discharged after treatment.
		Urea formaldehyde Resins Manufacture - 3506-01	2	0.0003/0.0053	One is floor washdown(aq.) and is recycled; the remaining one is (aq.) directly discharged after treatment.
16	D	Poly Ethyl Benzene Residues - 1710-05	3	0.0005/0.09	All are aq. streams; after raw material recovery, one stream is recycled; the remaining 2 are directly discharged after treatment.
17	I	Thiophene Acetic Acid - 3343-01	4	0.0007/0.01	After product separation, 1 non-aq. is recycled; the remaining 3(aq.) are process and cooling waters, and are sent to POTW.
18 a	D	Disperse Dye Pre Cursors, Org. Pigments, 1641-34	4+3	---	Two quench aqueous streams are recycled; the remaining 5 (aq.) are directly discharged.

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
		Organic Pigments - 2980-03	3	0.102/0.37	One non aq. stream from product separation is recycled; the remaining 2 (aq.streams) are directly discharged.
19	D	Dicumyl Peroxide - 1070-03	---	---	----
20	I	Hd Polyethylene and Poly Propylene, 3008-01/3020-03	3	0.083/?	After product separation, 2 non-aq. streams from 2 different processes are recycled, the remaining one is washdown/cooling water (aq.), and is sent to POTW after treatment.
21	D	Tetra Ethyl lead and Tetra Methyl lead, 3310-01/3338-01	2	1.7/?	All process wastewater streams(2) go through chemical precipitation, and then, one stream (aq.) is recycled and the remaining one(aq.) is directly discharged after III-stage biological treatment.
22	I	Flavor and Perfume Chemicals - 3101-00	5	0.001/0.75	One non-aq. stream is recycled; the remaining 4 (aq.) along with washdown/cooling waters(aq.) are sent to POTW.
23	D	Polystyrene Crystals - 3030-05 Impact Polystyrene Resin (3b,3c) - 3030-07 ABS Resin (4a,4b) - 0005-02	9	0.223/0.325	A total of 6 aq. streams (2 out of 3 each from 3 different processes) are contact cooling/floor wash waters, and are recycled; remaining 3 (aq.) are contract hauled.
24	D/I	Methyl Chloride - 2560-03 Methylene Chloride - 2620-01 Chloroform, Carbon Tet - 0930-01, 0810-02 Muriatic Acid (A8=Rainwater) (A9=Emergency Neutraliz.) (B6=Boiler blowdown) (B8=Pump seal water)	---	---	All are aqueous streams mixed with A8, A9, B6, B8; goes through precipitation, stream stripping, sol. extraction, and then, part of this is recycled and the remaining are directly discharged (exact # of streams not clear).

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.		TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
25	a	I	Phenolic Resins - 2905-01	2	0.0019/4.3E-3	Both the streams are washdowns (aq.) from production & floor area; one is recycled and the other goes to POTW after treatment.
	b		Urea Resins - 3506-01	3	0.003/0.0036	One aq. stream from raw material recovery is recycled; remaining 2 are washdowns(aq.), and are sent to POTW.
26	c	D/I	A - Sulfophthalic Acid - 2959-02	2	0.0001/0.14	One aq. stream from raw material recovery is recycled; remaining one(aq.) goes through treatment, and then, partly directly discharged and partly sent to POTW.
27		D	Extrusion of Nylon Polymer (source) (from chlorination chamber) - 2825-22	3	0.3/0.48	Two aq.streams go through II-stage bio.treatment and polishing pond; partly recycled and partly directly discharged. The remaining one is non-aq. stream, and goes to contract hauling.
28		D	Acetic Acid - 0070-04	2	0.019/0.02	Only non-aq. stream is recycled after distillation. The remaining (aq.stream) is directly discharged after treatment.
29		D	Nitroparaffins - Nitration fro Formaldehyde & 2np - 2791-02	6	0.014/0.3	All are aq. streams; one is recycled and the remaining 5 streams are directly discharged after biological treatment.
30		D	Dimethyl Sulphide - 1510-01 Cyclohtexyl Mercaptan - 2445-03 N-propyl Mercaptan - 2445-01 N-Butyl Mercaptan - 2445-02 T-Butyl Mercaptan - 2445-04 N-Octyl Mercaptan - 2445-05	>4	0.013/0.097	Production and floor washdowns (aq.) of all of these product/processes are pooled; after primary treatment, a part of it is directly discharged, and the other part is recycled. Among the process wastestreams of these product/processes, non.aq is sent to incineration and the aq. to POTW (exact # of streams not clear).

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.		TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
			T-Nonyl Mercaptan - 2445-06 T-Dodecyl Mercaptan - 2445-07 N-Dodecyl Mercaptan - 2445-08 Carbon Disulfide - 0790-01 Misc. Organic Suphur Compounds			
31	a	D/I	Sodium Formaldehyde Sulfoxalate - 3185-01	3	NA/0.8	One out of 3 (aq.) streams goes through filtration and then recycled; remaining 2 streams are washdown/cooling waters, and are sent to POTW.
	b	D/I	Phenolic Resins (Sulfonated) - 2905-03	3	NA/0.9	One out of 3(aq.) streams goes through filtration and then recycled; remaining 2 streams are washdown/cooling waters, and are sent to POTW.
32		D	Nycon 6 Resin - Fiber - 2825-01	5	0.175/0.194	All are aq.streams. One stream is distilled with recycle of recovered product, and the distillate is directly discharged; remaining 4 streams are directly discharged after treatment.
33		D	Tri cyresyl phosphate (2951-15) Trixylyl phosphate (2951-16) Tryiscalkyl phenyl phosphate (2951-11) Tributyl phosphate (2951-09) Alkyl Acid phosphate (2951-18) Diethyl bis (2-hydro ty ethyl) (2952-04) Di(2-Ethylhexyl) Adipate (0175-01) Fatty Acid Esters (2021-01)	---	---	----

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
34 a b	I	Brominated Flame Retardants - 3284-01 Brominated Flame Retardants - 3284-01	7	0.002/0.022	One stream is distilled with recycle of recovered product, and the resulting aq.stream is sent to POTW; Among the remaining 6 streams, the aq. streams are from raw material recovery and washdowns go to POTW, and non-aq. to contract hauling (exact # of streams not clear).

Note: "----" means 'Not clear from available information'.

* D - Direct
I - Indirect
D/I - Both Direct and Indirect

** This column indicates the ratio of the wastewater flow recycled to the total wastewater flow from that particular product/process alone, in million gallons per day. The flow recycled could be Aqueous or Non-aqueous, which will be explained under 'Fate of each process wastestream' column for that plant.

*** This column explains the type of flow (Aq. or Non-Aq.) recycled and its origin and final disposal (e.g., whether it is washdowns, cleaning waters, or from raw material recovery). The information on the type of treatment each process wastestream undergoes is also provided where available.

- There are 23 product/processes in which only the washdowns/floor washes and contact cooling waters were recycled. (Stormwater is included in a few cases.)

- There are 13 product/processes in which only the aqueous wastestreams from product separation and raw material recovery were recycled.

- There are 15 product/processes in which only non-aqueous streams were recycled.

As a result of the above analysis, the Agency recognizes that, from the available data on the recycle plants, 29.4% of the product/process wastestreams being recycled are non-aqueous streams, and would be considered as product and/or raw material recovery rather than recycle of process wastewater.

E. ANALYSIS OF CANDIDATE PRODUCTS FOR RECYCLE BASED ZERO DISCHARGE STANDARDS

As described in previous sections, EPA's remand analysis found that only three of the 697 plants in the OCPSF database that discharge process wastewater reported complete recycle of process wastewater generated by a total of six product/processes. Of the 234 zero and alternative discharge plants that do not discharge process wastewater to receiving bodies of water or to publicly owned treatment works, only 11 facilities reported the use of recycle techniques -- nine reported recycle of all wastewater and two reported use of recycle in combination with other alternative disposal techniques. NRDC misread the OCPSF record in asserting "that 36 plants achieve zero discharge by recycling their waste streams" because the Agency's 1987 development document (Table VII-48 on p. VII-146) did not comprehensively describe the source of the "Frequency of Waste Stream Final Discharge and Disposal Techniques" tabulation. The development document omitted the clear statement that the Table VII-48 tabulation characterizes the multiple disposal and discharge practices only for 697 direct and indirect discharge plants. Therefore, the table actually reports that 36 direct and indirect discharge plants use recycle techniques for only a portion of their waste streams. All of these 36 plants discharge wastewater.

Moreover, these 36 waste streams included non-aqueous product recovery waste streams in addition to process wastewater streams, and the wastewater streams often include only a portion of the discharges from an individual product/process. Because of the limitations inherent in applying recycling

techniques beyond the product/processes for which they are demonstrated, the most the Agency could do with respect to imposing zero discharge limitations would be to attempt to develop a technical basis to propose a zero discharge NSPS for some of all of these demonstrated product/process out of 25,000 in the OCPSF industry.

Since neither the Survey responses nor the remainder of the OCPSF record documents the process design and operating characteristics that permit the use of total recycle for any product/process, the Agency initiated a study of candidate products to ascertain the basis for such a proposal.

As already described, for the three direct/indirect discharge [illegible]nts, Section 308 survey responses were used to identify the six product/proces[illegible] [illegible]t recycled or reused all of the process wastewater (potassium acetate, [illegible]m acetate, sodium diacetate, acrylic resin, acrylic latex, and Nylon 6 caprola[illegible]am concentration by evaporation). A secondary source -- the SRI International 1982 Directory of Chemical Producers -- was used to identify the product mixes for the 11 zero/alternative discharge plants; the OCPSF record does not include product mix information for these plants because "zero and alternative discharge" plants only responded to part of the Agency's 1983 Section 308 survey. The listed products include formaldehyde and melamine, phenolic, urea, alkyd, epoxy, furan, polyester, and polyurethane resins. Thus a total of 15 products were identified as candidate products to study their process chemistry and operating characteristics that permit the use of total recycle.

Even though at least one plant in the OCPSF data base reported that it achieves zero discharge by totally recycling all the process wastewater generated by one or more of these 15 products, the questionnaire did not define "recycle" or "zero discharge" in the context of total recycle of process wastewater. Consideration of the process chemistry and operating characteristics of these product/processes indicates that most of these product/processes could not achieve zero discharge through wastewater recycle alone. Therefore, even if the Agency concluded that zero discharge standards based on total recycle of process wastewater could cover one or more of these product segments of the industry, it would have to conduct extensive technical and engineering studies to confirm that total recycle of the selected wastewater streams is practicable. EPA would practically have to establish design and operating practices for each

product/process, which is exactly the approach to regulation which EPA rejected in developing the OCPSF guideline.

As described below, only three of the 15 products provide reasonable prospects of achieving zero discharge through total recycle of process wastewater.

In the case of melamine, phenolic, and urea resin manufacture with or without captive formaldehyde production as well as alkyd, epoxy, furan, polyester, and polyurethane resin manufacture, water is vacuum stripped from the reactor to optimize the conversion of raw materials to product. In the case of the melamine, phenolic, and urea resins, the concentration of raw materials in water stripped from the process can be raised, through evaporation, to a level where most, perhaps all, of it can be reintroduced as feed to the process. Some process-generated wastewater may leave the plant with the product as a syrup. However, in the case of furan, alkyd, epoxy, and polyester resins, the water stripped from the process is not recycled but can be captured and disposed of by techniques such as evaporation or another alternative discharge technique. Polyurethane resins are manufactured by what is essentially a dry process, although there is usually a vent scrubber associated with this product/process. As already noted, even though vent scrubbers typically recycle wastewater, they must periodically discharge a portion of the recycle stream. Therefore, with the exception of melamine, phenolic, and urea resin manufacture, prospects of achieving zero discharge through recycle techniques are unlikely because the furan, alkyd, epoxy, polyester, and polyurethane resin processes generate process wastewater that is not amenable to complete recycle.

In the case of Nylon 6 resins and fibers, water and unreacted caprolactam monomer may be removed by vacuum stripping from the fiber spinning process and may be recycled to the resin process feed. However, this "recycle" or reuse option would be limited to plants that manufacture both the Nylon 6 resin as well as the fiber. Nevertheless, since the Nylon 6 resin process generates and discharges significant amounts of wastewater, this raw material recovery/recycle operation, in essence, reuses but then discharges the associated wastewater (November 1981 Contractor's Engineering Report, Appendix S pp. S-317 to 366).

Therefore, Nylon 6 resin and fiber production are unlikely candidates for zero discharge standards based on total recycle of process wastewater.

After formation of potassium and sodium acetic acid salts in a reactor, the salts can usually be crystallized from saturated solution and recovered by filtration. The filtrate can be recycled to the initial neutralization step. The salt may be purified by recrystallization from fresh water and recovered by filtration. Filtrate from the recrystallization may also be recycled to the process. As long as the processing equipment remains dedicated to the same product to avoid cross contamination with salts of other metals, and assuming water losses by evaporation or drying of the salt crystals, such product/processes should be operable with no discharge of wastewater. However, plants typically use the same batch reactor to manufacture multiple products because of the great variety of products manufactured by plants in the industry and the impracticability of dedicating a batch reactor to a particular product. Therefore, these acetic acid salts are also unlikely candidates for complete recycle of process wastewater.

In the case of acrylic resin/latex production, most of the process wastewater typically results from washing the polymerization reactor with water after every batch. Typically containing 1 to 2 percent solids, the wash water is often treated on-site and discharged. However, some plants are now evaluating techniques to capture and concentrate the latex solids in the wash water to give a saleable byproduct. One technique utilizes membrane separation technology, such as ultrafiltration, as a practicable way to separate latex solids from the wash water. By making multiple passes of the wash water through the ultrafiltration apparatus, the solids can be concentrated to a level that is marketable as a lower-grade latex. As long as the equipment is dedicated to successive batches of the same product, it should be practicable to recycle permeate as wash water for the reactor. Since the permeate contains soluble ingredients required in the process, it would also appear practicable to return permeate to the reactor for use in a new batch of the same latex.

Even if all of the wash water could be recycled, either as permeate or marketed as a lower-grade latex, the manufacture of a latex would generate some process wastewater. The reactor must be vented to a scrubber to control the

emission of volatile monomers, such as acrylates. The scrubber which typically uses recycle techniques must periodically discharge process wastewater. Some process wastewater may also accrue when the reactor is switched to a different product. While these wastewaters are perhaps unavoidable, the use of ultrafiltration would greatly reduce the volume of process wastewater that would otherwise have to be treated before discharge or disposal.

Thus, the OCPSF record and EPA's analysis support the possibility of achieving zero discharge through recycle of process wastewater for three of the 25,000 OCPSF product/processes. However, the record still does not provide the basis for EPA to conclude that recycle is a demonstrated technology for these product/processes. The above analysis suggests a probable explanation of how recycle is accomplished for these product/processes; the data base does not reveal what these plants are actually doing. Moreover, EPA is reluctant to devote the substantial time and resources which would be required to develop individual design and operating parameters and generally to develop a technological basis to impose zero discharge new source limitations on a handful of product/processes, especially since it is entirely possible that no new source will employ any of these precise product/processes.

F. SUMMARY AND CONCLUSIONS

In sum, the Agency believes that the OCPSF guideline is based on a rational, concentration-based approach to regulation which permits comprehensive coverage while shifting the promotion of recycle from the national level to the permit writer/control authority level. Given the extraordinary size and complexity of the industry, the exercise of promoting recycle through the development of individual product/process design and operating practices may be beyond the reasonable scope of a guideline development effort. Moreover, even if EPA were to undertake the exercise, the OCPSF record does not at present provide a technical basis for EPA to conclude that recycle is a demonstrated technology.

A P P E N D I X III-A

REVISED IN-PLANT BIOLOGICAL COST ESTIMATES Vs 1987 PROMULGATED IN-PLANT BIOLOGICAL COST ESTIMATES

(COST ESTIMATES ARE PRESENTED IN 1982 DOLLARS)

PLANT NUMBER	IN-PLANT BIOLOGICAL COST ESTIMATES AT PROMULGATION BAT (DIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGICAL COST ESTIMATES BASED ON REVISED DETENTION TIMES BAT (DIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
76	154,264	36,383	4,868	252,052	37,518	6,889
105	180,903	37,838	39,407	297,579	39,032	60,439
114	155,036	36,426	8,040	253,372	37,562	11,405
260	114,259	34,201	6,687	382,240	38,190	22,560
412	115,355	34,260	27,282	185,445	35,286	33,795
446	85,773	32,765	1,779	134,851	33,678	1,963
536	55,303	31,791	1,857	99,944	32,966	2,209
611	33,879	31,778	1,226	93,292	34,628	1,449
814	1,477,409	122,703	25,259	4,762,754	257,920	25,775
877	122,601	34,650	2,490	415,790	38,734	8,903
913	239,832	40,962	11,739	397,900	42,261	21,010
1241	261,328	42,063	13,772	434,340	43,393	25,908
1249	124,507	34,753	6,739	201,116	35,808	8,629
1569	120,658	34,545	2,326	194,525	35,588	2,938
1618	137,779	35,478	5,373	223,839	36,571	7,205
1650	16,949,213	1,206,306	899,727	67,423,724	2,667,136	1,069,587
1785	306,454	44,306	9,305	510,552	45,696	19,266
1928	43,402	31,778	1,668	76,316	32,901	1,814
2073	335,009	45,682	16,500	558,577	47,104	36,112
2206	163,252	36,876	2,876	267,422	38,032	4,185
2590	27,215	31,778	3,760	73,128	34,628	3,616
2735	4,283,634	312,359	153,746	14,018,248	666,365	227,194
2767	66,487	32,015	4,494	102,017	32,824	4,574
TOTALS	25,553,551	2,361,695	1,250,920	91,359,021	4,343,819	1,607,427

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
10	38,458	31,778	3,663	54,933	32,470	3,352
22	111,459	34,052	1,467	371,105	38,007	4,849
33	1,796,964	144,644	45,448	5,756,909	304,610	51,447
49	176,242	37,585	38,506	289,619	38,769	58,262
51	123,508	34,699	6,697	241,734	36,347	11,579
52	51,292	31,778	2,945	76,348	32,475	2,814
72	35,667	31,778	3,609	61,254	32,901	3,686
79	52,999	31,779	17,371	79,219	32,488	16,712
93	100,445	33,479	1,532	159,927	34,452	1,793
94	44,225	31,778	16,295	77,934	32,901	17,839
110	32,594	31,778	2,624	55,348	32,901	2,612
119	35,088	31,778	5,893	97,034	34,628	7,192
120	48,027	31,778	1,336	70,871	32,470	1,261
122	74,706	32,296	20,523	231,276	35,724	48,490
143	34,492	31,778	1,342	48,395	32,470	1,218
149	53,307	31,779	4,060	95,948	32,933	4,761
161	187,252	38,182	9,478	379,881	40,100	20,654
163	51,421	31,778	4,003	76,565	32,475	3,827
196	165,699	37,010	8,355	332,741	38,846	16,971
199	152,707	36,298	2,718	249,389	37,429	3,827
203	31,919	31,778	15,244	44,179	32,470	13,791
206	74,515	32,289	5,059	230,584	35,714	11,926
212	33,247	31,778	949	56,599	32,901	950
214	245,972	41,278	4,195	510,031	43,392	10,761
220	41,678	31,778	16,021	117,869	34,628	22,809
221	266,317	42,315	3,135	555,621	44,488	8,448
240	2,388,306	184,789	65,816	30,377,381	1,135,834	346,162
249	75,705	32,335	2,129	141,410	33,694	2,893
257	261,328	42,063	13,010	1,039,118	47,264	85,770
262	28,097	31,778	15,138	46,800	32,901	14,516
266	29,728	31,778	1,967	40,612	32,470	1,779
283	1,929,490	153,681	68,756	6,173,704	323,893	80,500
292	102,992	33,609	6,208	164,284	34,592	7,339
293	188,988	38,275	3,573	383,694	40,200	7,828
297	25,278	31,778	3,488	33,432	32,470	3,052
302	99,926	33,452	1,966	159,038	34,424	2,297
310	84,702	32,717	3,135	268,057	36,309	8,238
321	31,218	31,778	15,213	43,035	32,470	13,758
326	59,507	31,846	3,664	108,400	33,065	4,488
334	43,402	31,778	1,413	76,316	32,901	1,537
354	115,682	34,277	5,629	225,074	35,886	9,403
430	3,070,808	230,778	114,330	9,874,439	489,461	158,336
433	84,169	32,693	1,758	158,891	34,113	2,509
438	121,480	34,589	1,758	195,933	35,635	2,226

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
458	2,164,647	169,654	358,718	27,017,425	1,033,377	1,800,014
468	42,553	31,778	1,286	61,730	32,470	1,191
492	36,508	31,778	2,669	101,464	34,628	3,376
494	320,686	44,996	5,493	534,507	46,402	11,697
522	135,103	35,331	7,183	266,554	37,036	13,029
543	64,898	31,970	1,660	196,214	35,213	3,478
567	27,215	31,778	944	45,138	32,901	893
592	86,403	32,794	3,844	274,412	36,412	10,272
607	69,725	32,117	3,393	129,150	33,428	4,446
624	2,538,969	194,961	98,792	8,125,233	412,320	129,133
658	171,026	37,301	7,721	344,357	39,158	15,968
661	26,848	31,778	840	44,447	32,901	793
702	45,804	31,778	1,315	131,256	34,631	2,036
706	42,119	31,778	3,308	119,288	34,628	4,754
717	254,220	41,701	6,073	422,301	43,021	11,241
722	250,039	41,487	5,497	415,214	42,802	10,078
724	31,919	31,778	3,138	87,274	34,628	3,515
743	45,025	31,778	904	65,850	32,470	844
749	83,680	32,671	1,752	131,280	33,573	1,917
768	24,200	31,778	3,552	39,497	32,901	3,305
771	118,360	34,421	6,485	190,590	35,457	8,122
791	40,308	31,778	2,728	113,479	34,628	3,770
797	35,667	31,778	1,349	61,254	32,901	1,378
814	1,477,397	122,703	25,259	6,315,806	320,545	36,389
830	23,508	31,778	5,816	30,606	32,470	5,089
862	130,517	35,080	6,990	256,720	36,763	12,445
887	222,526	40,060	2,956	368,502	41,331	5,071
905	31,919	31,778	1,329	54,056	32,901	1,316
929	25,278	31,778	15,232	33,432	32,470	13,328
944	26,279	31,778	3,552	35,037	32,470	3,108
958	80,319	32,524	5,284	125,548	33,410	5,701
975	64,898	31,970	1,180	196,214	35,213	2,472
976	177,105	37,632	3,981	291,094	38,818	6,039
987	24,200	31,778	1,216	64,292	34,628	1,056
992	75,274	32,318	1,645	116,953	33,178	1,738
997	37,318	31,778	3,640	104,007	34,628	4,695
1006	34,492	31,778	954	48,395	32,470	866
1018	118,149	34,409	2,217	190,228	35,445	2,775
1047	180,385	37,810	9,166	296,693	39,003	14,037
1052	104,729	33,699	1,403	167,257	34,688	1,670
1053	42,294	31,778	368	119,851	34,628	531
1057	23,024	31,778	840	37,316	32,901	735
1083	38,859	31,778	2,704	55,597	32,470	2,477
1085	28,933	31,778	3,532	48,380	32,901	3,410

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
1086	142,108	35,716	32,080	231,251	36,820	43,640
1091	136,001	35,381	4,391	268,485	37,089	7,993
1094	138,306	35,507	7,747	224,743	36,601	10,406
1117	24,423	31,778	520	64,938	34,628	455
1126	191,682	38,420	7,130	389,615	40,355	15,750
1163	96,736	33,292	4,137	313,614	37,058	12,154
1172	204,121	39,087	7,553	768,788	43,902	40,884
1173	23,024	31,778	15,232	60,899	34,628	12,704
1181	90,364	32,980	5,371	171,774	34,442	7,929
1191	56,810	31,806	1,108	102,970	32,997	1,333
1194	33,183	31,778	3,570	46,247	32,470	3,234
1195	35,088	31,778	1,767	49,374	32,470	1,605
1197	40,308	31,778	2,728	113,479	34,628	3,770
1202	73,357	32,245	5,015	226,393	35,650	11,666
1219	276,642	42,834	13,776	460,246	44,186	26,807
1220	35,667	31,778	959	50,327	32,470	872
1223	37,843	31,778	1,611	53,916	32,470	1,472
1224	178,425	37,703	2,413	293,347	38,893	3,674
1234	62,529	31,909	3,210	95,308	32,692	3,213
1236	180,579	37,820	8,100	365,245	39,714	17,284
1237	54,570	31,785	17,580	81,864	32,508	17,020
1249	124,507	34,753	6,739	201,116	35,808	8,629
1264	28,097	31,778	3,530	46,800	32,901	3,385
1277	168,246	37,149	2,952	275,959	38,316	4,361
1310	147,924	36,035	3,413	241,205	37,154	4,732
1313	21,995	31,778	944	35,416	32,901	826
1314	22,649	31,778	1,216	29,242	32,470	1,064
1320	33,941	31,778	1,339	93,483	34,628	1,586
1322	68,240	32,068	4,555	208,043	35,378	9,964
1326	75,499	32,327	1,280	117,337	33,188	1,353
1351	45,025	31,778	1,429	128,709	34,628	2,178
1352	21,995	31,778	3,552	35,416	32,901	3,108
1356	35,088	31,778	3,599	60,137	32,901	3,659
1357	37,843	31,778	2,688	65,465	32,901	2,796
1361	126,379	34,855	2,334	247,866	36,518	4,084
1426	158,530	36,617	8,193	317,152	38,424	16,230
1432	90,067	32,966	5,360	288,201	36,638	14,829
1437	159,204	36,654	1,944	569,017	41,103	8,611
1450	21,995	31,778	6,968	57,955	34,628	5,609
1478	27,215	31,778	1,328	45,138	32,901	1,257
1504	75,274	32,318	1,645	233,338	35,756	3,913
1507	205,139	39,141	8,493	338,911	40,382	13,929
1528	29,014	31,778	3,532	78,489	34,628	3,626
1534	54,511	31,785	1,403	160,297	34,797	2,528

PLANT NUMBER	IN-PLANT BIOLOGICAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGICAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
1539	224,484	40,163	11,216	371,830	41,437	19,335
1560	28,097	31,778	3,117	46,800	32,901	2,989
1575	21,995	31,778	3,552	28,208	32,470	3,108
1595	92,694	33,092	2,681	146,674	34,035	3,043
1608	71,974	32,195	1,605	133,752	33,524	2,132
1622	142,193	35,720	5,512	281,809	37,457	10,281
1628	39,834	31,778	15,837	57,212	32,470	14,543
1645	42,553	31,778	3,317	120,688	34,628	4,811
1657	1,559,661	128,375	18,431	6,683,620	336,108	27,333
1659	98,347	33,373	5,681	188,474	34,884	8,740
1666	64,898	31,970	19,038	119,314	33,239	24,181
1667	203,723	39,065	10,237	766,969	43,878	55,326
1706	1,702,823	138,204	25,658	5,462,456	290,888	28,274
1716	85,931	32,773	5,202	162,548	34,205	7,497
1740	143,798	35,808	7,995	234,143	36,917	10,938
1742	88,716	32,902	22,762	139,878	33,827	25,424
1743	42,163	31,778	3,680	61,080	32,470	3,403
1744	28,097	31,778	3,530	46,800	32,901	3,385
1751	27,574	31,778	3,488	37,123	32,470	3,052
1764	82,691	32,627	1,899	260,574	36,188	4,890
1773	44,225	31,778	1,421	126,103	34,628	2,132
1788	112,364	34,100	6,606	180,325	35,116	8,093
1793	26,084	31,778	15,232	43,015	32,901	14,301
1805	153,488	36,341	7,038	250,724	37,474	9,936
1826	82,357	32,612	1,895	129,024	33,508	2,062
1832	44,225	31,778	2,799	64,515	32,470	2,605
1833	124,706	34,764	2,978	424,341	38,871	10,801
1853	2,027,158	160,324	80,244	24,987,274	970,397	389,265
1876	64,434	31,957	1,514	118,371	33,222	1,918
1891	239,640	40,952	3,175	397,575	42,251	5,679
1894	55,389	31,791	4,367	100,118	32,968	5,198
1899	118,571	34,432	5,733	399,517	38,471	19,943
1904	3,184,631	238,434	117,797	10,254,303	505,993	164,669
1931	52,999	31,779	17,371	155,182	34,752	30,550
1936	69,516	32,110	4,600	107,160	32,937	4,742
1971	75,462	32,325	1,279	117,273	33,187	1,352
1974	63,491	31,933	4,391	96,938	32,722	4,413
1993	60,026	31,856	1,598	179,203	34,997	3,131
2004	151,922	36,255	33,895	248,045	37,384	47,608
2007	42,981	31,778	3,989	75,490	32,901	4,324
2018	201,722	38,959	2,696	333,089	40,193	4,381
2037	59,767	31,851	18,297	108,925	33,072	22,454
2070	243,158	41,134	12,116	403,544	42,438	21,857
2084	118,571	34,432	27,846	190,952	35,469	34,904

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
2093	180,385	37,810	9,703	296,693	39,003	14,859
2117	103,741	33,648	5,894	199,815	35,191	9,313
2129	64,434	31,957	4,424	118,371	33,222	5,602
2176	66,263	32,008	1,536	201,030	35,279	3,276
2184	73,357	32,245	1,622	226,393	35,650	3,773
2191	34,492	31,778	1,342	58,990	32,901	1,357
2232	163,252	36,876	6,187	267,422	38,032	9,004
2241	308,833	44,422	66,148	1,275,337	49,897	497,675
2243	262,203	42,107	4,469	546,383	44,268	11,924
2250	49,767	31,778	2,200	88,894	32,902	2,513
2259	48,027	31,778	4,132	85,441	32,901	4,659
2261	134,922	35,321	2,683	266,167	37,025	4,862
2288	33,247	31,778	3,153	56,599	32,901	3,156
2293	48,944	31,778	16,853	141,609	34,663	27,647
2300	263,943	42,195	4,646	1,051,858	47,412	30,875
2311	64,666	31,963	19,004	98,930	32,761	19,191
2318	61,044	31,876	1,611	111,505	33,110	1,994
2341	329,039	45,397	14,555	548,550	46,813	31,497
2348	74,515	32,289	4,736	115,661	33,145	4,987
2350	50,105	31,778	1,482	89,564	32,903	1,697
2359	23,024	31,778	2,160	29,838	32,470	1,890
2442	25,687	31,778	2,440	34,087	32,470	2,135
2459	57,364	31,813	17,961	170,031	34,893	33,834
2465	63,965	31,945	1,171	117,420	33,206	1,479
2469	35,088	31,778	1,232	49,374	32,470	1,119
2485	1,590,890	130,523	70,040	18,740,326	770,425	294,834
2487	119,828	34,500	958	233,892	36,130	1,630
2495	177,172	37,635	9,021	291,207	38,822	13,687
2498	56,810	31,806	3,682	168,132	34,873	6,878
2501	57,226	31,811	1,564	169,558	34,888	2,941
2517	113,037	34,136	4,616	181,477	35,154	5,669
2524	55,389	31,791	1,347	100,118	32,968	1,603
2539	118,254	34,415	6,481	190,409	35,451	8,114
2548	95,367	33,224	4,098	182,227	34,717	6,210
2565	198,826	38,804	10,010	405,347	40,764	22,593
2634	67,152	32,035	1,689	103,146	32,848	1,724
2635	1,959,465	155,721	47,796	6,268,347	328,251	56,354
2641	127,060	34,892	2,559	205,488	35,954	3,307
2646	161,793	36,796	6,139	580,200	41,268	27,546
2666	44,225	31,778	1,010	64,515	32,470	940
2677	120,554	34,539	1,747	235,438	36,173	2,983
2714	24,200	31,778	3,552	64,292	34,628	3,085
2736	185,499	38,087	3,514	305,423	39,290	5,460
2741	97,007	33,305	5,628	185,663	34,808	8,601

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
2748	190,890	38,378	2,281	708,716	43,092	11,698
2756	1,533,142	126,548	68,768	4,935,083	266,090	71,652
2776	49,801	31,778	3,955	144,460	34,678	6,587
2793	113,149	34,142	2,345	377,819	38,117	7,848
2796	196,476	38,678	3,501	324,147	39,903	5,609
4001	66,776	32,023	3,977	123,134	33,309	5,113
4003	134,197	35,282	7,563	463,307	39,490	29,130
4006	56,530	31,803	6,814	102,407	32,991	8,176
4007	130,498	35,079	3,888	448,045	39,249	14,635
4008	97,277	33,319	24,181	315,693	37,093	71,364
4014	23,626	31,778	1,216	30,793	32,470	1,064
4022	42,119	31,778	3,747	61,007	32,470	3,464
4024	26,279	31,778	1,216	70,364	34,628	1,133
4026	92,263	33,072	5,444	175,736	34,545	8,118
4027	111,118	34,034	6,190	369,750	37,985	20,406
4032	28,933	31,778	3,739	39,321	32,470	3,383
4044	165,485	36,998	2,259	271,239	38,159	3,310
4047	60,026	31,856	1,136	179,203	34,997	2,226
4050	38,859	31,778	868	55,597	32,470	795
4057	48,699	31,778	3,923	140,798	34,660	6,407
4070	41,899	31,778	1,281	73,370	32,901	1,377
4072	41,229	31,778	1,275	72,059	32,901	1,363
TOTALS	49,802,940	9,983,728	2,523,438	215,256,510	15,591,565	6,209,111

A P P E N D I X III-B

REVISED BAT AND PSES COST COMPLIANCE ESTIMATES AND TECHNOLOGY BASIS

(COST DATA PRESENTED IN 1982 DOLLARS)

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
1	1	0	0	0	0	0	0	29539
2	12	583212	77154	8994	0	0	0	29539
3	15	881544	128618	4324	3536	762	0	29539
4	33	0	0	0	0	0	0	51259
5	61	912274	115757	4653	37220	8016	0	29539
6	63	0	4750	0	0	0	0	33782
7	76	1529448	1562142	46817	193544	41683	0	29539
8	83	328468	31298	310	11724	2525	0	33782
9	87	541052	196316	1937	0	0	0	26827
10	101	0	0	0	0	0	222650	26827
11	102	0	0	0	0	0	0	29539
12	105	1200770	2123576	340814	276731	59599	0	41206
13	112	0	0	0	0	0	111325	26827
14	114	1118466	368477	31427	472694	101803	0	26827
15	154	328468	33389	2412	74440	16032	0	26827
16	155	1406902	668691	22693	738817	159118	0	29539
17	159	0	0	0	0	0	0	29539
18	177	1011495	103592	21556	48386	10421	0	29539
19	180	0	0	0	0	0	222650	26827
20	183	862959	451849	27831	0	0	0	29539
21	190	731177	1072783	66000	0	0	0	41206
22	205	821587	757824	86733	193544	41683	0	29539
23	225	610771	115960	5036	375178	80801	0	29539
24	227	454726	28989	2124	0	0	0	41206
25	250	354104	50601	8063	385227	82966	0	33782
26	254	366729	54659	3248	470833	101402	0	26827
27	259	0	0	0	0	0	0	33782
28	260	1231815	147463	38554	81884	17635	0	29539
29	267	1411929	651263	13206	776832	193075	0	51259
30	269	60026	31856	626	0	0	0	29539
31	284	384432	67491	5018	111660	24048	0	26827
32	294	0	0	0	0	0	0	29539
33	296	594489	119654	21801	661521	164416	0	41206
34	301	8973044	3754917	96349	329397	116988	0	41206
35	352	405958	63704	1466	3908	842	0	29539
36	384	6856767	3047519	248419	358431	127299	0	51259
37	387	2969660	841368	37964	1827258	888306	0	65286
38	392	450142	33874	2736	0	0	0	26827
39	394	461491	47794	8211	0	0	0	26827
40	399	2000000	335000	9100	0	0	0	36574
41	412	642285	82906	69000	0	0	0	26827
42	415	3551871	3621418	129088	660906	234725	0	51259
43	443	868975	154617	28737	7816	1683	0	29539
44	444	110889	34022	6542	0	0	0	29539
45	446	919901	82783	5349	28101	6052	0	26827
46	447	2745254	1026242	41564	545805	135655	0	41206
47	451	0	0	0	0	0	44530	26827
48	481	498116	37693	2374	0	0	0	29539
49	485	1866959	2954508	114488	0	0	0	41206

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COS
50	486	872185	102024	27793	10608	2285	0	29539
51	488	1154248	468093	109650	82256	17715	0	29539
52	500	328709	38823	5380	163396	35190	0	29539
53	502	0	0	0	0	0	12468	29539
54	518	1950998	2281636	14440	329397	70942	0	26827
55	523	72315	42686	7095	0	0	0	29539
56	525	0	0	0	0	0	0	29539
57	536	989126	240404	16403	13529	2914	0	26827
58	569	0	0	0	0	0	0	29539
59	580	116439	34318	2395	0	0	0	29539
60	602	0	0	0	0	0	57889	29539
61	608	655540	1052470	14970	0	0	0	41206
62	611	947308	146462	10316	2419	521	0	26827
63	614	328468	34168	1578	87095	18757	0	29539
64	633	809133	73458	12751	2680	577	0	29539
65	657	4149193	393797	141987	374795	133111	0	29539
66	659	454557	52002	2826	0	0	0	33782
67	662	1247646	428399	22673	764871	164729	0	29539
68	663	858500	692391	18605	115382	24850	0	26827
69	664	919793	530584	10537	716485	154308	0	26827
70	669	0	0	0	0	0	124684	29539
71	682	697987	146981	15825	429694	152609	0	51259
72	683	1403937	781729	40680	866856	215450	0	51259
73	695	2383893	244490	94475	0	0	0	51259
74	709	0	0	0	0	0	151402	29539
75	727	471403	84419	5792	651406	161902	0	51259
76	741	0	0	0	0	0	0	41206
77	758	0	0	0	0	0	0	29539
78	775	540068	648766	3151	0	0	0	29539
79	802	551554	106422	6680	984190	244612	0	29539
80	811	0	0	0	0	0	0	33782
81	814	6225611	1332591	48218	604877	150337	0	41206
82	819	8484607	3028592	109041	268163	95240	0	41206
83	825	837227	151315	4430	346146	74549	0	29539
84	844	0	0	0	0	0	0	33782
85	851	3377409	3155331	138805	0	0	0	41206
86	859	0	0	0	0	0	0	41206
87	866	0	0	0	0	0	0	33782
88	871	451103	42992	6002	0	0	0	33782
89	876	552177	305539	6730	0	0	0	29539
90	877	1497397	933303	27721	65879	14188	0	26827
91	883	0	0	0	0	0	0	29539
92	888	0	0	0	0	0	0	26827
93	908	448303	78050	8660	560371	139276	0	51259
94	909	2743896	1079582	101930	372200	80160	0	41206
95	913	1141795	797059	47694	464270	164889	0	41206
96	938	115653	84916	1951	0	0	0	29539
97	942	0	0	0	0	0	0	29539
98	948	1291236	448579	13690	850672	211427	0	51259

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
99	956	0	0	0	0	0	71248	26827
100	962	782986	67022	2865	55830	12024	0	26827
101	970	469119	83791	6785	642303	159639	0	29539
102	973	828624	275200	45089	604825	130260	0	41206
103	984	328468	32299	1695	55830	12024	0	26827
104	990	328468	35924	1112	115382	24850	0	33782
105	991	0	0	0	0	0	4453	26827
106	992	454719	22868	2736	0	0	0	29539
107	1012	454779	79839	6443	585659	145561	0	29539
108	1020	349821	49140	8310	355451	76553	0	29539
109	1033	0	0	0	0	0	89060	29539
110	1038	972717	207113	14621	524713	186355	0	51259
111	1059	0	14500	0	0	0	0	41206
112	1061	458705	113196	8284	488885	105290	0	26827
113	1062	0	0	0	0	0	0	29539
114	1067	438206	65409	6155	37220	8016	0	29539
115	1133	139529	35574	1079	0	0	0	29539
116	1137	2219293	246146	24383	278325	98849	0	51259
117	1139	479801	60911	12220	0	0	0	33782
118	1148	835903	185891	4611	604423	214665	0	41206
119	1149	833465	4798387	23760	0	0	0	41206
120	1157	0	0	0	0	0	44530	33782
121	1203	332097	41724	2210	214015	46092	0	26827
122	1241	808568	100348	36200	521080	112224	0	26827
123	1249	1051487	124479	23939	24565	5291	0	33782
124	1267	0	0	0	0	0	0	26827
125	1299	0	0	0	0	0	0	29539
126	1319	0	0	0	0	0	0	29539
127	1323	544754	69758	1879	0	0	0	26827
128	1327	2953691	1186459	117597	617015	153354	0	41206
129	1340	1199794	466637	24908	409104	88108	0	33782
130	1343	1740987	2625061	58497	541551	116633	0	33782
131	1348	0	1000	0	0	0	0	26827
132	1349	0	0	0	0	0	0	26827
133	1389	411405	67752	3220	772315	166332	0	26827
134	1407	1002773	580864	9225	772315	166332	0	29539
135	1409	4106377	2354667	147923	287695	102177	0	41206
136	1414	454719	14197	8460	0	0	0	26827
137	1438	373116	56619	3606	513636	110621	0	33782
138	1439	1470942	1876635	68080	195405	42084	0	29539
139	1446	350850	718244	42480	0	0	0	26827
140	1464	482849	89871	8602	0	0	0	29539
141	1494	8463828	2288557	84297	340219	120831	0	41206
142	1520	1004495	252421	45473	30334	6533	0	29539
143	1522	811772	4140048	22573	0	0	0	57597
144	1524	328468	36119	2583	118546	25531	0	26827
145	1532	425575	75044	11239	217737	46894	0	29539
146	1569	1036063	174401	8011	186100	40080	0	29539
147	1572	0	25000	0	0	0	0	51259

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING C
148	1593	0	0	0	0	0	0	29539
149	1609	905355	288820	19941	502470	108216	0	29539
150	1616	331423	41307	3524	206571	44489	0	26827
151	1617	576429	1291980	4296	0	0	0	29539
152	1618	685778	104759	13436	0	0	0	26827
153	1624	778349	41593	2855	1359	293	0	33782
154	1643	0	0	0	0	0	0	26827
155	1647	912609	479951	10155	232625	50100	0	29539
156	1650	71050018	5988312	1228685	1732309	645153	0	57597
157	1656	0	0	0	0	0	0	29539
158	1670	0	0	0	0	0	4453	29539
159	1684	73357	32245	694	0	0	133590	33782
160	1688	343107	46699	7103	307065	66132	0	26827
161	1695	4893992	1257500	26851	276873	98333	0	51259
162	1698	449881	13302	13086	0	0	0	26827
163	1714	778349	56004	9912	33684	7254	0	26827
164	1717	328468	31437	826	36848	7936	0	26827
165	1724	841150	105982	21038	3350	721	0	29539
166	1753	671437	139572	15144	397230	141079	0	41206
167	1766	378121	58125	6076	547134	117835	0	26827
168	1769	7875173	9718672	157155	0	0	0	41206
169	1774	1035891	243484	13226	871002	309342	0	29539
170	1785	1012253	192393	29524	758625	188550	0	51259
171	1802	444655	77041	13785	546210	135756	0	29539
172	1839	782792	44868	8886	9863	2124	0	26827
173	1869	618340	705348	3628	0	0	0	51259
174	1877	1389291	881655	27052	183867	39599	0	29539
175	1881	328468	31617	631	41873	9018	0	33782
176	1890	529854	113692	19606	290316	62525	0	33782
177	1905	386297	63117	5875	15204	3275	0	33782
178	1910	1135742	1255931	11405	308740	66493	0	41206
179	1911	686981	106868	27170	666238	143486	0	33782
180	1928	859108	76427	5729	7072	1523	0	26827
181	1937	1251214	628168	61880	121523	26172	0	29539
182	1943	0	0	0	0	0	0	33782
183	1973	599338	119580	5777	311449	110613	0	29539
184	1977	0	0	0	0	0	0	51259
185	1986	0	0	0	0	0	0	26827
186	2009	674383	80766	9318	0	0	0	29539
187	2020	0	0	0	0	0	0	29539
188	2026	454719	17720	2736	0	0	0	33782
189	2030	1312598	1389196	79420	0	0	0	41206
190	2047	328468	34770	3724	96772	20842	0	26827
191	2049	378242	59210	6012	57691	12425	0	29539
192	2055	0	0	0	0	0	0	26827
193	2062	785050	50058	5652	14330	3086	0	29539
194	2073	1565332	2107497	66931	878392	189178	0	29539
195	2090	63318	35647	1953	0	0	0	29539
196	2110	362960	63158	6065	34801	7495	0	29539

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
197	2148	657716	216786	28974	816281	202880	0	29539
198	2181	0	0	0	0	0	0	26827
199	2193	0	0	0	0	0	89060	33782
200	2198	355187	50962	3103	392671	84569	0	29539
201	2206	779120	136702	7225	0	0	0	26827
202	2221	861504	222780	7759	320092	68938	0	26827
203	2222	670350	139270	6606	395910	140610	0	29539
204	2227	1717297	1113595	57123	1047842	372148	0	29539
205	2228	783187	42842	5329	5620	1210	0	29539
206	2236	458966	66378	8085	10515	2265	0	29539
207	2242	794313	66472	9040	280267	60360	0	29539
208	2254	564000	115855	12674	622275	154661	0	29539
209	2268	1430431	2902047	61784	65135	14028	0	29539
210	2272	1521382	2272954	53161	814763	202503	0	51259
211	2281	414832	118514	3459	9119	1964	0	29539
212	2292	623153	161108	35602	0	0	0	29539
213	2296	0	0	0	0	0	0	26827
214	2307	0	0	0	0	0	0	26827
215	2313	0	0	0	0	0	0	29539
216	2315	424577	90041	6312	411281	88577	0	26827
217	2316	864597	117054	7232	1489	321	0	29539
218	2322	2093797	2526055	109087	566116	121923	0	41206
219	2328	0	0	0	0	0	0	33782
220	2345	341793	46190	7518	297202	64008	0	29539
221	2353	0	0	0	0	0	0	29539
222	2360	426189	71906	3452	874670	188376	0	26827
223	2364	328468	31298	624	16563	3567	0	33782
224	2365	537219	47124	3521	0	0	0	29539
225	2368	543298	104153	5081	948787	235813	0	41206
226	2376	464098	52884	2830	0	0	0	33782
227	2390	0	0	0	0	0	0	29539
228	2394	1228402	182965	13864	524449	186261	0	41206
229	2399	0	0	0	0	0	0	29539
230	2400	0	0	0	0	0	0	26827
231	2419	328468	32929	1874	66810	14389	0	26827
232	2429	577551	117539	62203	0	0	0	29539
233	2430	6501134	6661361	215084	344970	122518	0	41206
234	2445	415461	68897	3285	800230	172344	0	33782
235	2447	0	1000	0	0	0	0	29539
236	2450	1160796	1420471	31753	691866	171958	0	41206
237	2461	356565	63076	2973	15446	3327	0	33782
238	2471	0	0	0	0	0	0	41206
239	2474	740217	426664	28735	0	0	0	26827
240	2481	1068738	320795	17744	930580	231288	0	51259
241	2527	870231	417182	56775	329925	117175	0	51259
242	2528	1614132	1128181	57991	363445	129080	0	51259
243	2531	521479	190457	3733	0	0	0	26827
244	2533	366452	54573	9703	468972	101002	0	26827
245	2536	0	0	0	0	0	0	29539

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COST
246	2537	328468	32169	723	53411	11503	0	26827
247	2541	1718347	2295209	31514	465250	100200	0	29539
248	2551	0	0	0	0	0	0	26827
249	2556	0	0	0	0	0	0	26827
250	2573	1207405	376056	23701	407559	87775	0	29539
251	2590	858178	76221	12516	1861	401	0	29539
252	2592	422449	70859	3394	848616	182765	0	26827
253	2606	0	0	0	0	0	4453	29539
254	2626	0	0	0	0	0	0	29539
255	2631	1268164	2667176	37870	289758	62405	0	41206
256	2633	672524	139875	26412	398549	141547	0	41206
257	2660	12586	18853	6437	0	0	178120	26827
258	2668	0	0	0	0	0	0	26827
259	2673	818854	84752	12964	4094	882	0	29539
260	2678	339927	45444	2365	282872	60922	0	26827
261	2680	1018611	490372	26144	11166	2405	0	29539
262	2692	0	1000	0	0	0	0	26827
263	2693	0	0	0	0	0	0	29539
264	2695	1257905	1803263	39263	990259	246121	0	41206
265	2701	613699	669010	14248	0	0	0	41206
266	2711	458155	40786	4960	0	0	0	26827
267	2735	15495718	1263917	272135	571430	202947	0	29539
268	2739	117139	87578	8235	0	0	0	51259
269	2763	464278	82458	5650	623084	154862	0	29539
270	2764	506987	94189	18345	796051	197852	0	41206
271	2767	430485	64122	6220	21774	4689	0	29539
272	2770	778726	67022	6555	55830	12024	0	29539
273	2771	458155	40786	8157	0	0	0	33782
274	2781	917047	157462	33873	9119	1964	0	29539
275	2786	591020	73529	9269	35731	7695	0	29539
276	2795	1080229	865104	6742	575544	143047	0	41206
277	2816	1236899	268670	16958	792876	281595	0	41206
278	2818	62529	31909	4280	0	0	0	29539
279	3033	189850	38322	5836	0	0	0	29539
280	4002	0	0	0	0	0	0	29539
281	4010	0	0	0	0	0	0	29539
282	4017	0	0	0	0	0	0	26827
283	4018	992916	238249	41090	27171	5852	0	29539
284	4021	542838	109519	17926	158929	34228	0	26827
285	4037	1137313	745696	38271	72579	15631	0	29539
286	4040	553899	72254	14185	0	0	0	29539
287	4051	332273	41828	1578	215876	46493	0	26827
288	4055	53273	60681	20687	0	0	0	29539
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		319047018	131971874	7254151	57547665	15354179	1566565	9475292

PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
1	2	328468	31298	451	3722	802	0	29539
2	5	454351	32339	7848	0	0	0	26827
3	10	838120	74081	11933	3461	745	0	26827
4	22	1350986	740063	14894	52666	11343	0	26827
5	30	527873	211506	3608	0	0	0	29539
6	33	6310032	1110003	74627	139575	30060	0	41206
7	49	762984	156290	97412	0	0	0	26827
8	51	1326705	968057	62256	116126	25010	0	29539
9	52	859140	76913	9185	4224	910	0	29539
10	58	0	0	0	0	0	0	26827
11	71	0	0	0	0	0	222650	33782
12	72	137176	118699	21329	0	0	0	29539
13	79	533543	47130	50984	0	0	0	33782
14	88	0	0	0	0	0	89060	26827
15	93	159927	34452	1793	0	0	0	29539
16	94	903624	158942	136275	7444	1603	0	26827
17	110	907786	141183	21394	3722	802	0	29539
18	111	0	0	0	0	0	44530	26827
19	119	551358	45497	20278	0	0	0	26827
20	120	853663	77070	4347	9305	2004	0	29539
21	122	685600	58337	82762	0	0	0	29539
22	143	874584	100313	4664	3722	802	0	29539
23	149	980434	229157	35950	14330	3086	0	29539
24	158	0	0	0	0	0	89060	26827
25	161	1771583	2293628	89448	298691	64328	0	29539
26	162	0	0	0	0	0	133590	29539
27	163	957582	218398	34291	11166	2405	0	29539
28	166	97912	254896	14951	0	0	0	29539
29	196	1607634	1771764	78477	227414	48978	0	29539
30	199	583200	1328857	17239	0	0	0	26827
31	203	498503	42932	48063	0	0	0	26827
32	206	685303	51889	20386	0	0	0	26827
33	209	0	0	0	0	0	0	29539
34	212	56599	33901	950	0	0	356240	33782
35	214	1331004	307377	16147	182378	39278	0	29539
36	220	572588	46503	57081	0	0	0	33782
37	221	1357031	151339	11526	133062	28657	0	33782
38	232	489168	103636	7899	0	0	0	29539
39	240	31269428	2487826	362459	213085	45892	0	41206
40	244	0	0	0	0	0	0	29539
41	249	924202	88035	7293	30148	6493	0	26827
42	257	1741164	1576686	130061	74440	16032	0	29539
43	262	893723	129141	118701	2419	521	0	29539
44	266	823404	74097	6493	2419	521	0	26827
45	276	655540	1052470	15244	0	0	0	41206
46	283	6182704	743893	80500	0	0	0	29539
47	285	0	0	0	0	0	8906	26827
48	292	1000599	133114	22335	64018	13788	0	29539
49	293	1442499	2294075	31040	0	0	0	29539

PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING C
50	297	361900	65972	6312	76301	16433	22265	26827
51	299	340166	45542	1843	284733	61322	0	29539
52	302	613750	70848	5085	0	0	0	29539
53	310	722381	64072	13098	0	0	0	26827
54	321	497359	42880	48030	0	0	0	33782
55	326	1004916	266160	32810	19354	4168	0	29539
56	334	859503	74494	4672	1675	361	0	33782
57	348	0	0	0	0	0	0	26827
58	354	1224415	817501	48497	84303	18156	0	26827
59	357	0	0	0	0	0	89060	29539
60	417	0	0	0	0	0	0	26827
61	423	901018	436183	8888	55830	12024	0	29539
62	428	0	0	0	0	0	222650	26827
63	430	11015425	1071365	203165	748510	186036	0	41206
64	433	1113272	465597	16101	46525	10020	0	29539
65	438	654024	88519	4423	0	0	0	26827
66	449	0	0	0	0	0	0	26827
67	451	0	0	0	0	0	44530	26827
68	458	27805712	2569528	1918455	0	0	0	51259
69	468	888651	105285	4889	16377	3527	0	33782
70	492	101464	34628	3376	0	0	102419	29539
71	494	542307	286402	11697	0	0	0	33782
72	508	0	0	0	0	0	89060	29539
73	522	1395176	1156287	66108	120965	26052	0	29539
74	529	454324	11526	2736	0	0	0	26827
75	543	650538	53800	6466	0	0	0	26827
76	544	0	0	0	0	0	22265	26827
77	567	847646	102057	7156	1861	401	0	26827
78	592	728736	64784	16158	0	0	0	33782
79	605	0	0	0	0	0	164761	26827
80	607	1047815	338302	30763	29032	6252	0	29539
81	618	0	0	0	0	0	222650	29539
82	624	9126969	1606568	152704	263145	56673	0	41206
83	658	1127885	102926	25349	50433	10862	0	33782
84	661	889934	126239	6441	1787	385	0	29539
85	667	0	0	0	0	0	13359	29539
86	702	134256	54631	2036	0	0	0	29539
87	706	573612	47481	11810	0	0	0	26827
88	717	422301	43021	11241	0	0	0	26827
89	720	460286	45359	3062	0	0	0	29539
90	722	1610575	4789469	35742	472694	101803	0	41206
91	724	541598	45090	10571	0	0	0	26827
92	743	892807	162068	7421	7816	1683	0	29539
93	749	914467	82156	5281	26426	5691	0	26827
94	768	882084	120627	26562	1489	321	0	29539
95	771	686809	590259	40983	61599	13266	0	29539
96	777	0	0	0	0	0	44530	29539
97	791	567803	46241	9656	0	0	0	26827
98	796	0	0	0	0	0	133590	26827

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99	797	917763	150943	11227	4839	1042	0	29539
100	814	7518560	1191471	52582	604877	150337	0	41206
101	830	30606	32470	5089	0	0	142496	33782
102	845	408855	226882	6529	20657	4449	0	29539
103	846	0	0	0	0	0	133590	26827
104	862	1309815	1046843	60162	111697	24056	0	26827
105	874	866397	335120	21295	478277	103006	0	26827
106	880	0	0	0	0	0	26718	29539
107	887	1188068	288290	9275	198755	42805	0	29539
108	905	533766	83893	10340	0	0	0	26827
109	912	0	0	0	0	0	129137	26827
110	917	328468	31351	2095	33498	7214	0	29539
111	929	487756	42765	47600	0	0	0	26827
112	931	0	0	0	0	0	218197	26827
113	932	0	0	0	0	0	4453	29539
114	944	35037	32470	3108	0	0	200385	33782
115	958	125548	33410	5701	0	0	0	29539
116	975	650933	54663	4596	0	0	0	33782
117	976	764737	157678	10077	0	0	0	26827
118	987	64292	34628	1056	0	0	400770	26827
119	988	0	0	0	0	0	178120	26827
120	992	571672	56046	4474	0	0	0	29539
121	997	887194	77032	13382	4653	1002	0	29539
122	1006	405203	110856	5463	3722	802	0	26827
123	1011	333002	42241	6053	223320	48096	0	29539
124	1018	1035194	148806	8063	88584	19078	0	29539
125	1026	0	0	0	0	0	222650	29539
126	1047	783628	137673	22917	0	0	0	33782
127	1052	950444	89666	4147	45408	9780	0	26827
128	1053	902643	86663	1399	6588	1419	0	33782
129	1057	37316	32901	735	0	0	89060	33782
130	1064	0	0	0	0	0	66795	29539
131	1069	422716	70934	4781	850477	183166	0	29539
132	1076	0	0	0	0	0	62342	26827
133	1083	838784	74097	8802	3536	762	0	26827
134	1085	48380	32901	3410	0	0	267180	33782
135	1086	694350	109625	80194	0	0	0	26827
136	1091	1404174	1176775	40951	145158	31262	0	29539
137	1094	507293	1074692	49185	0	0	0	29539
138	1107	457746	39842	2167	0	0	8906	26827
139	1117	519262	47679	1625	0	0	0	26827
140	1126	1462609	2365012	61950	0	0	0	29539
141	1162	475122	126133	8948	0	0	0	26827
142	1163	1140424	114112	19813	9863	2124	0	29539
143	1172	1251348	210464	48045	0	0	0	26827
144	1173	60899	34628	12704	0	0	223986	33782
145	1175	0	0	0	0	0	178120	26827
146	1181	638757	471268	38306	46711	10060	0	29539
147	1188	792566	84182	7428	26054	5611	0	29539

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148	1191	987471	229310	9627	14516	3126	0	29539
149	1194	500571	42770	11226	0	0	51210	33782
150	1195	49374	32470	1605	0	0	0	26827
151	1197	896666	76291	10120	3908	842	0	26827
152	1202	680717	59792	20126	0	0	0	26827
153	1219	1372926	4807680	86775	0	0	0	26827
154	1220	504651	44257	2996	0	0	0	33782
155	1223	382384	63768	1785	4839	1042	0	29539
156	1224	727383	1858099	15271	0	0	0	26827
157	1234	549632	50412	9099	0	0	0	33782
158	1236	1149538	106808	26833	57133	12305	0	33782
159	1237	536188	47595	51292	0	0	0	29539
160	1249	1029111	112348	20143	24565	5291	0	33782
161	1253	454324	15794	8460	0	0	0	29539
162	1255	454719	27484	2124	0	0	0	29539
163	1264	893723	129141	27681	2419	521	0	29539
164	1277	1058751	89923	7695	24193	5210	0	29539
165	1310	1557381	13052723	21744	148880	32064	0	41206
166	1313	35416	32901	826	0	0	115778	33782
167	1314	29242	32470	1064	0	0	0	26827
168	1320	547807	45285	4574	0	0	48983	26827
169	1322	990835	97162	19664	23263	5010	0	26827
170	1326	572056	43908	3477	0	0	0	33782
171	1351	999063	189245	12922	7816	1683	0	29539
172	1352	35416	32901	3108	0	0	115778	33782
173	1356	915860	148951	29722	3908	842	0	29539
174	1357	520184	44196	8682	0	0	0	33782
175	1361	1344159	1013886	21708	122454	26373	0	29539
176	1371	0	0	0	0	0	222650	26827
177	1386	0	0	0	0	0	44530	26827
178	1426	709883	113722	26766	174190	37515	0	29539
179	1432	1071388	95263	25879	65879	14188	0	26827
180	1433	0	0	0	0	0	14250	29539
181	1437	1096862	159394	10922	0	0	0	29539
182	1450	57955	34628	5609	0	0	115778	26827
183	1478	891043	127076	10255	2233	481	0	29539
184	1504	1016525	94160	7320	29776	6413	0	26827
185	1507	853252	208976	21963	0	0	0	33782
186	1528	533208	44935	11618	0	0	0	26827
187	1534	615016	48592	5264	0	0	0	26827
188	1535	0	0	0	0	0	8906	26827
189	1539	1185162	221174	35193	253468	54589	0	29539
190	1548	0	0	0	0	0	75701	29539
191	1556	454479	34298	2736	0	0	0	29539
192	1560	893723	129141	24438	2419	521	0	29539
193	1562	795401	95553	3438	136970	29499	0	29539
194	1564	0	0	0	0	0	75701	29539
195	1566	0	0	0	0	0	44530	29539
196	1575	28208	32470	3108	0	0	262727	26827

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197	1595	601768	65959	6967	0	0	0	29539
198	1601	47664	25803	2420	0	0	0	29539
199	1608	1057652	356104	14576	31451	6774	0	29539
200	1621	784293	69261	11491	93050	20040	0	29539
201	1622	1064996	92946	17705	33312	7174	0	33782
202	1628	919622	165423	131776	5583	1202	0	29539
203	1645	947272	102996	13371	6700	1443	0	29539
204	1653	657531	1074092	15332	0	0	0	41206
205	1657	7257460	798636	34795	546210	135756	0	41206
206	1659	1183942	620102	52451	67740	14589	0	29539
207	1666	1027171	302448	171721	24193	5210	0	29539
208	1667	1623082	256207	72236	304274	65531	0	26827
209	1706	6097260	1137104	33346	0	0	0	41206
210	1716	1121608	483178	47680	48944	10541	0	29539
211	1718	0	0	0	0	0	133590	29539
212	1740	641504	132585	23290	722068	155510	0	26827
213	1742	923109	95203	70248	44664	9619	0	29539
214	1743	887664	100758	12901	6532	1407	0	26827
215	1744	893723	129141	27681	2419	521	0	29539
216	1748	2257611	7860591	98815	660655	142284	0	29539
217	1751	365591	63768	3387	1303	281	222650	26827
218	1764	1043761	95435	8593	28473	6132	0	33782
219	1773	580822	47034	5120	0	0	0	26827
220	1788	634649	62389	16553	0	0	0	29539
221	1793	888334	124547	125773	19354	4168	0	29539
222	1797	0	0	0	0	0	0	29539
223	1801	782792	42739	3270	5397	1162	0	29539
224	1805	717057	123492	17623	0	0	0	26827
225	1808	0	0	0	0	0	155855	26827
226	1812	0	0	0	0	0	89060	33782
227	1826	1077619	446297	16555	37220	8016	0	29539
228	1832	518839	43496	8491	0	0	0	33782
229	1833	1220165	132986	16193	100494	21643	0	29539
230	1838	0	0	0	0	0	129137	29539
231	1843	0	0	0	0	0	44530	26827
232	1848	43397	26019	289	0	0	396317	29539
233	1853	26285652	2313798	438329	748004	185910	0	41206
234	1861	375681	57177	3426	40384	8697	0	29539
235	1876	1025204	299180	13649	23635	5090	0	29539
236	1887	0	0	0	0	0	178120	29539
237	1888	0	0	0	0	0	71248	29539
238	1891	892291	291299	8488	0	0	0	26827
239	1894	988521	241087	38836	16005	3447	0	29539
240	1899	1185438	123022	30416	89328	19238	0	26827
241	1904	11403060	2693218	205772	273759	97227	0	41206
242	1924	459292	43282	2798	0	0	0	29539
243	1931	938369	77576	68908	8188	1764	0	26827
244	1936	578284	485403	34655	24379	5250	0	29539
245	1945	454324	17894	8460	0	0	0	26827

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246	1948	455222	39756	4957	0	0	0	26827
247	1970	454324	12406	2124	0	0	0	26827
248	1971	900065	85649	3751	9491	2044	0	29539
249	1974	96938	32722	4413	0	0	0	29539
250	1988	0	0	0	0	0	178120	26827
251	1993	633527	52282	6119	0	0	111325	26827
252	2001	454324	15971	3600	0	0	0	26827
253	2004	702369	51581	81880	0	0	0	29539
254	2007	942638	178678	34348	8188	1764	0	26827
255	2018	1209073	2468986	18921	297760	64128	0	26827
256	2022	0	0	0	0	0	31171	26827
257	2033	0	0	0	0	0	84607	33782
258	2037	892112	75163	59499	4094	882	0	33782
259	2050	0	0	0	0	0	222650	26827
260	2057	454324	29682	7056	0	0	0	33782
261	2070	2081896	3999167	104847	446640	96192	0	29539
262	2075	793256	85650	10493	36922	7952	0	29539
263	2080	328468	32940	3087	66996	14429	0	29539
264	2084	645715	65109	69176	0	0	0	33782
265	2093	1214161	546905	34381	232625	50100	0	29539
266	2108	0	0	0	0	0	0	26827
267	2117	983374	107006	20500	65135	14028	0	29539
268	2123	340647	45736	1856	288455	62124	0	26827
269	2129	1025204	299180	39870	23635	5090	0	29539
270	2147	0	0	0	0	0	178120	26827
271	2176	983822	85682	6573	21588	4649	0	29539
272	2177	742090	2351856	19326	0	0	0	41206
273	2184	726024	82729	7157	0	0	0	29539
274	2191	58990	32901	1357	0	0	0	29539
275	2214	0	0	0	0	0	138043	29539
276	2232	1155073	397803	21716	26054	5611	0	26827
277	2241	2182954	531323	596447	660655	142284	0	29539
278	2243	2400156	4710827	42146	524802	113026	0	29539
279	2250	872081	74529	7227	2419	521	0	33782
280	2253	0	0	0	0	0	222650	26827
281	2259	917285	176555	34854	9305	2004	0	26827
282	2261	1336228	1121406	23085	120593	25972	0	29539
283	2262	0	0	0	0	0	44530	29539
284	2288	510923	43477	10212	0	0	111325	29539
285	2293	595933	49305	61919	0	0	0	26827
286	2300	1957070	519881	38961	649489	139879	0	26827
287	2311	882117	77343	58940	13827	2978	0	26827
288	2318	894692	75354	5230	4280	922	0	33782
289	2341	1381989	337211	46828	277289	59719	0	33782
290	2346	577963	113686	7760	286771	101849	0	41206
291	2348	544620	328371	31732	29032	6252	0	29539
292	2350	924912	186944	12547	10422	2244	0	26827
293	2359	484162	42765	6750	0	0	0	26827
294	2402	0	0	0	0	0	35624	29539

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295	2411	402421	65201	11567	710902	153106	0	29539
296	2426	0	0	0	0	0	0	29539
297	2432	121867	341512	26581	0	0	0	29539
298	2436	703983	148658	26272	437085	155233	0	29539
299	2442	834882	98240	18076	1563	337	0	29539
300	2459	953218	82162	73814	14888	3206	0	29539
301	2462	789713	101712	4355	120965	26052	0	33782
302	2465	1023252	295822	10553	23263	5010	0	29539
303	2469	832561	74063	4027	2605	561	0	26827
304	2485	19728758	1579796	317723	452223	97394	0	41206
305	2487	1247707	878249	8252	91561	19719	0	33782
306	2495	1099477	223216	26593	78162	16834	0	29539
307	2498	951319	78222	14867	9863	2124	0	26827
308	2501	952350	80454	6425	14814	3190	8906	26827
309	2507	0	0	0	0	0	0	26827
310	2517	964664	93303	13581	54527	11743	0	26827
311	2521	0	0	0	0	0	142496	26827
312	2524	883305	74849	4402	3350	721	0	33782
313	2539	1190941	833188	52053	60669	13066	0	26827
314	2548	1168425	585208	37695	62902	13547	0	29539
315	2565	1777269	2550851	86293	288455	62124	0	26827
316	2571	0	0	0	0	0	222650	29539
317	2578	0	0	0	0	0	0	29539
318	2581	0	0	0	0	0	4453	26827
319	2608	0	0	0	0	0	89060	33782
320	2609	328468	32496	988	59347	12782	0	29539
321	2634	187711	242227	10460	0	0	0	26827
322	2635	6605815	785653	59184	139575	30060	0	29539
323	2636	782792	44626	9033	2978	641	0	29539
324	2641	664770	93636	6419	0	0	0	29539
325	2642	0	0	0	0	0	28499	26827
326	2646	1394702	169266	34517	3722	802	0	29539
327	2647	0	0	0	0	0	0	29539
328	2666	518839	42765	3064	0	0	0	33782
329	2677	1309025	922324	16233	109799	23647	0	29539
330	2679	328468	36211	4277	120034	25852	0	29539
331	2685	505281	143156	6960	0	0	0	29539
332	2699	39243	73800	6260	0	0	0	29539
333	2714	847479	76221	11418	1303	281	0	29539
334	2736	781792	171741	8944	0	0	0	29539
335	2741	968633	101640	19370	55458	11944	0	26827
336	2748	1194885	140087	13793	0	0	0	29539
337	2756	9842187	1882475	185390	535084	132991	0	41206
338	2776	1022687	212187	36615	10254	2208	0	29539
339	2779	485880	96366	8849	0	0	0	29539
340	2793	843693	122221	11093	0	0	0	26827
341	2794	4171026	838656	76755	0	0	0	41206
342	2796	324147	39903	5609	0	0	0	26827
343	2805	0	0	0	0	0	0	29539

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344	2810	0	0	0	0	0	218197	26827
345	2814	0	0	0	0	0	89060	33782
346	4001	990103	290689	34197	22016	4741	0	33782
347	4003	1261967	140177	42542	119104	25651	0	29539
348	4006	993010	247810	60731	16935	3647	0	29539
349	4007	908142	100162	19288	0	0	0	29539
350	4008	1149492	130784	129546	55830	12024	0	29539
351	4009	0	0	0	0	0	89060	29539
352	4014	361861	69268	1176	1210	261	0	29539
353	4022	61007	32470	3464	0	0	0	29539
354	4023	738562	2282384	6771	0	0	0	41206
355	4024	398832	65926	1240	1117	240	178120	26827
356	4026	1152601	550172	50023	58063	12505	0	29539
357	4027	1210395	144097	35244	76673	16513	0	29539
358	4032	887229	130753	29243	2233	481	0	29539
359	4042	0	0	0	0	0	0	26827
360	4043	328468	34584	2744	93794	20200	0	29539
361	4044	1537378	1758984	19641	191869	41322	0	29539
362	4046	0	0	0	0	0	44530	33782
363	4047	554045	96814	2982	16749	3607	0	29539
364	4048	0	0	0	0	0	24046	26827
365	4050	838784	74097	2826	3536	762	0	26827
366	4052	0	0	0	0	0	133590	26827
367	4057	923985	76960	15243	6588	1419	0	26827
368	4064	0	0	0	0	0	22265	29539
369	4066	0	0	0	0	0	93513	29539
370	4070	856557	74494	4242	1563	337	0	33782
371	4072	936540	171437	10905	7258	1563	0	29539
		410771976	132422328	11219132	20247968	4605802	10031719	11068630

PLANT NUMBER	BAT TECHNOLOGY COSTED					
1	MONITORING COSTS ONLY					
12		SS		CN	BP	
15	CP	SS	AC	CN	BP	
33	MONITORING COSTS ONLY					
61	CP	SS		CN	BP	
63	CPU					
76	CP	SS	AC	CN	BP	
83	CP					
87		SS			BP	
101	MONITORING COSTS ONLY					
102	MONITORING COSTS ONLY					
105	CP	SSU	AC	CN	BP	
112						CH
114	CP	SS			BP	
154	CP					
155	CP	SS		CN	BP	
159	MONITORING COSTS ONLY					
177	CP	SS			BP	
180						CH
183		SS			BP	
190	CPU		AC	CN	BP	
205	CP		AC		BP	
225	CP			CN	BP	
227		SS				
250	CP					
254	CP					
259	MONITORING COSTS ONLY					
260	CP	SS		CN	BP	
267	CP	SS		CN	BP	
269					BP	
284	CP				BP	
294	MONITORING COSTS ONLY					
296	CP				BP	
301	CP	SS	AC	CN	BP	
352	CP				BP	
384	CP	SS			BP	
387	CP					
392		SS				
394		SS				
399	CPU					
412		SS			BP	
415	CP	SS			BP	
443	CP	SS	AC	CN		
444					BP	
446	CP	SS			BP	

PLANT NUMBER	BAT TECHNOLOGY COSTED					
447	CP	SS		CN	BP	
451	MONITORING COSTS ONLY					
481		SS		CN		
485	CPU	SS	AC	CN	BP	
486	CP	SS		CN	BP	
488	CP	SS	AC	CN	BP	
500	CP					
502						CH
518	CP	SS	AC	CN	BP	
523				CN		
525	MONITORING COSTS ONLY					
536	CP	SS	AC	CN	BP	
569	MONITORING COSTS ONLY					
580					BP	
602						CH
608		SS				
611	CP	SS	AC	CN	BP	
614	CP					
633	CP	SS			BP	
657	CP				BP	
659		SS				
662	CP	SS			BP	
663	CP	SS				
664	CP	SS				
669						CH
682	CP					
683	CP	SS			BP	
695	CPU				BP	
709						CH
727	CP					
741	MONITORING COSTS ONLY					
758	MONITORING COSTS ONLY					
775	CPU	SS				
802	CP					
811	MONITORING COSTS ONLY					
814	CP	SS		CN	BP	
819	CP	SS	AC	CN	BP	
825	CP	SS				
844	MONITORING COSTS ONLY					
851		SS		CN	BP	
859	MONITORING COSTS ONLY					
866	MONITORING COSTS ONLY					
871	CPU	SS				
876		SS				
877	CP	SS	AC	CN	BP	

PLANT NUMBER	BAT TECHNOLOGY COSTED				
883	MONITORING COSTS ONLY				
888	MONITORING COSTS ONLY				
908	CP				
909	CP	SS		BP	
913	CP	SSU		BP	
938			CN		
942	MONITORING COSTS ONLY				
948	CP	SS		BP	
956					CH
962	CP	SS			
970	CP				
973	CP		CN	BP	
984	CP				
990	CP				
991					CH
992		SS			
1012	CP				
1020	CP				
1033					CH
1038	CP			BP	
1059	CPU				
1061	CP		CN		
1062	MONITORING COSTS ONLY				
1067	CP			BP	
1133				BP	
1137	CP			BP	
1139		SS		BP	
1148	CP				
1149		SS			
1157					CH
1203	CP				
1241	CP			BP	
1249	CP	SS	CN	BP	
1267	MONITORING COSTS ONLY				
1299	MONITORING COSTS ONLY				
1319	MONITORING COSTS ONLY				
1323		SS	CN	BP	
1327	CP	SS	CN	BP	
1340	CP	SS		BP	
1343	CP	SS	AC		
1348	CPU				
1349	MONITORING COSTS ONLY				
1389	CP				
1407	CP	SS			
1409	CP	SS		BP	

PLANT NUMBER	BAT TECHNOLOGY COSTED					
1414		SS				
1438	CP					
1439	CP	SS	AC			
1446			AC			
1464		SS				
1494	CP	SS	AC			
1520	CP	SS	AC	CN	BP	
1522	CPU	SS				
1524	CP					
1532	CP				BP	
1569	CP	SS			BP	
1572	CPU					
1593	MONITORING COSTS ONLY					
1609	CP	SS				
1616	CP					
1617		SS				
1618		SS			BP	
1624	CP	SS				
1643	MONITORING COSTS ONLY					
1647	CP	SS				
1650	CP	SS		CN	BP	
1656	MONITORING COSTS ONLY					
1670						CH
1684					BP	CH
1688	CP					
1695	CP	SS			BP	
1698		SS				
1714	CP	SS				
1717	CP					
1724	CP	SS	AC		BP	
1753	CP					
1766	CP					
1769	CPU	SS	AC			
1774	CP					
1785	CPU	SSU			BP	
1802	CP					
1839	CP	SS				
1869		SS				
1877	CP	SS	AC	CN	BP	
1881	CP					
1890	CP			CN	BP	
1905	CP				BP	
1910	CP		AC	CN	BP	
1911	CP				BP	
1928	CP	SS			BP	

PLANT NUMBER	BAT TECHNOLOGY COSTED					
1937	CP	SS	AC	CN	BP	
1943	MONITORING COSTS ONLY					
1973	CP					
1977	MONITORING COSTS ONLY					
1986	MONITORING COSTS ONLY					
2009		SS			BP	
2020	MONITORING COSTS ONLY					
2026		SS				
2030	CPU	SS	AC	CN	BP	
2047	CP					
2049	CP			CN		
2055	MONITORING COSTS ONLY					
2062	CP	SS				
2073	CP	SS			BP	
2090				CN		
2110	CP				BP	
2148	CP			CN		
2181	MONITORING COSTS ONLY					
2193						CH
2198	CP					
2206		SS			BP	
2221	CP	SS				
2222	CP					
2227	CP	SS				
2228	CP	SS				
2236	CP				BP	
2242	CP	SS				
2254	CP				BP	
2268	CP	SS	AC			
2272	CP	SS			BP	
2281	CP		AC		BP	
2292	CPU	SS	AC	CN	BP	
2296	MONITORING COSTS ONLY					
2307	MONITORING COSTS ONLY					
2313	MONITORING COSTS ONLY					
2315	CP			CN		
2316	CP	SS	AC	CN	BP	
2322	CP	SS	AC	CN	BP	
2328	MONITORING COSTS ONLY					
2345	CP					
2353	MONITORING COSTS ONLY					
2360	CP					
2364	CP					
2365		SS			BP	
2368	CP					

PLANT NUMBER	BAT TECHNOLOGY COSTED					
2376		SS				
2390	MONITORING COSTS ONLY					
2394	CP	SS				
2399	MONITORING COSTS ONLY					
2400	MONITORING COSTS ONLY					
2419	CP					
2429	CPU	SS	AC	CN	BP	
2430	CP	SS			BP	
2445	CP					
2447	CPU					
2450	CP	SS				
2461	CP				BP	
2471	MONITORING COSTS ONLY					
2474	CPU	SS		CN	BP	
2481	CP	SS				
2527	CP			CN		
2528	CP	SS			BP	
2531		SS				
2533	CP					
2536	MONITORING COSTS ONLY					
2537	CP					
2541	CP	SS	AC	CN		
2551	MONITORING COSTS ONLY					
2556	MONITORING COSTS ONLY					
2573	CP	SS		CN	BP	
2590	CP	SS			BP	
2592	CP					
2606						CH
2626	MONITORING COSTS ONLY					
2631	CP	SS			BP	
2633	CP					
2660			AC			CH
2668	MONITORING COSTS ONLY					
2673	CP	SS			BP	
2678	CP					
2680	CP	SS	AC			
2692	CPU					
2693	MONITORING COSTS ONLY					
2695	CP	SS				
2701		SS				
2711		SS				
2735	CP	SS			BP	
2739	CPU			CN		
2763	CP					
2764	CP					

PLANT NUMBER	BAT TECHNOLOGY COSTED				
2767	CP				BP
2770	CP	SS			
2771		SS			
2781	CP	SS	AC	CN	BP
2786	CP				BP
2795	CP	SS			
2816	CP				BP
2818					BP
3033					BP
4002	MONITORING COSTS ONLY				
4010	MONITORING COSTS ONLY				
4017	MONITORING COSTS ONLY				
4018	CP	SS	AC	CN	BP
4021	CP			CN	BP
4037	CP	SS	AC	CN	BP
4040		SS		CN	BP
4051	CP				
4055			AC		BP

NOTES:

CP - CHEMICAL PRECIPITATION
CPU - CHEMICAL PRECIPITATION UPGRADES
SS - STEAM STRIPPING
SSU - STEAM STRIPPING UPGRADES
AC - ACTIVATED CARBON
CN - CYANIDE DESTRUCTION
BP - BIOLOGICAL PACKAGE
CH - CONTRACT HAULING

PLANT NUMBER	PSES TECHNOLOGY COSTED					
2	CP					
5		SS				
10	CP	SS			BP	
22	CP	SS	AC		BP	
30		SS				
33	CP		AC		BP	
49		SS				
51	CP	SS	AC	CN	BP	
52	CP	SS			BP	
58	MONITORING COSTS ONLY					
71						CH
72	CPU	SSU	AC	CN	BP	
79		SS			BP	
88						CH
93					BP	
94	CP	SS	AC		BP	
110	CP	SS	AC	CN	BP	
111						CH
119		SS			BP	
120	CP	SS			BP	
122		SS			BP	
143	CP	SS		CN	BP	
149	CP	SS	AC	CN	BP	
158						CH
161	CP	SS	AC	CN	BP	
162						CH
163	CP	SS	AC	CN	BP	
166			AC			
196	CP	SS	AC	CN	BP	
199			AC		BP	
203		SS			BP	
206	CPU	SS			BP	
209	MONITORING COSTS ONLY					
212	CPU				BP	CH
214	CP	SS			BP	
220		SS			BP	
221	CP	SS			BP	
232		SS				
240	CP	SS			BP	
244	MONITORING GOSTS ONLY					
249	CP	SS			BP	
257	CP		AC		BP	
262	CP	SS	AC	CN	BP	
266	CP	SS			BP	
276		SS				
283		SSU			BP	
285						CH
292	CP	SS		CN	BP	
293	CPU	SS	AC	CN	BP	
297	CP				BP	CH

PLANT NUMBER	PSES TECHNOLOGY COSTED					
299	CP					
302		SS			BP	
310		SS			BP	
321		SS			BP	
326	CP	SS	AC	CN	BP	
334	CP	SS			BP	
348	MONITORING COSTS ONLY					
354	CP	SS	AC		BP	
357						CH
417	MONITORING COSTS ONLY					
423	CP	SS				
428						CH
430	CP	SS		CN	BP	
433	CP	SS	AC	CN	BP	
438		SS			BP	
449	MONITORING COSTS ONLY					
451						CH
458		SS		CN	BP	
468	CP	SS		CN	BP	
492					BP	CH
494		SSU			BP	
508						CH
522	CP	SS	AC	CN	BP	
529		SS				
543		SS			BP	
544						CH
567	CP	SS	AC		BP	
592		SS			BP	
605						CH
607	CP	SS	AC	CN	BP	
618						CH
624	CP	SS			BP	
658	CP	SS			BP	
661	CP	SS	AC	CN	BP	
667						CH
702		SSU			BP	
706		SS			BP	
717					BP	
720		SS				
722	CP	SS		CN	BP	
724		SS			BP	
743	CP	SS	AC		BP	
749	CP	SS			BP	
768	CP	SS	AC	CN	BP	
771	CP		AC		BP	
777						CH
791		SS			BP	
796						CH
797	CP	SS	AC	CN	BP	
814	CP	SS		CN	BP	

PLANT NUMBER	PSES TECHNOLOGY COSTED					
830					BP	CH
845	CP		AC			
846						CH
862	CP	SS	AC		BP	
874	CP	SS				
880						CH
887	CP	SS			BP	
905	CPU	SS	AC		BP	
912						CH
917	CP					
929		SS			BP	
931						CH
932						CH
944					BP	CH
958					BP	
975		SS			BP	
976		SS			BP	
987					BP	CH
988						CH
992		SS			BP	
997	CP	SS			BP	
1006	CP		AC		BP	
1011	CP					
1018	CP	SS		CN	BP	
1026						CH
1047		SS			BP	
1052	CP	SS			BP	
1053	CP	SS			BP	
1057					BP	CH
1064						CH
1069	CP					
1076						CH
1083	CP	SS			BP	
1085					BP	CH
1086		SS			BP	
1091	CP	SS	AC	CN	BP	
1094			AC		BP	
1107		SS				CH
1117		SS			BP	
1126	CPU	SS	AC	CN	BP	
1162		SS				
1163	CP	SS		CN	BP	
1172		SS			BP	
1173					BP	CH
1175						CH
1181	CP		AC		BP	
1188	CP	SS				
1191	CP	SS	AC	CN	BP	
1194		SS			BP	CH
1195					BP	

PLANT NUMBER	PSES TECHNOLOGY COSTED					
1197	CP	SS			BP	
1202		SS			BP	
1219			AC		BP	
1220		SS			BP	
1223	CP				BP	
1224			AC		BP	
1234		SS			BP	
1236	CP	SS			BP	
1237		SS			BP	
1249	CP	SS		CN	BP	
1253		SS				
1255		SS				
1264	CP	SS	AC	CN	BP	
1277	CP	SS			BP	
1310	CP	SS			BP	
1313					BP	CH
1314					BP	
1320		SS			BP	CH
1322	CP	SS			BP	
1326		SS			BP	
1351	CP	SS	AC	CN	BP	
1352					BP	CH
1356	CP	SS	AC	CN	BP	
1357	CPU	SS			BP	
1361	CP	SS	AC	CN	BP	
1371						CH
1386						CH
1426	CP			CN	BP	
1432	CP	SS			BP	
1433						CH
1437		SS		CN	BP	
1450					BP	CH
1478	CP	SS	AC	CN	BP	
1504	CP	SS			BP	
1507		SS			BP	
1528		SS			BP	
1534	CPU	SS			BP	
1535						CH
1539	CP	SS			BP	
1548						CH
1556		SS				
1560	CP	SS	AC	CN	BP	
1562	CP	SS				
1564						CH
1566						CH
1575					BP	CH
1595		SS			BP	
1601				CN		
1608	CP	SS	AC	CN	BP	
1621	CP	SS				

PLANT NUMBER	PSES TECHNOLOGY COSTED					
1622	CP	SS			BP	
1628	CP	SS	AC	CN	BP	
1645	CP	SS		CN	BP	
1653		SS				
1657	CP	SSU		CN	BP	
1659	CP	SS	AC	CN	BP	
1666	CP	SS	AC	CN	BP	
1667	CP	SS			BP	
1706		SS			BP	
1716	CP	SS	AC	CN	BP	
1718						CH
1740	CP	SSU			BP	
1742	CP	SS			BP	
1743	CP	SS		CN	BP	
1744	CP	SS	AC	CN	BP	
1748	CP	SS	AC			
1751	CP				BP	CH
1764	CP	SS			BP	
1773		SS			BP	
1788		SS			BP	
1793	CP	SS	AC	CN	BP	
1797	MONITORING COSTS ONLY					
1801	CP	SS				
1805		SS			BP	
1808						CH
1812						CH
1826	CP	SS	AC	CN	BP	
1832		SS			BP	
1833	CP	SS			BP	
1838						CH
1843						CH
1848	CPU			CN		CH
1853	CP	SS		CN	BP	
1861	CP			CN		
1876	CP	SS	AC	CN	BP	
1887						CH
1888						CH
1891		SS			BP	
1894	CP	SS	AC	CN	BP	
1899	CP	SS			BP	
1904	CP	SS			BP	
1924		SS				
1931	CP	SS			BP	
1936	CP		AC		BP	
1945		SS				
1948		SS				
1970		SS				
1971	CP	SS			BP	
1974					BP	
1988						CH

PLANT NUMBER	PSES TECHNOLOGY COSTED					
1993		SS			BP	CH
2001		SS				
2004		SS			BP	
2007	CP	SS	AC	CN	BP	
2018	CP		AC		BP	
2022						CH
2033						CH
2037	CP	SS			BP	
2050						CH
2057		SS				
2070	CP	SS	AC	CN	BP	
2075	CP	SS				
2080	CP					
2084		SS			BP	
2093	CP	SS			BP	
2108	MONITORING COSTS ONLY					
2117	CP	SS			BP	
2123	CP					
2129	CP	SS	AC	CN	BP	
2147						CH
2176	CP	SS			BP	
2177		SS				
2184		SS		CN	BP	
2191					BP	
2214						CH
2232	CP	SS		CN	BP	
2241	CP	SS			BP	
2243	CP	SS	AC	CN	BP	
2250	CP	SS			BP	
2253						CH
2259	CP	SS	AC		BP	
2261	CP	SS	AC		BP	
2262						CH
2288		SS			BP	CH
2293		SS			BP	
2300	CP	SS			BP	
2311	CP	SS			BP	
2318	CP	SS			BP	
2341	CP	SS			BP	
2346	CP					
2348	CP		AC		BP	
2350	CP	SS	AC		BP	
2359		SS			BP	
2402						CH
2411	CP					
2426	MONITORING COSTS ONLY					
2432			AC			
2436	CP					
2442	CP	SS	AC		BP	
2459	CP	SS			BP	

PLANT NUMBER	PSES TECHNOLOGY COSTED					
2462	CP	SS				
2465	CP	SS	AC	CN	BP	
2469	CP	SS			BP	
2485	CP	SS			BP	
2487	CP	SS	AC		BP	
2495	CP	SS			BP	
2498	CP	SS			BP	
2501	CP	SS			BP	CH
2507	MONITORING COSTS ONLY					
2517	CP	SS			BP	
2521						CH
2524	CP	SS			BP	
2539	CP	SS	AC		BP	
2548	CP	SS	AC	CN	BP	
2565	CP	SS	AC		BP	
2571						CH
2578	MONITORING COSTS ONLY					
2581						CH
2608						CH
2609	CP					
2634			AC		BP	
2635	CP	SSU			BP	
2636	CP	SS				
2641		SS			BP	
2642						CH
2646	CP	SS			BP	
2647	MONITORING COSTS ONLY					
2666		SS			BP	
2677	CP	SS	AC	CN	BP	
2679	CP					
2685		SS				
2699			AC			
2714	CP	SS			BP	
2736		SS			BP	
2741	CP	SS			BP	
2748		SS			BP	
2756	CP	SS	AC	CN	BP	
2776	CP	SS	AC	CN	BP	
2779		SS				
2793		SS			BP	
2794			AC			
2796					BP	
2805	MONITORING COSTS ONLY					
2810						CH
2814						CH
4001	CP	SS	AC		BP	
4003	CP	SS			BP	
4006	CP	SS	AC	CN	BP	
4007		SS			BP	
4008	CP	SS		CN	BP	

PLANT NUMBER	PSES TECHNOLOGY COSTED					
4009						CH
4014	CP	SSU			BP	
4022					BP	
4023		SS				
4024	CP				BP	CH
4026	CP	SS	AC	CN	BP	
4027	CP	SS		CN	BP	
4032	CP	SS	AC	CN	BP	
4042	MONITORING COSTS ONLY					
4043	CP					
4044	CP	SS	AC	CN	BP	
4046						CH
4047	CP	SSU		CN	BP	
4048						CH
4050	CP	SS			BP	
4052						CH
4057	CP	SS			BP	
4064						CH
4066						CH
4070	CP	SS			BP	
4072	CP	SS	AC	CN	BP	

NOTES:

CP - CHEMICAL PRECIPITATION
CPU - CHEMICAL PRECIPITATION UPGRADES
SS - STEAM STRIPPING
SSU - STEAM STRIPPING UPGRADES
AC - ACTIVATED CARBON
CN - CYANIDE DESTRUCTION
BP - BIOLOGICAL PACKAGE
CH - CONTRACT HAULING

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 22 1992

OFFICE OF WATER

MEMORANDUM

SUBJECT: Erratum for the Record of the Proposed Amendments to the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category Regulation

FROM: George M. Jett
Project Officer
Engineering & Analysis Division (WH-552)

TO: The Record

Attached is an erratum for the record of the proposed amendments for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Point Source Category regulation that were proposed in the Federal Register on December 6, 1991 (56 FR 63897).

In reviewing the proposed regulation support document ("Supplement to the OCPSF Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category", EPA 440/1-91/009a, pages 01877-02015, Vol. III of the record), EPA has found several errors that may affect a reviewer's ability to adequately evaluate supporting information to the December 6, 1991 proposal.

The attached erratum corrects these errors.

00207F

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U.S. Environmental Protection Agency
Industrial Technology Division
Washington, D.C. 20460

Supplement to the OCPSF Development Document

for

Effluent Limitations Guidelines New Source Performance Standards and Pretreatment Standards for the Organic Chemicals and the Plastics and Synthetic Fibers Point Source Category

ERRATUM

Dear Readers,

The following errors were made in the Supplement to the OCPSF Development Document. Please correct the errors in your copies as per the corrections indicated.

1. Section I. Page I-3

In the fourth paragraph, on line 3, the word 'change' should be changed to 'changes'.

2. Section I. Page I-4

a) In the second paragraph, line 7 should read as follows: "...the costs to publicly-owned treatment works (POTWs) for similar levels of reduction in their discharge of these..."

b) In the fifth paragraph, on line 3, 'Clean Water At' should be changed to 'Clean Water Act'

3. Section I. Page I-5

In the first paragraph, line 1 should read as follows: "...of determining whether to promulgate national category-wide PSES, EPA...".

4. Section I. C-1. Page I-6

a) In the fourth paragraph, line 9 should read as follows: "...regulation initially controlled the discharge of up to 63 toxic pollutants and 3 conventional..."

b) In the fourth paragraph, on line 12, 'wastestreams' should be changed to 'waste streams'

062017

5. Section I. C-3. Page I-8

a) In the fourth paragraph, on line 5, 'wastestreams' should be changed to 'waste streams'.

b) In the fifth paragraph, on lines 6 and 7, 'wastestreams' should be changed to 'waste streams'.

6. Section II. Page II-1

In the second paragraph, on lines 5 and 6, the word 'Subcategory' should be changed to 'Subpart'.

7. Section II. Page II-4

a) In the first paragraph, line 1 should read as follows: "EPA has proposed unchanged the subcategory approach adopted in the promulgated guideline."

b) In the third paragraph, on line 7, the word 'are' should be changed to 'were'.

c) In the third paragraph, on line 8, the word 'notice' should be changed to 'Notice'.

8. Section II. Page II-5

a) In the first paragraph, on line 2, the word 'are' should be changed to 'were'.

b) In the first paragraph, line 3 should read as follows: "...limits could not be met by such plants now, nor could they be met at a reasonable..."

9. Section II. Page II-6

a) In the first paragraph, on line 6, the numbers '118-25' should be changed to '118-125'.

b) In the first paragraph, line 8 should read as follows: "...concentration (biodegradable food), biological systems will not operate..."

10. Section II. Page II-8

In the first paragraph, line 1 should read as follows: "...have end-of-pipe biological treatment in-place. In addition, EPA was able to..."

11. Section II. Page II-10

a) In the third paragraph, on line 8, the number '23' should be changed to '22'.

002018

b) In the fourth paragraph, on line 1, the number '304' should be changed to '303'. This is because Plant 2660 (identified in Table VII-42, page VII-132, 1987 Development Document) was incorrectly identified as a direct discharge OCPSF facility. Additional investigations revealed that Plant 2660 does not discharge any OCPSF process wastewater and is in fact, a zero discharge plant.

c) In the fourth paragraph, on line 3, '84 plants' should be changed to '83 plants'. This is because Plant 2660 (identified in Table VII-42, page VII-132, 1987 Development Document) was incorrectly identified as a direct discharge OCPSF facility without end-of-pipe biological treatment. Additional investigations revealed that Plant 2660 does not discharge any OCPSF process wastewater and is in fact, a zero discharge plant.

12. Section II, Page II-11

a) In the first paragraph, on line 2, '23 plants' should be changed to '22 plants'

b) In the third paragraph, line 13 should read as follows: "...million, respectively). Thus, EPA believes that rational economic decision..."

13. Section II, C-2, Page II-12

In Table II-3, Plant Numbers 709, 991, and 2606 have been incorrectly included. The correct plant numbers are 611 and 664. Hence, Table II-3 on page II-12 in your copy should be replaced by page II-12 provided in this package.

14. Section II, C-2, Page II-15

a) In the second paragraph, on line 20, '23' should be changed to '22'

b) Corrections indicated in Item 13 changed the loading calculations in Section II. Thus, in the second paragraph, line 23, '2,995 lbs/yr' should be changed to '2,996 lbs/yr'

15. Section II, C-2, Page II-18, 19 and 20

Corrections indicated in Item 13 changed additional loading calculations in Section II. Thus, Table II-7 contained on pages II-18 and 19 in your copy should be replaced by new pages II-18 and 19 provided in this package. Similarly, Table II-8 contained on page II-20 should be replaced by new page II-20 provided in this package.

16. Section II, Page II-21

a) Corrections indicated in Item 11(c) changed the number of plants without end-of-pipe biological treatment system, and hence the

002019

loading calculations in Section II. Thus, the following changes should be made in the second paragraph:

(i) On lines 1 and 4, '84 plants' should be changed to '83 plants'

(ii) On line 6, '1,888 lbs/yr should be changed to '1,931 lbs/yr'

(iii) On line 10, '4,181 lbs/yr should be changed to '3,547 lbs/yr'

(iv) On line 13, '6,069 lbs/yr should be changed to '5,478 lbs/yr' and '1,202 pounds' should be changed to '1,229 pounds'

b) In the third paragraph, line 5 should read as follows: "...availability of Subpart J."

17. Section II, Pages II-22, 23, and 24

Corrections indicated in Item 11(c) changed additional loading calculations in Section II. Thus, Table II-9 contained on pages II-22 and 23 in your copy should be replaced by new pages II-22 and 23 provided in this package. Similarly, Table II-10 contained on page II-24 should be replaced by new page II-24 provided in this package.

18. Section II, Page II-25

In the first paragraph, line 19 should read as follows: "...establish a BOD_5 floor would result in plants making undesirable treatment..."

19. Section II, Page II-26

In the first paragraph, on lines 9 and 10, the word 'control' should be changed to 'controls'

20. Section III, A, Page III-1

a) In the first paragraph, on line 2, '23 plants' should be changed to '22 plants'

b) In the fourth paragraph, line 7 should read as follows: "...Review Brief, pp. 8-11). The Court concluded that detention time was a key..."

21. Section III, A, Page III-2

a) In the second paragraph, line 1 should read as follows: "The decision remanded limitations for 19 of the 20 BAT Subpart J pollutants."

b) In the second paragraph, line 6 should read as follows: "...were based on the remanded BAT Subpart J limits."

002020

22. Section III. A. Page III-3

In the fourth paragraph, line 3 should read as follows: "...estimates associated with these chemical precipitation upgrades are presented in..."

23. Section III. B-1. Page III-6

In the first paragraph, line 6 should read as follows: "...are also shown in Table III-2."

24. Section III. B-1. Page III-8

a) In the first paragraph, lines 1-4 should read as follows: "However, in the case of other plants such as plant 293, cost estimates at promulgation (1987 Dev. Doc. pp. VIII-B46) were based on steam stripping and in-plant biological but should have also included activated carbon and cyanide destruction (1987 Dev. Doc. pp. VIII-B68)."

b) In the second paragraph, line 9 should read as follows: "...MGD. The flow corrections for all 14 indirect plants are presented in Table..."

25. Section III. B-2. Page III-8

a) In the third paragraph, line 1 should read as follows: "Revised compliance costs for BAT Subpart J direct dischargers and PSES..."

b) In the third paragraph, line 7 should read as follows: "...high phenol raw waste concentrations were identified from the Verification, 5..."

26. Section III. B-1. Page III-9

Based on the correction indicated in Item 24, Table III-4 on page III-9 in your copy should be replaced by page III-9 provided in this package.

27. Section III. B-2. Page III-13. second paragraph

During review of the Supplement to the OCPSF Development Document it was determined that Plant 1293T had been improperly omitted form the detention time analysis for the remaining 18 remanded pollutants. Based on the inclusion of Plant 1293T and its associated detention time, the second paragraph should be replaced by:

"Similar assessments for the remaining 18 remanded pollutants were conducted to determine necessary detention time as a function of reported or modeled raw waste concentrations. Table III-8 presents the analysis of this assessment. Based on the information presented on Table III-8 it was determined that the costing methodology for revised in-plant biological treatment is as follows:

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- For Pollutant #34 (2,4-Dimethylphenol), all BAT Subpart J and PSES plants with raw waste concentrations greater than 10 mg/l will be costed for an in-plant biological treatment system with a detention time of 413 hours; plants with raw waste concentrations above trigger levels but below 10 mg/l will be costed for an in-plant biological treatment system with a detention time of 84 hours.

- For Pollutant #55 (Naphthalene), all BAT Subpart J and PSES plants with raw waste concentrations greater than 3 mg/l will be costed for an in-plant biological treatment system with a detention time of 413 hours; plants with raw waste concentrations above trigger levels but below 3 mg/l will be costed for an in-plant biological treatment system with a detention time of 84 hours.

- For Pollutant #80 (Fluorene), all BAT Subpart J and PSES plants with raw waste concentrations greater than 0.5 mg/l will be costed for an in-plant biological treatment system with a detention time of 413 hours; plants with raw waste concentrations above trigger levels but below 0.5 mg/l will be costed for an in-plant biological treatment system with a detention time of 84 hours.

- For the remaining 15 remanded pollutants (excluding phenol), all BAT Subpart J and PSES plants with raw waste concentrations above trigger levels will be costed for an in-plant biological treatment system with a detention time of 84 hours."

28. <u>Section III. B-2. Page III-13. fourth paragraph</u>

Corrections indicated in Item 27 change the detention time assignment for some BAT Subpart J and PSES plants. Thus, the fourth paragraph (lines 3-6) on page III-13 should be replaced by the following:

"...of compliance for the remanded pollutants as a result of these assessments, 14 BAT Subpart J and 86 PSES plants were assigned 84 hour detention time, 39 PSES plants were assigned a 130 hour detention time and 4 BAT Subpart J and 117 PSES plants were assigned a 413 hour detention time. The..."

29. <u>Section III. B-2. Pages III-14 and 15</u>

Based on the inclusion of Plant 1293T and its associated detention time, Table III-8 on pages III-14 and 15 in your copy should be replaced by pages III-14 and 15 provided in this package.

002022

30. Section III. B-2. Page III-16

In Table III-9, Plant Numbers 412, 446, 1241, 1650, 2206, 536, 1928 have been incorrectly included. These plants are not Subpart J plants. Two BAT Subpart J plants (Plant Numbers 657 and 2030) were incorrectly not included in this Table. Based on this and the corrections indicated in Item 27, Table III-9 on page III-16 in your copy should be replaced by page III-16 provided in this package.

31. Section III. B-3. Page III-30

a) In the first paragraph, line 1 should read as follows: "The Agency then estimated the costs associated with the revised in-plant..."

b) In the first paragraph, line 2 should read as follows: "...biological treatment systems for all BAT Subpart J and PSES plants that were affected by the new..."

32. Section III. B-3. Page III-31

a) In the second paragraph, line 5 should read as follows: "...modeled raw waste concentrations and the revised, higher-detention time, only 25..."

b) In the second paragraph, line 7 should read as follows: "...estimated revised land costs based on the increased detention time."

33. Section III. B-3. Page III-32

In Table III-11 detention time of 24 and 143 hours were incorrectly included. The correct detention times are 84 and 413 hours. Hence, Table III-11 in your copy should be replaced by page III-32 provided in this package.

34. Section IV. Page IV-7

In the second paragraph, line 19 should read as follows: "...treatment/ reconditioning processes are almost never 100 percent efficient."

35. Section IV. Page IV-8

In the fourth paragraph, line 1 should read as follows: "As stated in the above sections, the Fifth Circuit remanded the NSPS and..."

36. Section IV. Page IV-9

a) In the second paragraph, on line 1, '234' should be changed to '235'. This is because Plant 2660 (identified in Table VII-42, Page VII-132, 1987 Development Document) was incorrectly identified as a direct discharge OCPSF facility. Additional investigations revealed that Plant 2660 does not discharge any OCPSF process wastewater and is, in fact, a zero discharge plant.

002023

TABLE II-3

TWENTY-TWO DIRECT DISCHARGE BAT SUBPART J PLANTS

OBS	PLANT NUMBER
1	76
2	105
3	114
4	260
5	373
6	611*
7	657
8	663
9	664*
10	814
11	877
12	913
13	1249
14	1569
15	1618
16	1774
17	1785
18	2030
19	2073
20	2590
21	2735
22	2767

'*' - NOTE: In the previous version of Table II-3, plant numbers 709, 991, and 2606 were incorrectly included under BAT Subpart J plants. These plants use contract hauling as their method of discharge and hence they do not come under BAT Subpart J plants. In addition to this, two BAT Subpart J plants, i.e., plant numbers 611 and 664 were incorrectly excluded from Table II-3. Thus, in this version of Table II-3, plant numbers 709, 991, and 2606 have been deleted and plant numbers 611 and 664 have been added.

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b) In the third paragraph, lines 2 and 3 should read as follows: "...discharge by recycling their wastestreams' because the Agency's 1987 Development Document (Table VII-48 on p. VII-146) did not comprehensively describe the source...".

c) In the third paragraph, on line 9 the word 'wastestreams' should be changed to 'waste streams'.

37. Section IV. Page IV-11

a) Corrections indicated in Item 11(b) changed the total number of plants discharging process wastewater. Thus, in the first paragraph, on line 1, 697 should be changed to 696.

b) In the second paragraph, on line 1, the word 'Database' should be changed to 'database'.

38. Section IV. Table IV-2. Pages IV-12 to IV-18

Corrections were made to Table IV-2 to correct typographical errors. Thus, Table IV-2 contained on pages IV-12 to IV-18 in your copy should be replaced by new pages IV-12 to IV-18 provided in this package.

39. Section IV. Page IV-20

a) In the first paragraph, lines 3 and 4 should read as follows: "...to attempt to develop a technical basis to propose NSPS for zero discharge for some or all of these recycle product/processes out of 25,000 in the OCPSF industry."

b) In the third paragraph, on line 4, 'Nylon 6 caprolactam' should read as 'Nylon 6/caprolactam'

40. Section IV. Page IV-21

In the third paragraph, line 7 should read as follows: "...where most, and perhaps all, of it can be reintroduced as feed to the process. Some...".

41. Appendix III-A. Page III-A1

Based on the corrections indicated in Item 27, the revised in-plant biological cost estimates for the BAT Subpart J and PSES plants have been changed. Hence, Appendix III-A, pages III-A1 through III-A7 in your copy should be replaced by page III-A1 through III-A7 provided in this package.

42. Appendix III-B. Page III-B1

Based on the corrections indicated in Item 27, the revised BAT and PSES Cost Compliance Estimates and Technology Basis have been changed. Hence, Appendix III-B pages III-B1 through III-B29 in your copy should be replaced by pages III-B1 through III-B29 provided in this package.

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TABLE II-7

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J

PLANTS BEYOND BAT SUBPART I LIMITATIONS

FOR 22 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
1	1	7	17598.02	123.48	82.93	82.928	0.000
2	3	8	37864.48	624.59	421.82	421.824	0.000
3	*4°	16	95570.35	360.21	226.33	275.230	48.905
4	*6°	10	114246.51	1216.59	133.16	231.694	98.536
5	*7°	8	13802.86	124.92	84.36	124.918	40.553
6	*8	5	5065.80	535.28	311.98	452.653	140.671
7	*9	6	62816.34	200.00	113.94	200.004	86.059
8	*10°	7	586319.23	27153.76	1079.19	825.269	-253.926
9	*11°	8	671.25	124.92	84.36	84.365	0.000
10	*12	4	204483.41	119.98	68.16	119.979	51.821
11	*13	7	50144.01	167.52	126.96	126.963	0.000
12	*14	7	134173.94	2129.84	126.96	126.963	0.000
13	*16°	7	31092.29	837.58	634.82	634.815	0.000
14	*23°	10	103073.30	1654.89	223.29	315.198	91.906
15	*25°	8	5066.34	832.89	363.56	485.218	121.656
16	*26	7	1664.63	326.26	217.40	326.256	108.855
17	*27	7	191669.35	514.80	86.96	151.690	64.729
18	*29	7	524091.78	167.52	126.96	126.963	0.000
19	*30	5	54354.99	1160.26	112.56	123.812	11.256
20	*32°	9	167030.58	2065.65	836.96	836.958	0.000
21	*33	4	3234.54	234.11	156.76	234.114	77.350
22	34	7	30766.39	123.48	82.93	82.928	0.000
23	*38°	13	10485.31	196.17	155.62	196.170	40.553
24	39	8	1547.72	201.45	152.79	152.791	0.000
25	*42	2	145.23	143.60	46.08	46.079	0.000
26	*44°	9	236554.32	3437.90	296.15	141.639	-154.515
27	*45°	7	710444.40	837.58	634.82	634.815	0.000
28	*52	0	.	.	.	.	.
29	55°	9	11462.90	125.44	86.89	86.885	0.000
30	56°	6	221653.46	145.02	97.94	145.024	47.083
31	57	4	2252.95	285.01	190.84	136.316	-54.526
32	58	4	5293.44	508.94	340.79	340.791	0.000
33	59	6	5708.21	615.59	412.82	615.588	202.763
34	60	4	2999.10	244.29	163.58	163.579	0.000
35	65°	15	579285.47	238.40	197.85	197.849	0.000
36	66°	10	16342.39	762.36	419.18	392.428	-26.757
37	68	6	10893.25	221.61	148.62	107.336	-41.282
38	70	6	9829.00	529.41	355.03	198.156	-156.874
39	71	7	39755.90	129.27	86.96	86.961	0.000
40	72	4	382.40	101.79	68.16	68.158	0.000
41	73°	4	132.22	101.79	68.16	68.158	0.000
42	74	4	112.83	101.79	68.16	68.158	0.000
43	75	4	197.96	101.79	68.16	68.158	0.000
44	76	7	2263.09	123.48	82.93	82.928	0.000
45	77	9	5077.49	233.29	192.74	192.738	0.000
46	78	7	5268.24	123.48	82.93	82.928	0.000
47	80°	6	17203.90	123.12	82.56	82.565	0.000
48	81	7	17255.66	123.48	82.93	82.928	0.000
49	84°	7	2914.17	135.83	91.22	82.928	-8.293

ALL DATA IN POUNDS PER YEAR

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TABLE II-7

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J PLANTS BEYOND BAT SUBPART I LIMITATIONS FOR 22 PLANTS

CBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
50	* 85°	10	40198.66	985.85	161.63	237.44	75.815
51	* 86°	16	97372.00	262.63	222.08	246.53	24.457
52	* 87°	9	169132.92	220.11	128.76	154.52	25.753
53	* 88	7	3866.69	3866.69	3866.69	3866.69	0.000
54	119	7	70707.39	10917.94	6602.53	6602.53	0.000
55	120	6	469556.15	9129.10	6194.69	6194.69	0.000
56	121°	6	217382.34	1864.59	1259.24	1259.24	0.000
57	122	6	613976.30	2425.42	1626.53	1626.53	0.000
58	124	0	.	.	.	.	.
59	128°	8	2868008.81	58142.25	11809.99	11809.99	0.000
			8901182.64	138484.96	42246.38	42908.93	662.548

* Volatile pollutants with limitations based on steam stripping.

'°' - NOTE: In the previous version of this table plant numbers 709, 991, and 2606 were incorrectly included under BAT Subpart J plants for loading computations. These plants use contract hauling as their method of discharge and hence they do not come under BAT Subpart J plants. In addition to this, two BAT Subpart J plants, i.e., plant numbers 611 and 664 were incorrectly excluded from the list of BAT Subpart J plants for loading computations. Thus, plant numbers 709, 991, and 2606 were deleted and plant numbers 611 and 664 were added to the list of BAT Subpart J plants to compute the loadings. Since chemicals marked '°' in this table were reported by at least one of the three plants deleted or two plants added, the plant count, and the corresponding loading values changed. These changes have been incorporated in the above table.

ALL DATA IN POUNDS PER YEAR

002027

TABLE II-8

ADDITIONAL ANNUAL LOADINGS DISCHARGED AT CURRENT LEVELS FROM THE FOUR POLLUTANTS UNREGULATED BY BAT SUBPART J LIMITATIONS FOR 22 PLANTS

CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD
24	6	41614.32	123.12
31	6	31505.36	221.61
35•	6	12274.09	611.17
36•	6	4420.70	1377.72
		89814.46	2333.63

ALL DATA IN POUNDS PER YEAR

'•' - NOTE: In the previous version of this table plant numbers 709, 991, and 2606 were incorrectly included under BAT Subpart J plants for loading computations. These plants use contract hauling as their method of discharge and hence they do not come under BAT Subpart J plants. In addition to this, two BAT Subpart J plants, i.e., plant numbers 611 and 664 were incorrectly excluded from the list of BAT Subpart J plants for loading computations. Thus, plant numbers 709, 991, and 2606 were deleted and plant numbers 611 and 664 were added to the list of BAT Subpart J plants to compute the loadings. Since chemicals marked '•' in this table were reported by at least one of the three plants deleted or two plants added, the plant count, and the corresponding loading values changed. These changes have been incorporated in the above table.

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TABLE II-9

ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J

PLANTS BEYOND BAT SUBPART I LIMITATIONS

FOR 83 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
1	1	11	18563.43	1088.35	86.85	86.85	0.000
2	3°	22	460997.30	4776.49	1740.53	1740.53	0.000
3	* 4°	30	434484.87	1249.22	541.16	886.37	345.207
4	* 6°	22	119992.59	1753.12	257.85	768.23	510.382
5	* 7°	18	19488.32	257.30	141.84	257.30	115.460
6	* 8	8	5066.69	535.60	312.30	452.97	140.671
7	* 9	9	62819.81	200.08	113.97	200.08	86.116
8	* 10	19	1163043.88	37583.60	2173.76	1662.28	-511.472
9	* 11°	21	1813.91	532.73	197.14	197.14	0.000
10	* 12	6	204494.35	119.98	68.16	119.98	51.821
11	* 13	15	62615.34	269.34	159.00	159.00	0.000
12	* 14	15	325347.04	2361.31	177.07	177.07	0.000
13	* 16	15	125648.20	2331.56	1222.96	1222.96	0.000
14	* 23°	25	166405.02	3099.25	478.88	783.79	304.911
15	* 25°	14	8517.15	1511.29	789.83	947.06	157.225
16	* 26	10	1665.08	326.46	217.46	326.39	108.933
17	* 27	10	191679.85	514.88	86.98	151.77	64.786
18	* 29	20	533690.33	451.15	205.25	205.25	0.000
19	* 30	10	54425.46	1144.61	112.94	124.23	11.291
20	* 32°	13	167042.84	2046.62	837.12	837.12	0.000
21	* 33	6	3234.71	234.12	156.77	234.12	77.350
22	34	9	30767.06	123.48	82.93	82.93	0.000
23	* 38°	13	67147.97	446.41	299.75	453.73	153.974
24	39	12	2206.30	672.55	182.00	182.00	0.000
25	* 42	4	145.30	143.62	46.10	46.10	0.000
26	* 44°	22	472734.17	4228.78	536.72	256.69	-280.030
27	* 45	14	905780.92	1282.29	764.92	764.92	0.000
28	* 52	0	.	.	.	.	.
29	55°	29	25818.36	3226.91	226.59	226.59	0.000
30	56°	14	1413496.27	491.71	160.64	491.71	331.065
31	57	9	3046.11	505.69	239.01	170.72	-68.288
32	58	8	5594.39	701.23	410.10	410.10	0.000
33	59	11	8092.62	1009.65	498.84	932.48	433.648
34	60	6	2999.26	244.30	163.59	163.59	0.000
35	65°	47	14395878.48	2417.01	600.82	600.82	0.000
36	66°	17	17069.22	907.47	544.92	510.14	-34.782
37	68	14	14512.55	548.91	231.91	167.49	-64.420
38	70	9	24502.68	1086.97	432.84	241.59	-191.256
39	71	16	47707.39	312.07	134.20	134.20	0.000
40	72	7	466.24	185.61	71.16	71.16	0.000
41	73	7	132.33	101.79	68.16	68.16	0.000
42	74	7	157.74	146.69	71.16	71.16	0.000
43	75	7	242.87	146.69	71.16	71.16	0.000
44	76	10	2335.05	195.33	85.92	85.92	0.000
45	77	19	9984.61	406.05	255.85	255.85	0.000
46	78	11	5816.97	311.51	107.27	107.27	0.000
47	80	13	20701.21	684.35	180.77	180.77	0.000
48	81	11	19867.49	201.00	105.20	105.20	0.000
49	84	12	3315.50	474.37	118.00	107.27	-10.727

ALL DATA IN POUNDS PER YEAR

062029

TABLE II-9
ADDITIONAL ANNUAL LOADINGS DISCHARGED BY BAT SUBPART J
PLANTS BEYOND BAT SUBPART I LIMITATIONS
FOR 83 PLANTS

OBS	CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD	BATLOAD I	BATLOAD J	BATLOAD J - BATLOAD I
50	* 85°	20	41106.92	1048.89	197.92	283.33	85.41
51	* 86°	53	859248.98	2336.34	600.09	683.06	82.97
52	* 87°	16	176479.82	431.25	157.53	188.37	30.84
53	* 88	18	11242.31	6144.72	6144.72	6144.72	0.00
54	119	12	73165.20	12180.44	7865.02	7865.02	0.00
55	120	11	507700.55	24549.38	13313.48	13313.48	0.00
56	121°	11	1922096.63	9899.01	2341.98	2341.98	0.00
57	122	11	778015.97	3143.25	1914.80	1914.80	0.00
58	124	0	.	.	.	.	.
59	128	17	2892078.33	62454.67	14034.66	14034.66	0.00
			28888707.92	205817.48	63340.73	65271.81	1931.08

* Volatile pollutants with limitations based on steam stripping.

'°' - NOTE: In the previous version of this table, the loading values for the listed chemicals were computed for 84 direct discharge plants without end-of-pipe biological treatment in-place. Among these 84 plants Plant 2660 (identified in Table VII-42, page VII-132, 1987 Development Document) was incorrectly identified as direct discharge OCPSF facility without end-of-pipe biological treatment. Additional investigations revealed that Plant 2660 does not discharge any OCPSF process wastewater and is in fact, a zero discharge plant. Therefore, Plant 2660 was deleted from the list of "84 plants". Since Plant 2660 was one of the plants reporting the chemicals marked '°', the plant count and the corresponding loading values for these chemicals changed. These changes have been incorporated in the above table.

ALL DATA IN POUNDS PER YEAR

002030

TABLE II-10

ADDITIONAL ANNUAL LOADINGS DISCHARGED AT CURRENT LEVELS FROM THE FOUR POLLUTANTS UNREGULATED BY BAT SUBPART J LIMITATIONS FOR 83 PLANTS

CHEMICAL NUMBER	PLANT COUNT	ANNUAL RAW LOAD	CURRENT LOAD
24	14	42126.63	175.37
31	8	31506.97	221.62
35•	12	17734.20	1261.10
36•	10	5600.85	1889.21
		96968.65	3547.30

ALL DATA IN POUNDS PER YEAR

'•' - NOTE: In the previous version of this table, the loading values for the listed chemicals were computed for 84 direct discharge plants without end-of-pipe biological treatment in-place. Among these 84 plants Plant 2660 (identified in Table VII-42, page VII-132, 1987 Development Document) was incorrectly identified as direct discharge OCPSF facility without end-of-pipe biological treatment. Additional investigations revealed that Plant 2660 does not discharge any OCPSF process wastewater and is in fact, a zero discharge plant. Therefore, Plant 2660 was deleted from the list of "84 plants". Since Plant 2660 was one of the plants reporting the chemicals marked '•', the plant count and the corresponding loading values for these chemicals changed. These changes have been incorporated in the above table.

062031

TABLE III-4

TECHNOLOGY CORRECTIONS

A. Direct (BAT) Subpart J Plants:

PLANT NO.	TECHNOLOGIES COSTED AT PROMULGATION(1)	TECHNOLOGIES COSTED FOR REVISED BASELINE COST(1)
488	CP, SS, PB	CP, SS, PB, AC, CN

B. Indirect (PSES) Plants:

PLANT NO.	TECHNOLOGIES COSTED AT PROMULGATION(1)	TECHNOLOGIES COSTED FOR REVISED BASELINE COST(1)
58	PB	Monitoring Only
161	SS, CP	CP, AC, SS, CN, PB
293*	SS, PB	AC, SS, CN, PB
417	PB	Monitoring Only
607	CP, AC	CP, AC, SS, CN, PB
797	CP, AC	CP, AC, SS, CN, PB
1172	SS, CP	SS, PB
1191	SS, CP, PB	CP, AC, SS, CN, PB
1320	SS, CH	SS, PB, CH
1659	CP, AC	CP, AC, SS, CN, PB
1666	CP, AC	CP, AC, SS, CN, PB
1716	CP, AC	CP, AC, SS, CN, PB
1718	PB, CH	CH
1838	SS, BP, CH	CH
1848	CH Cost = $592,249	CH Cost = $396,317
2057	SS, PB	SS
2129	CP, AC	CP, AC, SS, CN, PB
2232	Monitoring Cost=$29,539	Monitoring Cost=$26,827
2507	PB	Monitoring Only
2677	SS, CP, PB	CP, AC, SS, CN, PB
4042	PB	Monitoring Only
4072	SS, CP	CP, AC, SS, CN, PB

(1) CP = Chemical Precipitation
SS = Steam Stripping
AC = Activated Carbon
CN = Cyanide Destruction
PB = In-Plant Biological
CH = Contract Hauling

* For Plant # 293, cost estimates at promulgation (1987 Dev. Doc. pp. VIII-B46) were based on steam stripping and in-plant biological but should have also included activated carbon and cyanide destruction (1987 Dev. Doc. pp. VIII-B68).

062032

TABLE III-8

DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS

Pollutant No.	Plant No.	Average Influent Concentration (ppm)	Average Effluent Concentration (ppm)	Detention Times (hours)	Source Document for Detention Time
1 (Acenaphthene)	12 F	0.102	ND (Not Detected)	62	308 Questionnaire C12
	1293 T*	0.876	ND	413	12 Plant Report
	306 V	3.850	0.013	36	Verification Report
34 (2,4-Dimethylphenol)	12 F	0.697	0.013	62	308 Questionnaire C12
	3033 T	4.592	0.014	NA	--
	306 V	9.967	0.0102	36	Verification Report
	1293 T*	29.868	ND	413	12 Plant Report
39 (Fluoranthene)	851 V	0.133	0.0102	34	Verification Report
	1293 T*	1.572	0.0113	413	12 Plant Report
	306 V	5.225	0.0158	36	Verification Report
55 (Naphthalene)	2631 V	0.232	0.017	45	Verification Report
	695 V	0.250	ND	--	--
	2438 V	0.327	0.0112	4.5	308 Supplemental Questionnaire
	3033 T	0.520	ND	--	--
	384 T	1.040	ND	17	12 Plant Report
	1650 V	1.411	ND	72	308 Supplemental Questionnaire
	851 V	2.255	ND	34	Verification Report
	12 F	2.275	0.012	62	308 Questionnaire C12
	1293 T*	20.964	ND	413	12 Plant Report
66 (Bis[2-Ethylhexyl] phthalate)	948 F	1.097	0.043	72	Verification Report
	948 V	4.396	0.053	72	Verification Report
68 (Di-n-Butylphthalate)	948 F	0.377	0.013	72	Verification Report
	948 V	2.265	0.03	72	Verification Report
70 (Diethylphthalate)	948 V	0.433	0.061	72	Verification Report
	948 F	1.220	0.023	72	Verification Report
71 (Dimethylphthalate)	948 V	0.134	0.037	72	Verification Report
	948 F	0.207	ND	72	Verification Report
72 (Benzo(a)Anthracene)	1293 T*	0.308	ND	413	12 Plant Report
	306 V	1.585	0.056	36	Verification Report

062033

TABLE III-8 (CONTINUED)

DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS

Pollutant No.	Plant No.	Average Influent Concentration (ppm)	Average Effluent Concentration (ppm)	Detention Times (hours)	Source Document for Detention Time
76 (Chrysene)	1293 T*	0.266	ND	413	12 Plant Report
	384 T	0.312	ND	17	12 Plant Report
	306 V	1.082	ND	36	Verification Report
77 (Acenaphthylene)	1293 T*	0.472	ND	413	12 Plant Report
	1650 V	0.641	ND	72	308 Supplemental Questionnaire
	306 V	9.758	0.013	72	Verification Report
78 (Anthracene)	851 V	0.494	0.0107	34	Verification Report
	1293 T*	0.694	ND	413	12 Plant Report
	306 V	2.105	ND	36	Verification Report
80 (Fluorene)	1650 V	0.167	ND	42	308 Supplemental Questionnaire
	851 V	0.475	ND	34	Verification Report
	1293 T*	1.232	ND	413	12 Plant Report
81 (Phenanthrene)	1650 V	0.166	ND	72	308 Supplemental Questionnaire
	2313 T	0.612	0.025	72	12 Plant Report
	851 V	2.452	ND	34	Verification Report
	1293 T*	9.285	ND	413	12 Plant Report
	306 V	8.450	0.017	36	Verification Report
84 (Pyrene)	851 V	0.246	0.0165	34	Verification Report
	1293 T*	1.023	0.0103	413	12 Plant Report
	306 V	3.083	0.016	36	Verification Report

* Plant Number 1293T and its associated detention time had been improperly omitted from the detention time analysis for the 18 remanded pollutants.

002034

TABLE III-9

PLANT-BY-PLANT DETENTION TIME ASSIGNMENT

A. BAT Subpart J Plants:

84 HOURS			130 HOURS	413 HOURS
76	1249	2735	None	260
105	1569	2767		611
114	1618			877
657*	1785			2590
814	2030*			
913	2073			

* Plant Numbers 657 and 2030 have been improperly omitted from the list of BAT Subpart J plants.

B. PSES Plants:

84 HOURS			130 HOURS		413 HOURS		
10	1052	1974	94	1426	22	1091*	1833
33	1083	2004	212	1622	51*	1094**	1853
49	1086	2018	214	1657	72*	1117	1876*
52	1195	2070	221	2037	79**	1126*	1894*
93	1219	2093	249	2117	110*	1163	1899
120	1223	2232	334	2191	119	1172	1904**
143	1224	2311	354	2243	122	1173	1931
163	1237	2341	522	2250	149*	1191*	1993
199	1249	2348	567	2259	161*	1194**	2007*
203	1277	2359	658	2261	196*	1197	2084**
266	1310	2442	661	2288	206	1202	2129*
283	1314	2469	862	2318	220	1220**	2176
292	1326	2495	905	2350	240	1234**	2184
297	1539	2517	1057	2487	257	1264*	2241
302	1575	2539	1085	2524	262*	1320	2293
321	1595	2634	1181	2565	293*	1322	2300
438	1628	2635	1236	2741	310	1351	2459
468	1706	2641	1313	4001	326*	1356*	2465*
494	1740	2736	1352	4070	430**	1361*	2485
624	1742	2756	1357		433*	1432	2498
717	1743	2796			458	1437	2501
722	1751	4014			492	1450	2548*
743	1788	4022			543	1478*	2646
749	1805	4032			592	1504	2666**
771	1826	4044			607*	1507**	2677*
887	1891	4050			702	1528	2714
929	1936				706	1534	2748
958	1971				724	1560*	2776
976					768*	1608*	2793
992					791	1645	4003
1006					797*	1659*	4006*
1018					814*	1666*	4007
					830**	1667	4008
					944**	1716*	4024
					975	1744*	4026*
					987	1764	4027
					997	1773	4047
					1047**	1793*	4057
					1053	1832**	4072*

* The inclusion of plant 1293T in the detention analysis for the remaining 18 remanded pollutants change the detention time assignment for these plants from 130 to 413 hours.

** The inclusion of plant 1293T in the detention analysis for the remaining 18 remanded pollutants change the detention time assignment for these plants from 84 to 413 hours.

002035

TABLE III-11

REVISED LAND REQUIREMENT ESTIMATES FOR
IN-PLANT BIOLOGICAL TREATMENT SYSTEMS

REVISED LAND REQUIREMENTS FOR IN-PLANT BIOLOGICAL TREATMENT SYSTEMS			
A. Small Faciliites: Flow < 0.5 MGD			
	td = 84 hours*	td = 130 hours*	td = 413 hours*
FLOW (MGD)	Land Requirement in Acres	Land Requirement in Acres	Land Requirement in Acres
0.001	0.075	0.075	0.075
0.005	0.075	0.100	0.150
0.010	0.100	0.125	0.200
0.050	0.200	0.250	0.500
0.10	0.275	0.375	0.850
0.5	0.350	1.25	3.25
B. Large Facilities: Flow ≥ 0.501 MGD			
0.75	2.2	3.1	8.9
1.0	2.8	3.9	11.7
1.5	4.1	5.7	17.3
2.0	5.3	7.5	22.9
3.0	7.7	10.9	34.2
4.0	10.1	14.4	45.1
5.0	12.5	17.9	56.2

* td = detention time

NOTE: Detention times of 24 and 143 hours were incorrectly included. The correct detention times are 84 and 413 hours.

062036

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
1	I	Potassium Acetate - 0075-06	1	Completely Recycled	Only Aq.waste stream from reactor, completely recycled
		Anhydrous Sodium Acetate - 0075-01	1	Completely Recycled	Only Aq.waste stream from reactor, completely recycled
		Sodium Diacetate - 0075-04	1	Completely Recycled	Only Aq.waste stream from reactor, completely recycled
2 a	D/I	Acrylic Latex and Acrylic Resins (0153-01) (0155-04)	2+2	Completely Recycled	A total of 4 aq.streams (washdown waters from 2 separate product processes) are recycled
b		Methylmethacrylate - 2665-03	2	0.005/0.0052	After product separation 2 streams are generated. One non-aq. stream is recycled and the other is an aq. stream sent to POTW.
c		Acrylic Resins - 0155-03	2+1	0.0025/0.116 0.114/0.116	One non-aqueous stream is recycled; one aq.stream and sent to POTW. Contact cooling water(aq.) is recycled.
d		Acrylic Resins - 0155-05	---	---	----
3	D	Rayon Fibre-viscose - 3145-01			----
4	I	Formaldehyde - 2040-03	---	---	----
5	D	Acrylonitrile - 0170-01	3	0.144/0.144	Out of 3 streams, 1 is contaminated storm water, and is recycled; other 2 streams are aqueous floor washdowns, and are deep well injected (flows unknown).
6 a	I	Ethylene Oxide - 1980-01	5	0.086/0.387	After product separation, only 1 of 5 aqueous streams is recycled, the other 4(aq.) are deep well injected or sent to POTW.
b		Butyl Acrylate - 0165-09	2	0.008/0.011	Out of 2 streams, 1 aqueous stream is recycled and one is incinerated (non aq).

062037

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
c d		Ethyl Acrylate - 0165-16 Ethyl Acrylate - 0165-16	4	0.035/0.04	All are non-aqueous streams, 2 are recycled after product separation and the remaining 2 are incinerated.
e		Methanol - 2500-02	4	0.061/0.174	All are aq. streams, one goes through filtration and recycling. The remaining 3 streams are washdowns, and are sent to POTW.
7	I	2,6-Di-T-Butylphenols and 1612-01 p-phenylene Diamines - 2942-01	2	0.0001/0.0044	Both are non-aqueous streams. One is recycled after raw material recovery and the other one is sent to POTW.
8	I	Vinyl Acetate Emulsion - 3043-06	2	0.0001>/-	One stream is stormwater (aq.)and is recycled; other one is process aq. waste stream, and is sent to POTW (process flow unknown).
9	D	Caprolactum Concentration/Evaporation - 0785-07	1	Completely Recycled	After distillation the only aq. stream produced is recycled.
10 a	D	(PET) Resins and Fibres - 3006-33	8	(16+0.065)/16.4	Group of 4 aqueous and 4 non-aqueous streams. In the non-aqueous group, one stream (0.065) is recycled, and the remaining three are sent to incineration. In the aqueous group, one stream which is contact cooling water (16.0) is recycled, and the remaining three go through biological treatment, and are directly discharged.
11 a	I	Styrene-Divinylbenzene Resins - 3232-01	2	0.004/1.62	After product separation, 2 streams are generated; one(non-aq.) is recycled and the other is (aq.) sent to POTW.
b		Acrylic Resins - 0155-10	2	0.005/0.015	After product separation, 2 streams are generated; one (non-aq.) is recycled and the other(aq.) is sent to POTW.

002038

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
c		Alkyd Resins - 0189-02	1	Completely Recycled	Only non-aq.stream is generated from reactors, and is completely recycled.
12	D	Low Density Polyethylene - 3008-04	5	0.092/0.19	All are aq. waste streams; one stream is recycled after product separation, and the remaining 4 streams are sent to POTW after treatment.
13	D	PET Resin/Fibre - 3006-33	6	0.00007/0.9	All are non-aq. streams generated from product separation; one is recycled, and the remaining 5 go to other types of disposal.
14	I	Petroleum Hydrocarbon Resin - 2856-04	---	---	----
15 a	D	Phenolic Resin Manufacture - 2905-01	2	0.001/0.006	One is floor washdown(aq.), and is recycled; the remaining one is (aq.stream) directly discharged after treatment.
b		Urea formaldehyde Resins Manufacture - 3506-01	2	0.0003/0.0053	One is floor washdown(aq.) and is recycled; the remaining one is (aq.) directly discharged after treatment.
16	D	Poly Ethyl Benzene Residues - 1710-05	3	0.0005/0.09	All are aq. streams; after raw material recovery, one stream is recycled; the remaining 2 are directly discharged after treatment.
17	I	Thiophene Acetic Acid - 3343-01	4	0.0007/0.01	After product separation, 1 non-aq. is recycled; the remaining 3(aq.) are process and cooling waters, and are sent to POTW.
18 a	D	Disperse Dye Pre Cursors, Org. Pigments, 1641-34	4+3	---	Two quench aqueous streams are recycled; the remaining 5 (aq.) are directly discharged.

002038

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
		Organic Pigments - 2980-03	3	0.102/0.37	One non aq. stream from product separation is recycled; the remaining 2 (aq.streams) are directly discharged.
19	D	Dicumyl Peroxide - 1070-03	---	---	....
20	I	Hd Polyethylene and Poly Propylene, 3008-01/3020-03	3	0.083/?	After product separation, 2 non-aq. streams from 2 different processes are recycled, the remaining one is washdown/cooling water (aq.), and is sent to POTW after treatment.
21	D	Tetra Ethyl lead and Tetra Methyl lead, 3310-01/3330-01	2	1.7/?	All process wastewater streams(2) go through chemical precipitation, and then, one stream (aq.) is recycled and the remaining one(aq.) is directly discharged after III-stage biological treatment.
22	I	Flavor and Perfume Chemicals - 3101-00	5	0.001/0.75	One non-aq. stream is recycled; the remaining 4 (aq.) along with washdown/cooling waters(aq.) are sent to POTW.
23	D	Polystyrene Crystals - 3030-05 Impact Polystyrene Resin (3b,3c) - 3030-07 ABS Resin (4a,4b) - 0005-02	9	0.223/0.325	A total of 6 aq. streams (2 out of 3 each from 3 different processes) are contact cooling/floor wash waters, and are recycled; remaining 3 (aq.) are contract hauled.
24	D/I	Methyl Chloride - 2560-03 Methylene Chloride - 2420-01 Chloroform, Carbon Tet - 0930-01, 0810-02 Muriatic Acid (A8=Rainwater) (A9=Emergency Neutraliz.) (B6=Boiler blowdown) (B8=Pump seal water)	---	---	All are aqueous streams mixed with A8, A9, B6, B8; goes through precipitation, stream stripping, sol. extraction, and then, part of this is recycled and the remaining are directly discharged (exact # of streams not clear).

002040

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.		TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
25	a	I	Phenolic Resins - 2905-01	2	0.0019/4.3E-3	Both the streams are washdowns (aq.) from production & floor area; one is recycled and the other goes to POTW after treatment.
	b		Urea Resins - 3506-01	3	0.003/0.0036	One aq. stream from raw material recovery is recycled; remaining 2 are washdowns(aq.), and are sent to POTW.
26	c	D/I	A - Sulfophthalic Acid - 2959-02	2	0.0001/0.14	One aq. stream from raw material recovery is recycled; remaining one(aq.) goes through treatment, and then, partly directly discharged and partly sent to POTW.
27		D	Extrusion of Nylon Polymer (source) (from chlorination chamber) - 2825-22	3	0.3/0.48	Two aq.streams go through II-stage bio.treatment and polishing pond; partly recycled and partly directly discharged. The remaining one is non-aq. stream, and goes to contract hauling.
28		D	Acetic Acid - 0870-04	2	0.019/0.02	Only non-aq. stream is recycled after distillation. The remaining (aq.stream) is directly discharged after treatment.
29		D	Nitroparaffins - Nitration fro Formaldehyde & 2np - 2791-02	6	0.014/0.3	All are aq. streams; one is recycled and the remaining 5 streams are directly discharged after biological treatment.
30		D	Dimethyl Sulphide - 1510-01 Cyclohtexyl Mercapten - 2445-03 N-propyl Mercapten - 2445-01 N-Butyl Mercapten - 2445-02 T-Butyl Mercapten - 2445-04 N-Octyl Mercapten - 2445-05	>4	0.013/0.097	Production and floor washdowns (aq.) of all of these product/processes are pooled; after primary treatment, a part of it is directly discharged, and the other part is recycled. Among the process wastestreams of these product/processes, non.aq is sent to incineration and the aq. to POTW (exact # of streams not clear).

012041

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.		TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
			T-Nonyl Mercaptan - 2445-06 T-Dodecyl Mercaptan - 2445-07 N-Dodecyl Mercaptan - 2445-08 Carbon Disulfide - 0790-01 Misc. Organic Suphur Compounds			
31	a	D/I	Sodium Formaldehyde Sulfoxalate - 3185-01	3	NA/0.8	One out of 3 (aq.) streams goes through filtration and then recycled; remaining 2 streams are washdown/cooling waters, and are sent to POTW.
	b	D/I	Phenolic Resins (Sulfonated) - 2905-03	3	NA/0.9	One out of 3(aq.) streams goes through filtration and then recycled; remaining 2 streams are washdown/cooling waters, and are sent to POTW.
32		D	Nycon 6 Resin - Fiber - 2825-01	5	0.175/0.194	All are aq.streams. One stream is distilled with recycle of recovered product, and the distillate is directly discharged; remaining 4 streams are directly discharged after treatment.
33		D	Tri cyresyl phosphate (2951-15) Trixylyl phosphate (2951-16) Tryiocalkyl phenyl phosphate (2951-11) Tributyl phosphate (2951-09) Alkyl Acid phosphate (2951-18) Diethyl bis (2-hydro ty ethyl) (2952-06) Di(2-Ethylhexyl) Adipate (0175-01) Fatty Acid Esters (2021-01)	---	---	----

020242

Table IV-2

DESCRIPTION OF RECYCLED WASTESTREAMS BY PRODUCT/PROCESS AMONG DIRECT AND INDIRECT DISCHARGE OCPSF PLANTS

PLANT NO.	TYPE OF DISCHARGE*	PRODUCT PROCESS NAME, CODE	# OF STREAMS FROM EACH PROCESS	AQ. OR NON-AQ.** FLOW RECYCLED/TOTAL PROCESS FLOW (mgd)	FATE OF EACH PROCESS WASTE STREAM*** (From 308 Questionnaire)
34 a	I	Brominated Flame Retardants - 3284-01	7	0.002/0.022	One stream is distilled with recycle of recovered product, and the resulting aq.stream is sent to POTW; Among the remaining 6 streams, the aq. streams are from raw material recovery and washdowns go to POTW, and non-aq. to contract hauling (exact # of streams not clear).
b		Brominated Flame Retardants - 3284-01			

Note: "----" means 'Not clear from available information'.

* D - Direct
I - Indirect
D/I - Both Direct and Indirect

** This column indicates the ratio of the wastewater flow recycled to the total wastewater flow from that particular product/process alone, in million gallons per day. The flow recycled could be Aqueous or Non-aqueous, which will be explained under 'Fate of each process wastestream' column for that plant.

*** This column explains the type of flow (Aq. or Non-Aq.) recycled and its origin and final disposal (e.g., whether it is washdowns, cleaning waters, or from raw material recovery). The information on the type of treatment each process wastestream undergoes is also provided where available.

0102043

A P P E N D I X III-A

REVISED IN-PLANT BIOLOGICAL COST ESTIMATES Vs 1987 AS PROMULGATED IN-PLANT BIOLOGICAL COST ESTIMATES

(COST ESTIMATES ARE PRESENTED IN 1982 DOLLARS)

PLANT NUMBER	IN-PLANT BIOLOGICAL COST ESTIMATES AT PROMULGATION BAT (DIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGICAL COST ESTIMATES BASED ON REVISED DETENTION TIMES BAT (DIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
76	154,264	36,383	4,868	252,052	37,518	6,889
105	180,903	37,838	39,407	297,579	39,032	60,439
114	155,036	36,426	8,040	253,372	37,562	11,405
260	114,259	34,201	6,687	382,240	38,190	22,560
611	33,879	31,778	1,226	93,292	34,628	1,449
657 *	3,496,321	259,390	118,314	11,304,160	551,323	168,975
814	1,477,409	122,703	25,259	4,762,754	257,920	25,775
877	122,601	34,650	2,490	415,790	38,734	8,903
913	239,832	40,962	11,739	397,900	42,261	21,010
1249	124,507	34,753	6,739	201,116	35,808	8,629
1569	120,658	34,545	2,326	194,525	35,588	2,938
1618	137,779	35,478	5,373	223,839	36,571	7,205
1785	306,454	44,306	9,305	510,552	45,696	19,266
2030 *	192,349	38,456	9,536	317,109	39,673	15,106
2073	335,009	45,682	16,500	558,577	47,104	36,112
2590	27,215	31,778	3,760	73,128	34,628	3,616
2735	4,283,634	312,359	153,746	14,018,248	666,365	227,194
2767	66,487	32,015	4,494	102,017	32,824	4,574
TOTALS	11,568,596	1,243,703	429,810	34,358,248	2,051,424	652,046

* - PLANTS HAVE BEEN IMPROPERLY OMITTED FROM THE BAT SUBPART J PLANT LIST

002045

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
10	38,458	31,778	3,663	54,933	32,470	3,352
22	111,459	34,052	1,467	371,105	38,007	4,849
33	1,796,964	144,644	45,448	5,756,909	304,610	51,447
49	176,242	37,585	38,506	289,619	38,769	58,262
51*	123,508	34,699	6,697	419,472	38,793	24,094
52	51,292	31,778	2,945	76,348	32,475	2,814
72*	35,667	31,778	3,609	98,837	34,628	4,470
79**	52,999	31,779	17,371	155,182	34,752	30,550
93	100,445	33,479	1,532	159,927	34,452	1,793
94	44,225	31,778	16,295	77,934	32,901	17,839
110*	32,594	31,778	2,624	89,340	34,628	2,996
119	35,088	31,778	5,893	97,034	34,628	7,192
120	48,027	31,778	1,336	70,871	32,470	1,261
122	74,706	32,296	20,523	231,276	35,724	48,490
143	34,492	31,778	1,342	48,395	32,470	1,218
149*	53,307	31,779	4,060	156,219	34,761	7,177
161*	187,252	38,182	9,478	692,373	42,867	47,864
163	51,421	31,778	4,003	76,565	32,475	3,827
196*	165,699	37,010	8,355	597,149	41,516	38,221
199	152,707	36,298	2,718	249,389	37,429	3,827
203	31,919	31,778	15,244	44,179	32,470	13,791
206	74,515	32,289	5,059	230,584	35,714	11,926
212	33,247	31,778	949	56,599	32,901	950
214	245,972	41,278	4,195	510,031	43,392	10,761
220	41,678	31,778	16,021	117,869	34,628	22,809
221	266,317	42,315	3,135	555,621	44,488	8,448
240	2,388,306	184,789	65,816	30,377,381	1,135,834	346,162
249	75,705	32,335	2,129	141,410	33,694	2,893
257	261,328	42,063	13,010	1,039,118	47,264	85,770
262*	28,097	31,778	15,138	75,749	34,628	15087
266	29,728	31,778	1,967	40,612	32,470	1,779
283	1,929,490	153,681	68,756	6,173,704	323,893	80,500
292	102,992	33,609	6,208	164,284	34,592	7,339
293*	188,988	38,275	3,573	700,162	42,975	18,179
297	25,278	31,778	3,488	33,432	32,470	3,052
302	99,926	33,452	1,966	159,038	34,424	2,297
310	84,702	32,717	3,135	268,057	36,309	8,238
321	31,218	31,778	15,213	43,035	32,470	13,758
326*	59,507	31,846	3,664	177,408	34,976	7,124
334	43,402	31,778	1,413	76,316	32,901	1,537
354	115,682	34,277	5,629	225,074	35,886	9,403
430**	3,070,808	230,778	114,330	41,028,499	1,448,808	664,833
433*	84,169	32,693	1,758	266,068	36,276	4,595
438	121,480	34,589	1,758	195,933	35,635	2,226

002046

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
458	2,164,647	169,654	358,718	27,017,425	1,033,377	1,800,014
468	42,553	31,778	1,286	61,730	32,470	1,191
492	36,508	31,778	2,669	101,464	34,628	3,376
494	320,686	44,996	5,493	534,507	46,402	11,697
522	135,103	35,331	7,183	266,554	37,036	13,029
543	64,898	31,970	1,660	196,214	35,213	3,478
567	27,215	31,778	944	45,138	32,901	893
592	86,403	32,794	3,844	274,412	36,412	10,272
607*	69,725	32,117	3,393	213,338	35,455	7,560
624	2,538,969	194,961	98,792	8,125,233	412,320	129,133
658	171,026	37,301	7,721	344,357	39,158	15,968
661	26,848	31,778	840	44,447	32,901	793
702	45,804	31,778	1,315	131,256	34,631	2,036
706	42,119	31,778	3,308	119,288	34,628	4,754
717	254,220	41,701	6,073	422,301	43,021	11,241
722	250,039	41,487	5,497	415,214	42,802	10,078
724	31,919	31,778	3,138	87,274	34,628	3,515
743	45,025	31,778	904	65,850	32,470	844
749	83,680	32,671	1,752	131,280	33,573	1,917
768*	24,200	31,778	3,552	64,292	34,628	3,552
771	118,360	34,421	6,485	190,590	35,457	8,122
791	40,308	31,778	2,728	113,479	34,628	3,770
797*	35,667	31,778	1,349	98,837	34,628	1,671
814*	1,477,397	122,703	25,259	17,168,297	718,327	101,282
830**	23,508	31,778	5,816	62,290	34,629	5,816
862	130,517	35,080	6,990	256,720	36,763	12,445
887	222,526	40,060	2,956	368,502	41,331	5,071
905	31,919	31,778	1,329	54,056	32,901	1,316
929	25,278	31,778	15,232	33,432	32,470	13,328
944**	26,279	31,778	3,552	70,364	34,628	3,552
958	80,319	32,524	5,284	125,548	33,410	5,701
975	64,898	31,970	1,180	196,214	35,213	2,472
976	177,105	37,632	3,981	291,094	38,818	6,039
987	24,200	31,778	1,216	64,292	34,628	1,056
992	75,274	32,318	1,645	116,953	33,178	1,738
997	37,318	31,778	3,640	104,007	34,628	4,695
1006	34,492	31,778	954	48,395	32,470	866
1018	118,149	34,409	2,217	190,228	35,445	2,775
1047**	180,385	37,810	9,166	661,727	42,440	44,914
1052	104,729	33,699	1,403	167,257	34,688	1,670
1053	42,294	31,778	368	119,851	34,628	531
1057	23,024	31,778	840	37,316	32,901	735
1083	38,859	31,778	2,704	55,597	32,470	2,477
1085	28,933	31,778	3,532	48,380	32,901	3,410

002047

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
1086	142,108	35,716	32,080	231,251	36,820	43,640
1091*	136,001	35,381	4,391	470,792	39,607	17,099
1094**	138,306	35,507	7,747	480,384	39,757	30,587
1117	24,423	31,778	520	64,938	34,628	455
1126*	191,682	38,420	7,130	712,282	43,141	36,689
1163	96,736	33,292	4,137	313,614	37,058	12,154
1172	204,121	39,087	7,553	768,788	43,902	40,884
1173	23,024	31,778	15,232	60,899	34,628	12,704
1181	90,364	32,980	5,371	171,774	34,442	7,929
1191*	56,810	31,806	1,108	168,132	34,873	2,070
1194**	33,183	31,778	3,570	91,146	34,628	4,143
1195	35,088	31,778	1,767	49,374	32,470	1,605
1197	40,308	31,778	2,728	113,479	34,628	3,770
1202	73,357	32,245	5,015	226,393	35,650	11,666
1219	276,642	42,834	13,776	460,246	44,186	26,807
1220**	35,667	31,778	959	98,837	34,628	1,188
1223	37,843	31,778	1,611	53,916	32,470	1,472
1224	178,425	37,703	2,413	293,347	38,893	3,674
1234**	62,529	31,909	3,210	187,907	35,104	6,514
1236	180,579	37,820	8,100	365,245	39,714	17,284
1237	54,570	31,785	17,580	81,864	32,508	17,020
1249	124,507	34,753	6,739	201,116	35,808	8,629
1264*	28,097	31,778	3,530	75,748	34,628	3,518
1277	168,246	37,149	2,952	275,959	38,316	4,361
1310	147,924	36,035	3,413	241,205	37,154	4,732
1313	21,995	31,778	944	35,416	32,901	826
1314	22,649	31,778	1,216	29,242	32,470	1,064
1320	33,941	31,778	1,339	93,483	34,628	1,586
1322	68,240	32,068	4,555	208,043	35,378	9,964
1326	75,499	32,327	1,280	117,337	33,188	1,353
1351	45,025	31,778	1,429	128,709	34,628	2,178
1352	21,995	31,778	3,552	35,416	32,901	3,108
1356*	35,088	31,778	3,599	97,034	34,628	4,393
1357	37,843	31,778	2,688	65,465	32,901	2,796
1361*	126,379	34,855	2,334	431,163	38,980	8,556
1426	158,530	36,617	8,193	317,152	38,424	16,230
1432	90,067	32,966	5,360	288,201	36,638	14,829
1437	159,204	36,654	1,944	569,017	41,103	8,611
1450	21,995	31,778	6,968	57,955	34,628	5,609
1478*	27,215	31,778	1,328	73,128	34,628	1,328
1504	75,274	32,318	1,645	233,338	35,756	3,913
1507**	205,139	39,141	8,493	773,454	43,964	46,156
1528	29,014	31,778	3,532	78,489	34,628	3,626
1534	54,511	31,785	1,403	160,297	34,797	2,528

002048

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
1539	224,484	40,163	11,216	371,830	41,437	19,335
1560*	28,097	31,778	3,117	75,749	34,628	3,106
1575	21,995	31,778	3,552	28,208	32,470	3,108
1595	92,694	33,092	2,681	146,674	34,035	3,043
1608*	71,974	32,195	1,605	221,406	35,574	3,673
1622	142,193	35,720	5,512	281,809	37,457	10,281
1628	39,834	31,778	15,837	57,212	32,470	14,543
1645	42,553	31,778	3,317	120,688	34,628	4,811
1657	1,559,661	128,375	18,431	6,683,620	336,108	27,333
1659*	98,347	33,373	5,681	319,815	37,161	16,919
1666*	64,898	31,970	19,038	196,214	35,213	39,887
1667	203,723	39,065	10,237	766,969	43,878	55,326
1706	1,702,823	138,204	25,658	5,462,456	290,888	28,274
1716*	85,931	32,773	5,202	272,644	36,383	13,836
1740	143,798	35,808	7,995	234,143	36,917	10,938
1742	88,716	32,902	22,762	139,878	33,827	25,424
1743	42,163	31,778	3,680	61,080	32,470	3,403
1744*	28,097	31,778	3,530	75,749	34,628	3,518
1751	27,574	31,778	3,488	37,123	32,470	3,052
1764	82,691	32,627	1,899	260,574	36,188	4,890
1773	44,225	31,778	1,421	126,103	34,628	2,132
1788	112,364	34,100	6,606	180,325	35,116	8,093
1793*	26,084	31,778	15,232	69,792	34,628	15,232
1805	153,488	36,341	7,038	250,724	37,474	9,936
1826	82,357	32,612	1,895	129,024	33,508	2,062
1832**	44,225	31,778	2,799	126,105	34,628	4,199
1833	124,706	34,764	2,978	424,341	38,871	10,801
1853	2,027,158	160,324	80,244	24,987,274	970,397	389,265
1876*	64,434	31,957	1,514	194,581	35,191	3,153
1891	239,640	40,952	3,175	397,575	42,251	5,679
1894*	55,389	31,791	4,367	163,283	34,825	7,980
1899	118,571	34,432	5,733	399,517	38,471	19,943
1904**	3,184,631	238,434	117,797	42,858,273	1,501,079	693,389
1931	52,999	31,779	17,371	155,182	34,752	30,550
1936	69,516	32,110	4,600	107,160	32,937	4,742
1971	75,462	32,325	1,279	117,273	33,187	1,352
1974	63,491	31,933	4,391	96,938	32,722	4,413
1993	60,026	31,856	1,598	179,203	34,997	3,131
2004	151,922	36,255	33,895	248,045	37,384	47,608
2007*	42,981	31,778	3,989	122,069	34,628	5,836
2018	201,722	38,959	2,696	333,089	40,193	4,381
2037	59,767	31,851	18,297	108,925	33,072	22,454
2070	243,158	41,134	12,116	403,544	42,438	21,857
2084**	118,571	34,432	27,846	399,517	38,471	96,866

002049

PLANT NUMBER	IN-PLANT BIOLOGICAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGICAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
2093	180,385	37,810	9,703	296,693	39,003	14,859
2117	103,741	33,648	5,894	199,815	35,191	9,313
2129*	64,434	31,957	4,424	194,581	35,191	9,211
2176	66,263	32,008	1,536	201,030	35,279	3,276
2184	73,357	32,245	1,622	226,393	35,650	3,773
2191	34,492	31,778	1,342	58,990	32,901	1,357
2232	163,252	36,876	6,187	267,422	38,032	9,004
2241	308,833	44,422	66,148	1,275,337	49,897	497,675
2243	262,203	42,107	4,469	546,383	44,268	11,924
2250	49,767	31,778	2,200	88,894	32,902	2,513
2259	48,027	31,778	4,132	85,441	32,901	4,659
2261	134,922	35,321	2,683	266,167	37,025	4,862
2288	33,247	31,778	3,153	56,599	32,901	3,156
2293	48,944	31,778	16,853	141,609	34,663	27,647
2300	263,943	42,195	4,646	1,051,858	47,412	30,875
2311	64,666	31,963	19,004	98,930	32,761	19,191
2318	61,044	31,876	1,611	111,505	33,110	1,994
2341	329,039	45,397	14,555	548,550	46,813	31,497
2348	74,515	32,289	4,736	115,661	33,145	4,987
2350	50,105	31,778	1,482	89,564	32,903	1,697
2359	23,024	31,778	2,160	29,838	32,470	1,890
2442	25,687	31,778	2,440	34,087	32,470	2,135
2459	57,364	31,813	17,961	170,031	34,893	33,834
2465*	63,965	31,945	1,171	192,935	35,170	2,424
2469	35,088	31,778	1,232	49,374	32,470	1,119
2485	1,590,890	130,523	70,040	18,740,326	770,425	294,834
2487	119,828	34,500	958	233,892	36,130	1,630
2495	177,172	37,635	9,021	291,207	38,822	13,687
2498	56,810	31,806	3,682	168,132	34,873	6,878
2501	57,226	31,811	1,564	169,558	34,888	2,941
2517	113,037	34,136	4,616	181,477	35,154	5,669
2524	55,389	31,791	1,347	100,118	32,968	1,603
2539	118,254	34,415	6,481	190,409	35,451	8,114
2548*	95,367	33,224	4,098	308,364	36,971	11,895
2565	198,826	38,804	10,010	405,347	40,764	22,593
2634	67,152	32,035	1,689	103,146	32,848	1,724
2635	1,959,465	155,721	47,796	6,268,347	328,251	56,354
2641	127,060	34,892	2,559	205,488	35,954	3,307
2646	161,793	36,796	6,139	580,200	41,268	27,546
2666**	44,225	31,778	1,010	126,103	34,628	1,515
2677*	120,554	34,539	1,747	407,511	38,600	6,162
2714	24,200	31,778	3,552	64,292	34,628	3,085
2736	185,499	38,087	3,514	305,423	39,290	5,460
2741	97,007	33,305	5,628	185,663	34,808	8,601

PLANT NUMBER	IN-PLANT BIOLOGIGAL COST ESTIMATES AT PROMULGATION PSES (INDIRECT PLANTS) (1982 dollars)			IN-PLANT BIOLOGIGAL COST ESTIMATES BASED ON REVISED DETENTION TIMES PSES (INDIRECT PLANTS) (1982 dollars)		
	CAPITAL COST	O & M COST	LAND COST	CAPITAL COST	O & M COST	LAND COST
2748	190,890	38,378	2,281	708,716	43,092	11,698
2756	1,533,142	126,548	68,768	4,935,083	266,090	71,652
2776	49,801	31,778	3,955	144,460	34,678	6,587
2793	113,149	34,142	2,345	377,819	38,117	7,848
2796	196,476	38,678	3,501	324,147	39,903	5,609
4001	66,776	32,023	3,977	123,134	33,309	5,113
4003	134,197	35,282	7,563	463,307	39,490	29,130
4006*	56,530	31,803	6,814	167,175	34,863	12,674
4007	130,498	35,079	3,888	448,045	39,249	14,635
4008	97,277	33,319	24,181	315,693	37,093	71,364
4014	23,626	31,778	1,216	30,793	32,470	1,064
4022	42,119	31,778	3,747	61,007	32,470	3,464
4024	26,279	31,778	1,216	70,364	34,628	1,133
4026*	92,263	33,072	5,444	296,523	36,776	15,371
4027	111,118	34,034	6,190	369,750	37,985	20,406
4032	28,933	31,778	3,739	39,321	32,470	3,383
4044	165,485	36,998	2,259	271,239	38,159	3,310
4047	60,026	31,856	1,136	179,203	34,997	2,226
4050	38,859	31,778	868	55,597	32,470	795
4057	48,699	31,778	3,923	140,798	34,660	6,407
4070	41,899	31,778	1,281	73,370	32,901	1,377
4072*	41,229	31,778	1,275	116,428	34,628	1,798
TOTALS	49,802,940	9,983,728	2,523,438	295,361,371	18,050,286	7,660,302

* - THE INLUSION OF PLANT # 1293T TO THE DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS CHANGED THE DETENTION TIME ASSIGNMENT FOR THESE PLANTS FROM 130 TO 413 HOURS.

** - THE INLUSION OF PLANT # 1293T TO THE DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS CHANGED THE DETENTION TIME ASSIGNMENT FOR THESE PLANTS FROM 84 TO 413 HOURS.

A P P E N D I X III-B

REVISED BAT AND PSES COST COMPLIANCE ESTIMATES AND TECHNOLOGY BASIS

(COST DATA PRESENTED IN 1982 DOLLARS)

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
1	1	0	0	0	0	0	0	29539
2	12	583212	77154	8994	0	0	0	29539
3	15	881544	128618	4324	3536	762	0	29539
4	33	0	0	0	0	0	0	51259
5	61	912274	115757	4653	37220	8016	0	29539
6	63	0	4750	0	0	0	0	33782
7	76	1529448	1562142	46817	193544	41683	0	29539
8	83	328468	31298	310	11724	2525	0	33782
9	87	541052	196316	1937	0	0	0	26827
10	101	0	0	0	0	0	222650	26827
11	102	0	0	0	0	0	0	29539
12	105	1200770	2123576	340814	276731	59599	0	41206
13	112	0	0	0	0	0	111325	26827
14	114	1118466	368477	31427	472694	101803	0	26827
15	154	328468	33389	2412	74440	16032	0	26827
16	155	1406902	668691	22693	738817	159118	0	29539
17	159	0	0	0	0	0	0	29539
18	177	1011495	103592	21556	48386	10421	0	29539
19	180	0	0	0	0	0	222650	26827
20	183	862959	451849	27831	0	0	0	29539
21	190	731177	1072783	66000	0	0	0	41206
22	205	821587	757824	86733	193544	41683	0	29539
23	225	610771	115960	5036	375178	80801	0	29539
24	227	454726	28989	2124	0	0	0	41206
25	250	354104	50601	8063	385227	82966	0	33782
26	254	366729	54659	3248	470833	101402	0	26827
27	259	0	0	0	0	0	0	33782
28	260	1231815	147463	38554	81884	17635	0	29539
29	267	1411929	651263	13206	776832	193075	0	51259
30	269	60026	31856	626	0	0	0	29539
31	284	384432	67491	5018	111660	24048	0	26827
32	294	0	0	0	0	0	0	29539
33	296	594489	119654	21801	661521	164416	0	41206
34	301	8973044	3754917	96349	329397	116988	0	41206
35	352	405958	63704	1466	3908	842	0	29539
36	384	6856767	3047519	248419	358431	127299	0	51259
37	387	2969660	841368	37964	1827258	888306	0	65286
38	392	450142	33874	2736	0	0	0	26827
39	394	461491	47794	8211	0	0	0	26827
40	399	2000000	335000	9100	0	0	0	36574
41	412 B	572195	81880	62487	0	0	0	26827
42	415	3551871	3621418	129088	660906	234725	0	51259
43	443	868975	154617	28737	7816	1683	0	29539
44	444	110889	34022	6542	0	0	0	29539
45	446 B	870823	81870	5165	28101	6052	0	26827
46	447	2745254	1026242	41564	545805	135655	0	41206
47	451	0	0	0	0	0	44530	26827
48	481	498116	37693	2374	0	0	0	29539
49	485	1866959	2954508	114488	0	0	0	41206

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
50	486	872185	102024	27793	10608	2285	0	29539
51	488	1154248	468093	109650	82256	17715	0	29539
52	500	328709	38823	5380	163396	35190	0	29539
53	502	0	0	0	0	0	12468	29539
54	518	1950998	2281636	14440	329397	70942	0	26827
55	523	72315	42686	7095	0	0	0	29539
56	525	0	0	0	0	0	0	29539
57	536 B	944485	239229	16051	13529	2914	0	26827
58	569	0	0	0	0	0	0	29539
59	580	116439	34318	2395	0	0	0	29539
60	602	0	0	0	0	0	57889	29539
61	608	655540	1052470	14970	0	0	0	41206
62	611	947308	146462	10316	2419	521	0	26827
63	614	328468	34168	1578	87095	18757	0	29539
64	633	809133	73458	12751	2680	577	0	29539
65	657 BB	11957032	685730	192648	374795	133111	0	29539
66	659	454557	52002	2826	0	0	0	33782
67	662	1247646	428399	22673	764871	164729	0	29539
68	663	858500	692391	18605	115382	24850	0	26827
69	664	919793	530584	10537	716485	154308	0	26827
70	669	0	0	0	0	0	124684	29539
71	682	697987	146981	15825	429694	152609	0	51259
72	683	1403937	781729	40680	866856	215450	0	51259
73	695	2383893	244490	94475	0	0	0	51259
74	709	0	0	0	0	0	151402	29539
75	727	471403	84419	5792	651406	161902	0	51259
76	741	0	0	0	0	0	0	41206
77	758	0	0	0	0	0	0	29539
78	775	540068	648766	3151	0	0	0	29539
79	802	551554	106422	6680	984190	244612	0	29539
80	811	0	0	0	0	0	0	33782
81	814	6225611	1332591	48218	604877	150337	0	41206
82	819	8484607	3028592	109041	268163	95240	0	41206
83	825	837227	151315	4430	346146	74549	0	29539
84	844	0	0	0	0	0	0	33782
85	851	3377409	3155331	138805	0	0	0	41206
86	859	0	0	0	0	0	0	41206
87	866	0	0	0	0	0	0	33782
88	871	451103	42992	6002	0	0	0	33782
89	876	552177	305539	6730	0	0	0	29539
90	877	1497397	933303	27721	65879	16188	0	26827
91	883	0	0	0	0	0	0	29539
92	888	0	0	0	0	0	0	26827
93	908	448303	78050	8660	560371	139276	0	51259
94	909	2743896	1079582	101930	372200	80160	0	41206
95	913	1141795	797059	47694	464270	164889	0	41206
96	938	115653	84916	1951	0	0	0	29539
97	942	0	0	0	0	0	0	29539
98	948	1291236	448579	13690	850672	211427	0	51259

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
99	956	0	0	0	0	0	71248	26827
100	962	782986	67022	2865	55830	12024	0	26827
101	970	469119	83791	6785	642303	159639	0	29539
102	973	828624	275200	45089	604825	130260	0	41206
103	984	328468	32299	1695	55830	12024	0	26827
104	990	328468	35924	1112	115382	24850	0	33782
105	991	0	0	0	0	0	4453	26827
106	992	454719	22868	2736	0	0	0	29539
107	1012	454779	79839	6443	585659	145561	0	29539
108	1020	349821	49140	8310	355451	76553	0	29539
109	1033	0	0	0	0	0	89060	29539
110	1038	972717	207113	14621	524713	186355	0	51259
111	1059	0	14500	0	0	0	0	41206
112	1061	458705	113196	8284	488885	105290	0	26827
113	1062	0	0	0	0	0	0	29539
114	1067	438206	65409	6155	37220	8016	0	29539
115	1133	139529	35574	1079	0	0	0	29539
116	1137	2219293	246146	24383	278325	98849	0	51259
117	1139	479801	60911	12220	0	0	0	33782
118	1148	835903	185891	4611	604423	214465	0	41206
119	1149	833465	4798387	23760	0	0	0	41206
120	1157	0	0	0	0	0	44530	33782
121	1203	332097	41724	2210	214015	46092	0	26827
122	1241 a	635556	99018	24064	521080	112224	0	26827
123	1249	1051487	124479	23939	24565	5291	0	33782
124	1267	0	0	0	0	0	0	26827
125	1299	0	0	0	0	0	0	29539
126	1319	0	0	0	0	0	0	29539
127	1323	544754	69758	1879	0	0	0	26827
128	1327	2953691	1186459	117597	617015	153354	0	41206
129	1340	1199794	466637	24908	409104	88108	0	33782
130	1343	1740987	2625061	58497	541551	116633	0	33782
131	1348	0	1000	0	0	0	0	26827
132	1349	0	0	0	0	0	0	26827
133	1389	411405	67752	3220	772315	166332	0	26827
134	1407	1002773	580864	9225	772315	166332	0	29539
135	1409	4106377	2354667	147923	287695	102177	0	41206
136	1414	454719	14197	8460	0	0	0	26827
137	1438	373116	56619	3606	513636	110621	0	33782
138	1439	1470942	1876635	68080	195405	42084	0	29539
139	1446	350850	718244	42480	0	0	0	26827
140	1464	482849	89871	8602	0	0	0	29539
141	1494	8463828	2288557	84297	340219	120831	0	41206
142	1520	1004495	252421	45473	30334	6533	0	29539
143	1522	811772	4140048	22573	0	0	0	57597
144	1524	328468	36119	2583	118546	25531	0	26827
145	1532	425575	75044	11239	217737	46894	0	29539
146	1569	1036063	174401	8011	186100	40080	0	29539
147	1572	0	25000	0	0	0	0	51259

062065

BAT COST DATA

CBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COST
148	1593	0	0	0	0	0	0	29539
149	1609	905355	288820	19941	502470	108216	0	29539
150	1616	331423	41307	3524	206571	44489	0	26827
151	1617	576429	1291980	4296	0	0	0	29539
152	1618	685778	104759	13436	0	0	0	26827
153	1624	778349	41593	2855	1359	293	0	33782
154	1643	0	0	0	0	0	0	26827
155	1647	912609	479951	10155	232625	50100	0	29539
156	1650 B	20575507	4527482	1058825	1732309	645153	0	57597
157	1656	0	0	0	0	0	0	29539
158	1670	0	0	0	0	0	4453	29539
159	1684	73357	32245	694	0	0	133590	33782
160	1688	343107	44699	7103	307065	66132	0	26827
161	1695	4893992	1257500	26851	276873	98333	0	51259
162	1698	449881	13302	13086	0	0	0	26827
163	1714	778349	56004	9912	33684	7254	0	26827
164	1717	328468	31437	826	36848	7936	0	26827
165	1724	841150	105982	21038	3350	721	0	29539
166	1753	671437	139572	15144	397230	141079	0	41206
167	1766	378121	58125	4076	547134	117835	0	26827
168	1769	7875173	9718672	157155	0	0	0	41206
169	1774	1035891	243484	13226	871002	309342	0	29539
170	1785	1012253	~~[illegible]~~ 185393	29524	758625	192393	0	51259
171	1802	444655	77041	13785	546210	135756	0	29539
172	1839	782792	44868	8886	9863	2124	0	26827
173	1869	618340	705348	3628	0	0	0	51259
174	1877	1389291	881655	27052	183867	39599	0	29539
175	1881	328468	31617	631	41873	9018	0	33782
176	1890	529854	113692	19606	290316	62525	0	33782
177	1905	386297	63117	5875	15204	3275	0	33782
178	1910	1135742	1255931	11405	308740	66493	0	41206
179	1911	686981	106868	27170	666238	143486	0	33782
180	1928 B	826194	75304	5583	7072	1523	0	26827
181	1937	1251214	628168	61880	121523	26172	0	29539
182	1943	0	0	0	0	0	0	33782
183	1973	599338	119580	5777	311449	110613	0	29539
184	1977	0	0	0	0	0	0	51259
185	1986	0	0	0	0	0	0	26827
186	2009	674383	80766	9318	0	0	0	29539
187	2020	0	0	0	0	0	0	29539
188	2026	454719	17720	2736	0	0	0	33782
189	2030 BQ	1437358	1390413	84990	0	0	0	41206
190	2047	328468	34770	3724	96772	20842	0	26827
191	2049	378242	59210	6012	57691	12425	0	29539
192	2055	0	0	0	0	0	0	26827
193	2062	785050	50058	5652	14330	3086	0	29539
194	2073	1565332	2107497	66931	878392	189178	0	29539
195	2090	63318	35647	1953	0	0	0	29539
196	2110	362960	63158	6065	34801	7495	0	29539

BAT COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
197	2148	657716	216786	28974	816281	202880	0	29539
198	2181	0	0	0	0	0	0	26827
199	2193	0	0	0	0	0	89060	33782
200	2198	355187	50962	3103	392671	84569	0	29539
201	2206 B	674950	135546	5916	0	0	0	26827
202	2221	861504	222780	7759	320092	68938	0	26827
203	2222	670350	139270	6606	395910	140610	0	29539
204	2227	1717297	1113595	57123	1047842	372148	0	29539
205	2228	783187	42842	5329	5620	1210	0	29539
206	2236	458966	66378	8085	10515	2265	0	29539
207	2242	794313	66472	9040	280267	60360	0	29539
208	2254	564000	115855	12674	622275	154461	0	29539
209	2268	1430431	2902047	61784	65135	14028	0	29539
210	2272	1521382	2272954	53161	814763	202503	0	51259
211	2281	414832	118514	3459	9119	1964	0	29539
212	2292	623153	161108	35602	0	0	0	29539
213	2296	0	0	0	0	0	0	26827
214	2307	0	0	0	0	0	0	26827
215	2313	0	0	0	0	0	0	29539
216	2315	424577	90041	6312	411281	88577	0	26827
217	2316	864597	117054	7232	1489	321	0	29539
218	2322	2093797	2526055	109087	566116	121923	0	41206
219	2328	0	0	0	0	0	0	33782
220	2345	341793	46190	7518	297202	64008	0	29539
221	2353	0	0	0	0	0	0	29539
222	2360	426189	71906	3452	874670	188376	0	26827
223	2364	328468	31298	624	16563	3567	0	33782
224	2365	537219	47124	3521	0	0	0	29539
225	2368	543298	104153	5081	948787	235813	0	41206
226	2376	464098	52884	2830	0	0	0	33782
227	2390	0	0	0	0	0	0	29539
228	2394	1228402	182965	13864	524449	186261	0	41206
229	2399	0	0	0	0	0	0	29539
230	2400	0	0	0	0	0	0	26827
231	2419	328468	32929	1874	66810	14389	0	26827
232	2429	577551	117539	62203	0	0	0	29539
233	2430	6501134	6661361	215084	344970	122518	0	41206
234	2445	415461	68897	3285	800230	172344	0	33782
235	2447	0	1000	0	0	0	0	29539
236	2450	1160796	1420471	31753	691866	171958	0	41206
237	2461	356565	63076	2973	15446	3327	0	33782
238	2471	0	0	0	0	0	0	41206
239	2474	740217	426664	28735	0	0	0	26827
240	2481	1068738	320795	17744	930580	231288	0	51259
241	2527	870231	417182	56775	329925	117175	0	51259
242	2528	1614132	1128181	57991	363445	129080	0	51259
243	2531	521479	190457	3733	0	0	0	26827
244	2533	366452	54573	9703	468972	101002	0	26827
245	2536	0	0	0	0	0	0	29539

062057

BAT COST DATA

ORS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
246	2537	328468	32169	723	53411	11503	0	26827
247	2541	1718347	2295209	31514	445250	100200	0	29539
248	2551	0	0	0	0	0	0	26827
249	2556	0	0	0	0	0	0	26827
250	2573	1207405	376056	23701	407559	87775	0	29539
251	2590	858178	76221	12516	1861	401	0	29539
252	2592	422449	70859	3314	848616	182765	0	26827
253	2606	0	0	0	0	0	4453	29539
254	2626	0	0	0	0	0	0	29539
255	2631	1268164	2667176	37870	289758	62405	0	41206
256	2633	672524	139875	26412	398549	141547	0	41206
257	2668	0	0	0	0	0	0	26827
258	2673	818854	84752	12964	4094	882	0	29539
259	2678	339927	45444	2365	282872	60922	0	26827
260	2680	1018611	490372	26144	11166	2405	0	29539
261	2692	0	1000	0	0	0	0	26827
262	2693	0	0	0	0	0	0	29539
263	2695	1257905	1803263	39263	990259	246121	0	41206
264	2701	613699	669010	14248	0	0	0	41206
265	2711	458155	40786	4960	0	0	0	26827
266	2735	15495718	1263917	272135	571430	282947	0	29539
267	2739	117139	87578	8235	0	0	0	51259
268	2743	464278	82458	5450	623084	154862	0	29539
269	2764	506987	94189	18345	796051	197852	0	41206
270	2767	430485	64122	6220	21774	4689	0	29539
271	2770	778726	67022	6555	95830	12024	0	29539
272	2771	458155	40786	8157	0	0	0	33782
273	2781	917047	157462	33873	9119	1964	0	29539
274	2786	991020	73529	9169	35731	7695	0	29539
275	2795	1080229	865104	6742	575544	143047	0	41206
276	2816	1236899	268670	14958	792876	281595	0	41206
277	2818	62529	31909	6280	0	0	0	29539
278	3033	189850	38322	5836	0	0	0	29539
279	4002	0	0	0	0	0	0	29539
280	4010	0	0	0	0	0	0	29539
281	4017	0	0	0	0	0	0	26827
282	4018	992916	238249	41090	27171	5852	0	29539
283	4021	542838	109519	17926	158929	34228	0	26827
284	4037	1137313	745696	38271	72579	15631	0	29539
285	4040	553899	72254	14185	0	0	0	29539
286	4051	332273	41828	1578	215876	46493	0	26827
287	4055	53273	60681	20687	0	0	0	29539
		276018615	130778618	7113445	37547665	13354179	1388445	9448464

@ - PLANTS WERE INCORRECTLY INCLUDED IN THE LIST OF BAT SUBPART J PLANTS.

@@ - PLANTS WERE INCORRECTLY OMITTED FROM THE LIST OF BAT SUBPART J PLANTS.

Plant 2660 was removed because it was incorrectly listed in the original table.

PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
1	2	328468	31298	451	3722	802	0	29539
2	5	454351	32339	7848	0	0	0	26827
3	10	838120	74081	11933	3461	745	0	26827
4	22	1350986	740063	14094	52666	11343	0	26827
5	30	527873	211506	3608	0	0	0	29539
6	33	6310032	1110003	76627	139575	30060	0	41206
7	49	762984	156290	97412	0	0	0	26827
8	51*	1504443	970503	74771	116126	25010	0	29539
9	52	859140	76913	9185	4224	910	0	29539
10	58	0	0	0	0	0	0	26827
11	71	0	0	0	0	0	222650	33782
12	72*	174759	120426	22113	0	0	0	29539
13	79**	609506	49394	64822	0	0	0	33782
14	88	0	0	0	0	0	89060	26827
15	93	159927	34452	1793	0	0	0	29539
16	94	903624	158942	136275	7444	1603	0	26827
17	110*	941778	142910	21778	3722	802	0	29539
18	111	0	0	0	0	0	44530	26827
19	119	551358	45497	20278	0	0	0	26827
20	120	853663	77070	4347	9305	2004	0	29539
21	122	685600	58337	82762	0	0	0	29539
22	143	874584	100313	4664	3722	802	0	29539
23	149*	1040705	230985	38366	14330	3086	0	29539
24	158	0	0	0	0	0	89060	26827
25	161*	2084075	2296395	116658	298691	64328	0	29539
26	162	0	0	0	0	0	133590	29539
27	163	957582	218398	34291	11166	2405	0	29539
28	166	97912	254896	14951	0	0	0	29539
29	196*	1872042	1774434	99727	227414	48978	0	29539
30	199	583200	1328857	17239	0	0	0	26827
31	203	498503	42932	48063	0	0	0	26827
32	206	685303	51889	20386	0	0	0	26827
33	209	0	0	0	0	0	0	29539
34	212	56599	33901	950	0	0	356240	33782
35	214	1331004	307377	16147	182378	39278	0	29539
36	220	572588	46503	57081	0	0	0	33782
37	221	1357031	151339	11526	133062	28657	0	33782
38	232	489168	103636	7899	0	0	0	29539
39	240	31269428	2487826	362459	213085	45892	0	41206
40	244	0	0	0	0	0	0	29539
41	249	924202	88035	7293	30148	6493	0	26827
42	257	1741164	1576686	130061	74440	16032	0	29539
43	262*	922672	130868	119272	2419	521	0	29539
44	266	823404	74097	6493	2419	521	0	26827
45	276	655540	1052470	15244	0	0	0	41206
46	283	6182704	743893	80500	0	0	0	29539
47	285	0	0	0	0	0	8906	26827
48	292	1000599	133114	22335	64018	13788	0	29539
49	293*	1758967	2296850	41391	0	0	0	29539

PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
50	297	361900	65972	6312	76301	16433	22265	26827
51	299	340166	45542	1843	284733	61322	0	29539
52	302	613750	70848	5085	0	0	0	29539
53	310	722381	64072	13098	0	0	0	26827
54	321	497359	42880	48030	0	0	0	33782
55	326*	1073924	268071	35446	19354	4168	0	29539
56	334	859503	74494	4672	1675	361	0	33782
57	348	0	0	0	0	0	0	26827
58	354	1224415	817501	48497	84303	18156	0	26827
59	357	0	0	0	0	0	89060	29539
60	417	0	0	0	0	0	0	26827
61	423	901018	436183	8188	95830	12024	0	29539
62	428	0	0	0	0	0	222650	26827
63	430**	42169485	2030712	709062	768510	186036	0	41206
64	433*	1220449	467760	18187	44525	10020	0	29539
65	438	654024	88519	4423	0	0	0	26827
66	449	0	0	0	0	0	0	26827
67	451	0	0	0	0	0	44530	26827
68	458	27805712	2569528	1918455	0	0	0	51259
69	468	888651	105285	4889	16377	3527	0	33782
70	492	101464	34428	3376	0	0	102419	29539
71	494	542307	286402	11697	0	0	0	33782
72	508	0	0	0	0	0	89060	29539
73	522	1395176	1156287	66108	120965	26052	0	29539
74	529	454324	11526	2736	0	0	0	26827
75	543	650538	53800	6466	0	0	0	26827
76	544	0	0	0	0	0	22265	26827
77	567	847646	102057	7156	1861	401	0	26827
78	592	728736	64784	16158	0	0	0	33782
79	605	0	0	0	0	0	164761	26827
80	607*	1132003	340329	33877	29032	6252	0	29539
81	618	0	0	0	0	0	222650	29539
82	624	9126969	1606568	192704	263145	56673	0	41206
83	658	1127885	102926	25349	50433	10862	0	33782
84	661	889934	126239	6441	1787	385	0	29539
85	667	0	0	0	0	0	13359	29539
86	702	134256	54431	2036	0	0	0	29539
87	706	573612	47481	11810	0	0	0	26827
88	717	422301	43021	11241	0	0	0	26827
89	720	460286	45359	3062	0	0	0	29539
90	722	1610575	4789469	35742	472694	101803	0	41206
91	724	541598	45090	10571	0	0	0	26827
92	743	892807	162068	7421	7816	1683	0	29539
93	749	914467	82156	5281	26426	5691	0	26827
94	768*	906879	122354	26809	1489	321	0	29539
95	771	686809	590259	40983	61599	13266	0	29539
96	777	0	0	0	0	0	44530	29539
97	791	567803	46241	9656	0	0	0	26827
98	796	0	0	0	0	0	133590	26827

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PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT BAULING COSTS	ANNUAL MONITORING COSTS
99	797*	955346	152670	11520	4839	1042	0	29539
100	814*	18371051	1589253	117475	604877	150337	0	41206
101	830**	62290	34628	5816	0	0	142496	33782
102	845	408855	226882	6529	20657	4449	0	29539
103	846	0	0	0	0	0	133590	26827
104	862	1309815	1046843	60162	111697	24056	0	26827
105	874	866397	335120	21295	478277	103006	0	26827
106	880	0	0	0	0	0	26718	29539
107	887	1188068	288290	9275	198755	42805	0	29539
108	905	533766	83893	10340	0	0	0	26827
109	912	0	0	0	0	0	129137	26827
110	917	328468	31351	2095	33498	7214	0	29539
111	929	487756	42765	47600	0	0	0	26827
112	931	0	0	0	0	0	218197	26827
113	932	0	0	0	0	0	4453	29539
114	944**	70364	34628	3552	0	0	200385	33782
115	958	125548	33410	5701	0	0	0	29539
116	975	650933	54663	4596	0	0	0	33782
117	976	764737	157678	10077	0	0	0	26827
118	987	64292	34628	1056	0	0	400770	26827
119	988	0	0	0	0	0	178120	26827
120	992	571672	56046	4474	0	0	0	29539
121	997	887194	77032	13382	4653	1002	0	29539
122	1006	405203	110856	5463	3722	802	0	26827
123	1011	333002	42241	6053	223320	48096	0	29539
124	1018	1035194	148806	8063	88584	19078	0	29539
125	1026	0	0	0	0	0	222650	29539
126	1047**	1148662	141110	53794	0	0	0	33782
127	1052	950444	89666	4147	45408	9780	0	26827
128	1053	902643	86663	1399	6588	1419	0	33782
129	1057	37316	32901	735	0	0	89060	33782
130	1064	0	0	0	0	0	66795	29539
131	1069	422716	70934	4781	850477	183166	0	29539
132	1076	0	0	0	0	0	62342	26827
133	1083	838784	74097	8802	3536	762	0	26827
134	1085	48380	32901	3410	0	0	267180	33782
135	1086	694350	109625	80194	0	0	0	26827
136	1091*	1606481	1179293	50057	145158	31262	0	29539
137	1094**	762934	1077848	69366	0	0	0	29539
138	1107	457746	39842	2167	0	0	8906	26827
139	1117	519262	47679	1625	0	0	0	26827
140	1126*	1785276	2367798	82889	0	0	0	29539
141	1162	475122	126133	8948	0	0	0	26827
142	1163	1140424	114112	19813	9863	2124	0	29539
143	1172	1251348	210464	48045	0	0	0	26827
144	1173	60899	34628	12704	0	0	223986	33782
145	1175	0	0	0	0	0	178120	26827
146	1181	638757	471268	38306	46711	10060	0	29539
147	1188	792566	84182	7428	26054	5611	0	29539

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PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
148	1191*	1052633	231186	10364	14516	3126	0	29539
149	1194**	545470	44928	12135	0	0	51210	33782
150	1195	49374	32470	1605	0	0	0	26827
151	1197	896666	76291	10120	3908	842	0	26827
152	1202	680717	59792	20126	0	0	0	26827
153	1219	1372926	4807680	86775	0	0	0	26827
154	1220**	553161	46415	3312	0	0	0	33782
155	1223	382384	63768	1785	4839	1042	0	29539
156	1224	727383	1858099	15271	0	0	0	26827
157	1234**	642231	52824	12400	0	0	0	33782
158	1236	1149538	106808	26833	57133	12305	0	33782
159	1237	536188	47595	51292	0	0	0	29539
160	1249	1029111	112348	20143	24565	5291	0	33782
161	1253	454324	15794	8460	0	0	0	29539
162	1255	454719	27484	2124	0	0	0	29539
163	1264*	922672	130868	27814	2419	521	0	29539
164	1277	1058751	89923	7495	24193	5210	0	29539
165	1310	1557381	13052723	21744	148880	32064	0	41206
166	1313	35416	32901	826	0	0	115778	33782
167	1314	29242	32470	1064	0	0	0	26827
168	1320	547807	45285	4574	0	0	48983	26827
169	1322	990835	97162	19664	23263	5010	0	26827
170	1326	572056	43908	3477	0	0	0	33782
171	1351	999063	189245	12922	7816	1683	0	29539
172	1352	35416	32901	3108	0	0	115778	33782
173	1356*	952757	150678	30456	3908	842	0	29539
174	1357	520184	44196	8682	0	0	0	33782
175	1361*	1527456	1016348	26180	122454	26373	0	29539
176	1371	0	0	0	0	0	222650	26827
177	1386	0	0	0	0	0	44530	26827
178	1426	709883	113722	26766	176190	37515	0	29539
179	1432	1071388	95263	25879	65879	14188	0	26827
180	1433	0	0	0	0	0	14250	29539
181	1437	1096862	159394	10922	0	0	0	29539
182	1450	57955	34628	5609	0	0	115778	26827
183	1478*	919033	128803	10326	2253	481	0	29539
184	1504	1016525	94160	7320	29776	6413	0	26827
185	1507**	1287795	212558	54190	0	0	0	33782
186	1528	533208	44935	11618	0	0	0	26827
187	1534	615016	48592	5264	0	0	0	26827
188	1535	0	0	0	0	0	0	26827
189	1539	1185162	221174	35193	253468	54589	8906	29539
190	1548	0	0	0	0	0	0	29539
191	1556	454479	34298	2736	0	0	75701	29539
192	1560*	922672	130868	24555	2419	521	0	29539
193	1562	795401	95553	3438	136970	29499	0	29539
194	1564	0	0	0	0	0	75701	29539
195	1566	0	0	0	0	0	44530	29539
196	1575	28208	32470	3108	0	0	262727	26827

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PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
197	1595	601768	65959	6967	0	0	0	29539
198	1601	47664	25803	2420	0	0	0	29539
199	1608*	1145306	358154	16117	31451	6774	0	29539
200	1621	784293	69261	11491	93050	20040	0	29539
201	1622	1064996	92946	17705	33312	7174	0	33782
202	1628	919622	165423	131776	5583	1202	0	29539
203	1645	947272	102996	13371	6700	1443	0	29539
204	1653	657531	1074092	15332	0	0	0	41206
205	1657	7257460	798636	34795	544210	135756	0	41206
206	1659*	1315283	622379	60630	67740	14589	0	29539
207	1666*	1104071	304422	187427	24193	5210	0	29539
208	1667	1623082	256207	72236	304274	65531	0	26827
209	1706	6097260	1137104	33346	0	0	0	41206
210	1716*	1231704	485356	54019	48944	10541	0	29539
211	1718	0	0	0	0	0	133590	29539
212	1740	641504	132585	23290	722068	155510	0	26827
213	1742	923109	95203	70248	44664	9619	0	29539
214	1743	887664	100758	12901	6532	1407	0	26827
215	1744*	922672	130868	27814	2419	521	0	29539
216	1748	2257611	7860591	90815	660655	142284	0	29539
217	1751	365591	63768	3387	1303	281	222650	26827
218	1764	1043761	95435	8593	28473	6132	0	33782
219	1773	580822	47034	5120	0	0	0	26827
220	1788	634649	62389	16553	0	0	0	29539
221	1793*	915111	126274	126704	19354	4168	0	29539
222	1797	0	0	0	0	0	0	29539
223	1801	782792	42739	3270	5397	1162	0	29539
224	1805	717057	123492	17623	0	0	0	26827
225	1808	0	0	0	0	0	155855	26827
226	1812	0	0	0	0	0	89060	33782
227	1826	1077619	446297	16555	37220	8016	0	29539
228	1832**	580427	45654	10085	0	0	0	33782
229	1833	1220165	132986	16193	100494	21643	0	29539
230	1838	0	0	0	0	0	129137	29539
231	1843	0	0	0	0	0	44530	26827
232	1848	43397	26019	289	0	0	396317	29539
233	1853	26285652	2313798	438329	748004	185910	0	41206
234	1861	375681	57177	3426	40384	8697	0	29539
235	1876*	1101414	301149	14884	23435	5090	0	29539
236	1887	0	0	0	0	0	178120	29539
237	1888	0	0	0	0	0	71248	29539
238	1891	892291	291299	8488	0	0	0	26827
239	1894*	1051686	242944	41618	16005	3447	0	29539
240	1899	1185438	123022	30416	89328	19238	0	26827
241	1904**	44007030	3688304	734492	273759	97227	0	41206
242	1924	459292	43282	2798	0	0	0	29539
243	1931	938369	77576	68908	8188	1764	0	26827
244	1936	578284	485403	34655	24379	5250	0	29539
245	1945	454324	17894	8460	0	0	0	26827

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PRES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
246	1948	455222	39756	4957	0	0	0	26827
247	1970	454324	12406	2124	0	0	0	26827
248	1971	900065	85649	3751	9491	2044	0	29539
249	1974	96938	32722	4413	0	0	0	29539
250	1988	0	0	0	0	0	178120	26827
251	1993	633527	52282	6119	0	0	111325	26827
252	2001	454324	15971	3600	0	0	0	26827
253	2004	702369	51581	81880	0	0	0	29539
254	2007*	989217	180405	35860	8188	1764	0	26827
255	2018	1209073	2468986	18921	297760	64128	0	26827
256	2022	0	0	0	0	0	31171	327
257	2033	0	0	0	0	0	84607	[illegible]
258	2037	892112	75163	59499	4094	882	0	[illegible]
259	2050	0	0	0	0	0	222650	[illegible]
260	2057	454324	29682	7056	0	0	0	[illegible]
261	2070	2081896	3999167	104847	446640	96192	0	29539
262	2075	793256	85650	10493	36922	7952	0	29539
263	2080	328468	32940	3087	66996	14429	0	29539
264	2084**	854280	68111	131138	0	0	0	33782
265	2093	1214161	546905	34381	232625	50100	0	29539
266	2108	0	0	0	0	0	0	26827
267	2117	983374	107006	20500	65135	14028	0	29539
268	2123	340647	45736	1856	288455	62124	0	26827
269	2129*	1101414	301149	43479	23635	5090	0	29539
270	2147	0	0	0	0	0	178120	26827
271	2176	983822	85682	6573	21588	4649	0	29539
272	2177	742090	2351856	19326	0	0	0	41206
273	2184	726024	82729	7157	0	0	0	29539
274	2191	58990	32901	1357	0	0	0	29539
275	2214	0	0	0	0	0	138043	29539
276	2232	1155073	397803	21716	26054	5611	0	26827
277	2241	2182954	531323	596447	660655	142284	0	29539
278	2243	2400156	4710827	42146	524802	113026	0	29539
279	2250	872081	74529	7227	2619	521	0	33782
280	2253	0	0	0	0	0	222650	26827
281	2259	917285	176555	34154	9305	2004	0	26827
282	2261	1336228	1121406	23085	120593	25972	0	29539
283	2262	0	0	0	0	0	44530	29539
284	2288	510923	43477	10212	0	0	111325	29539
285	2293	595933	49305	61919	0	0	0	26827
286	2300	1957070	519881	38961	649489	139879	0	26827
287	2311	882117	77343	58940	13827	2978	0	26827
288	2318	894692	75354	5230	4280	922	0	33782
289	2341	1381989	337211	46828	277289	59719	0	33782
290	2346	577963	113686	7760	286771	101849	0	41206
291	2348	544620	328371	31732	29032	6252	0	29539
292	2350	924912	186944	12547	10422	2244	0	26827
293	2359	484162	42765	6750	0	0	0	26827
294	2402	0	0	0	0	0	35624	29539
295	2411	402421	65201	11567	710902	153106	0	29539

002064

PBES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
295	2411	402421	65201	11567	710902	153106	0	29539
296	2426	0	0	0	0	0	0	29539
297	2432	121867	341512	26581	0	0	0	29539
298	2436	703983	148658	26272	437085	155233	0	29539
299	2442	834882	98240	18076	1563	337	0	29539
300	2459	953218	82162	73814	14888	3206	0	29539
301	2462	789713	101712	4355	120965	26052	0	33782
302	2465*	1098767	297786	11498	23263	5010	0	29539
303	2469	832561	74063	4027	2605	561	0	26827
304	2485	19728758	1579796	317723	452223	97394	0	41206
305	2487	1247707	878249	8252	91561	19719	0	33782
306	2495	1099477	223216	26593	78162	16834	0	29539
307	2498	951319	78222	14867	9863	2124	0	26827
308	2501	952350	80454	6425	14814	3190	8906	26827
309	2507	0	0	0	0	0	0	26827
310	2517	964664	93303	13581	54527	11743	0	26827
311	2521	0	0	0	0	0	142496	26827
312	2524	883305	74849	4402	3350	721	0	33782
313	2539	1190941	833188	32053	60669	13066	0	26827
314	2548*	1294562	587462	43380	62902	13547	0	29539
315	2565	1777269	2550851	86293	288455	62124	0	26827
316	2571	0	0	0	0	0	222650	29539
317	2578	0	0	0	0	0	0	29539
318	2581	0	0	0	0	0	4453	26827
319	2608	0	0	0	0	0	89060	33782
320	2609	328468	32496	988	59347	12782	0	29539
321	2634	187711	242227	10460	0	0	0	26827
322	2635	6405815	785653	59184	139575	30060	0	29539
323	2636	782792	44626	9033	2978	641	0	29539
324	2641	664770	93636	6419	0	0	0	29539
325	2642	0	0	0	0	0	28499	26827
326	2646	1394702	169266	34517	3722	802	0	29539
327	2647	0	0	0	0	0	0	29539
328	2666**	580427	44923	3439	0	0	0	33782
329	2677*	1481098	924751	19412	109799	23647	0	29539
330	2679	328468	36211	4277	120034	25852	0	29539
331	2685	305281	143156	6960	0	0	0	29539
332	2699	39243	73800	6260	0	0	0	29539
333	2714	847479	76221	11418	1303	281	0	29539
334	2736	781792	171741	8944	0	0	0	29539
335	2741	968633	101640	19370	55458	11944	0	26827
336	2748	1194885	140087	13793	0	0	0	29539
337	2756	9842187	1882475	185390	533084	132991	0	41206
338	2776	1022687	212187	36615	10254	2208	0	29539
339	2779	485880	96366	8849	0	0	0	29539
340	2793	843693	122221	11093	0	0	0	26827
341	2794	4171026	838656	76755	0	0	0	41206
342	2796	324147	39903	5609	0	0	0	26827
343	2805	0	0	0	0	0	0	29539

002065

PSES COST DATA

OBS	PLANT NUMBER	TOTAL CAPITAL COSTS	TOTAL O&M COSTS	TOTAL LAND COSTS	CAPITAL SLUDGE COSTS	O & M SLUDGE COSTS	CONTRACT HAULING COSTS	ANNUAL MONITORING COSTS
344	2810	0	0	0	0	0	218197	26827
345	2814	0	0	0	0	0	89060	33782
346	4001	990103	290689	34197	22016	4741	0	33782
347	4003	1261967	140177	42542	119104	25651	0	29539
348	4006*	1057778	249682	65230	16935	3647	0	29539
349	4007	908142	100162	19288	0	0	0	29539
350	4008	1149492	130784	129546	55830	12024	0	29539
351	4009	0	0	0	0	0	89060	29539
352	4014	361861	69268	1176	1210	261	0	29539
353	4022	61007	32470	3464	0	0	0	29539
354	4023	738562	2282384	6771	0	0	0	41206
355	4024	398832	65926	1240	1117	240	178120	26827
356	4026*	1273388	952403	57276	58063	12505	0	29539
357	4027	1210395	144097	35244	76673	16513	0	29539
358	4032	887229	130753	29243	2233	481	0	29539
359	4042	0	0	0	0	0	0	26827
360	4043	328468	34584	2744	93794	20200	0	29539
361	4044	1537378	1758984	19641	191869	41322	0	29539
362	4046	0	0	0	0	0	44530	33782
363	4047	554045	96814	2982	16749	3607	0	29539
364	4048	0	0	0	0	0	26046	26827
365	4050	838784	74097	2826	3536	762	0	26827
366	4052	0	0	0	0	0	133590	26827
367	4057	923985	76960	13243	6588	1419	0	26827
368	4064	0	0	0	0	0	22265	29539
369	4066	0	0	0	0	0	93513	29539
370	4070	856557	74494	4242	1563	337	0	33782
371	4072**	980909	173164	11340	7258	1563	0	29539
		490876838	134881046	12673321	20247968	4605802	10031719	11068630

* - THE INLUSION OF PLANT # 1293T TO THE DETENTION TIME ANALYSIS FOR THE 18 REMAINDED POLLUTANTS CHANGED THE DETENTION TIME ASSIGNMENT FOR THESE PLANTS FROM 130 TO 413 HOURS.

** - THE INLUSION OF PLANT # 1293T TO THE DETENTION TIME ANALYSIS FOR THE 18 REMAINDED POLLUTANTS CHANGED THE DETENTION TIME ASSIGNMENT FOR THESE PLANTS FROM 84 TO 413 HOURS.

002066

PLANT NUMBER	BAT TECHNOLOGY COSTED					
1	MONITORING COSTS ONLY					
12		SS		CN	BP	
15	CP	SS	AC	CN	BP	
33	MONITORING COSTS ONLY					
61	CP	SS		CN	BP	
63	CPU					
76	CP	SS	AC	CN	BP	
83	CP					
87		SS			BP	
101	MONITORING COSTS ONLY					
102	MONITORING COSTS ONLY					
105	CP	SSU	AC	CN	BP	
112						CH
114	CP	SS			BP	
154	CP					
155	CP	SS		CN	BP	
159	MONITORING COSTS ONLY					
177	CP	SS			BP	
180						CH
183		SS			BP	
190	CPU		AC	CN	BP	
205	CP		AC		BP	
225	CP			CN	BP	
227		SS				
250	CP					
254	CP					
259	MONITORING COSTS ONLY					
260	CP	SS		CN	BP	
267	CP	SS		CN	BP	
269					BP	
284	CP				BP	
294	MONITORING COSTS ONLY					
296	CP				BP	
301	CP	SS	AC	CN	BP	
352	CP				BP	
384	CP	SS			BP	
387	CP					
392		SS				
394		SS				
399	CPU					
412		SS			BP	
415	CP	SS			BP	
443	CP	SS	AC	CN		
444					BP	
446	CP	SS			BP	

002067

PLANT NUMBER	BAT TECHNOLOGY COSTED					
447	CP	SS		CN	BP	
451	MONITORING COSTS ONLY					
481		SS		CN		
485	CPU	SS	AC	CN	BP	
486	CP	SS		CN	BP	
488	CP	SS	AC	CN	BP	
500	CP					CH
502						
518	CP	SS	AC	CN	BP	
523				CN		
525	MONITORING COSTS ONLY					
536	CP	SS	AC	CN	BP	
569	MONITORING COSTS ONLY					
580					BP	
602						CH
608		SS				
611	CP	SS	AC	CN	BP	
614	CP					
633	CP	SS			BP	
657	CP				BP	
659		SS				
662	CP	SS			BP	
663	CP	SS				
664	CP	SS				CH
669						
682	CP					
683	CP	SS			BP	
695	CPU				BP	
709						CH
727	CP					
741	MONITORING COSTS ONLY					
758	MONITORING COSTS ONLY					
775	CPU	SS				
802	CP					
811	MONITORING COSTS ONLY					
814	CP	SS		CN	BP	
819	CP	SS	AC	CN	BP	
825	CP	SS				
844	MONITORING COSTS ONLY					
851		SS		CN	BP	
859	MONITORING COSTS ONLY					
866	MONITORING COSTS ONLY					
871	CPU	SS				
876		SS				
877	CP	SS	AC	CN	BP	

002068

PLANT NUMBER	BAT TECHNOLOGY COSTED					
883	MONITORING COSTS ONLY					
888	MONITORING COSTS ONLY					
908	CP					
909	CP	SS			BP	
913	CP	SSU			BP	
938				CN		
942	MONITORING COSTS ONLY					
948	CP	SS			BP	
956						CH
962	CP	SS				
970	CP					
973	CP			CN	BP	
984	CP					
990	CP					
991						CH
992		SS				
1012	CP					
1020	CP					
1033						CH
1038	CP				BP	
1059	CPU					
1061	CP			CN		
1062	MONITORING COSTS ONLY					
1067	CP				BP	
1133					BP	
1137	CP				BP	
1139		SS			BP	
1148	CP					
1149		SS				
1157						CH
1203	CP					
1241	CP				BP	
1249	CP	SS		CN	BP	
1267	MONITORING COSTS ONLY					
1299	MONITORING COSTS ONLY					
1319	MONITORING COSTS ONLY					
1323		SS		CN	BP	
1327	CP	SS		CN	BP	
1340	CP	SS			BP	
1343	CP	SS	AC			
1348	CPU					
1349	MONITORING COSTS ONLY					
1389	CP					
1407	CP	SS				
1409	CP	SS			BP	

002069

PLANT NUMBER	BAT TECHNOLOGY COSTED					
1414		SS				
1438	CP					
1439	CP	SS	AC			
1446			AC			
1464		SS				
1494	CP	SS	AC			
1520	CP	SS	AC	CN	BP	
1522	CPU	SS				
1524	CP					
1532	CP				BP	
1569	CP	SS			BP	
1572	CPU					
1593	MONITORING COSTS ONLY					
1609	CP	SS				
1616	CP					
1617		SS				
1618		SS			BP	
1624	CP	SS				
1643	MONITORING COSTS ONLY					
1647	CP	SS				
1650	CP	SS		CN	BP	
1656	MONITORING COSTS ONLY					
1670						CH
1684					BP	CH
1688	CP					
1695	CP	SS			BP	
1698		SS				
1714	CP	SS				
1717	CP					
1724	CP	SS	AC		BP	
1753	CP					
1766	CP					
1769	CPU	SS	AC			
1774	CP					
1785	CPU	SSU			BP	
1802	CP					
1839	CP	SS				
1869		SS				
1877	CP	SS	AC	CN	BP	
1881	CP					
1890	CP			CN	BP	
1905	CP				BP	
1910	CP		AC	CN	BP	
1911	CP				BP	
1928	CP	SS			BP	

002070

PLANT NUMBER	BAT TECHNOLOGY COSTED					
1937	CP	SS	AC	CN	BP	
1943	MONITORING COSTS ONLY					
1973	CP					
1977	MONITORING COSTS ONLY					
1986	MONITORING COSTS ONLY					
2009		SS			BP	
2020	MONITORING COSTS ONLY					
2026		SS				
2030	CPU	SS	AC	CN	BP	
2047	CP					
2049	CP			CN		
2055	MONITORING COSTS ONLY					
2062	CP	SS				
2073	CP	SS			BP	
2090				CN		
2110	CP				BP	
2148	CP			CN		
2181	MONITORING COSTS ONLY					
2193						CH
2198	CP					
2206		SS			BP	
2221	CP	SS				
2222	CP					
2227	CP	SS				
2228	CP	SS				
2236	CP				BP	
2242	CP	SS				
2254	CP				BP	
2268	CP	SS	AC			
2272	CP	SS			BP	
2281	CP		AC		BP	
2292	CPU	SS	AC	CN	BP	
2296	MONITORING COSTS ONLY					
2307	MONITORING COSTS ONLY					
2313	MONITORING COSTS ONLY					
2315	CP			CN		
2316	CP	SS	AC	CN	BP	
2322	CP	SS	AC	CN	BP	
2328	MONITORING COSTS ONLY					
2345	CP					
2353	MONITORING COSTS ONLY					
2360	CP					
2364	CP					
2365		SS			BP	
2368	CP					

002071

PLANT NUMBER	BAT TECHNOLOGY COSTED					
2376		SS				
2390	MONITORING COSTS ONLY					
2394	CP	SS				
2399	MONITORING COSTS ONLY					
2400	MONITORING COSTS ONLY					
2419	CP					
2429	CPU	SS	AC	CN	BP	
2430	CP	SS			BP	
2445	CP					
2447	CPU					
2450	CP	SS				
2461	CP				BP	
2471	MONITORING COSTS ONLY					
2474	CPU	SS		CN	BP	
2481	CP	SS				
2527	CP			CN		
2528	CP	SS			BP	
2531		SS				
2533	CP					
2536	MONITORING COSTS ONLY					
2537	CP					
2541	CP	SS	AC	CN		
2551	MONITORING COSTS ONLY					
2556	MONITORING COSTS ONLY					
2573	CP	SS		CN	BP	
2590	CP	SS			BP	
2592	CP					
2606						CH
2626	MONITORING COSTS ONLY					
2631	CP	SS			BP	
2633	CP					
2668	MONITORING COSTS ONLY					
2673	CP	SS			BP	
2678	CP					
2680	CP	SS	AC			
2692	CPU					
2693	MONITORING COSTS ONLY					
2695	CP	SS				
2701		SS				
2711		SS				
2735	CP	SS			BP	
2739	CPU			CN		
2763	CP					
2764	CP					

002072

PLANT NUMBER	BAT TECHNOLOGY COSTED				
2767	CP				BP
2770	CP	SS			
2771		SS			
2781	CP	SS	AC	CN	BP
2786	CP				BP
2795	CP	SS			
2816	CP				BP
2818					BP
3033					BP
4002	MONITORING COSTS ONLY				
4010	MONITORING COSTS ONLY				
4017	MONITORING COSTS ONLY				
4018	CP	SS	AC	CN	BP
4021	CP			CN	BP
4037	CP	SS	AC	CN	BP
4040		SS		CN	BP
4051	CP				
4055			AC		BP

NOTES:

CP - CHEMICAL PRECIPITATION
CPU - CHEMICAL PRECIPITATION UPGRADES
SS - STEAM STRIPPING
SSU - STEAM STRIPPING UPGRADES
AC - ACTIVATED CARBON
CN - CYANIDE DESTRUCTION
BP - BIOLOGICAL PACKAGE
CH - CONTRACT HAULING

062073

PLANT NUMBER	PSES TECHNOLOGY COSTED					
2	CP					
5		SS				
10	CP	SS			BP	
22	CP	SS	AC		BP	
30		SS				
33	CP		AC		BP	
49		SS				
51	CP	SS	AC	CN	BP	
52	CP	SS			BP	
58	MONITORING COSTS ONLY					
71						CH
72	CPU	SSU	AC	CN	BP	
79		SS			BP	
88						CH
93					BP	
94	CP	SS	AC		BP	
110	CP	SS	AC	CN	BP	
111						CH
119		SS			BP	
120	CP	SS			BP	
122		SS			BP	
143	CP	SS		CN	BP	
149	CP	SS	AC	CN	BP	
158						CH
161	CP	SS	AC	CN	BP	
162						CH
163	CP	SS	AC	CN	BP	
166			AC			
196	CP	SS	AC	CN	BP	
199			AC		BP	
203		SS			BP	
206	CPU	SS			BP	
209	MONITORING COSTS ONLY					
212	CPU				BP	CH
214	CP	SS			BP	
220		SS			BP	
221	CP	SS			BP	
232		SS				
240	CP	SS			BP	
244	MONITORING COSTS ONLY					
249	CP	SS			BP	
257	CP		AC		BP	
262	CP	SS	AC	CN	BP	
266	CP	SS			BP	
276		SS				
283		SSU			BP	
285						CH
292	CP	SS		CN	BP	
293	CPU	SS	AC	CN	BP	
297	CP				BP	CH

002074

PLANT NUMBER	PSES TECHNOLOGY COSTED					
299	CP					
302		SS			BP	
310		SS			BP	
321		SS			BP	
326	CP	SS	AC	CN	BP	
334	CP	SS			BP	
348	MONITORING COSTS ONLY					
354	CP	SS	AC		BP	
357						CH
417	MONITORING COSTS ONLY					
423	CP	SS				
428						CH
430	CP	SS		CN	BP	
433	CP	SS	AC	CN	BP	
438		SS			BP	
449	MONITORING COSTS ONLY					
451						CH
458		SS		CN	BP	
468	CP	SS		CN	BP	
492					BP	CH
494		SSU			BP	
508						CH
522	CP	SS	AC	CN	BP	
529		SS				
543		SS			BP	
544						CH
567	CP	SS	AC		BP	
592		SS			BP	
605						CH
607	CP	SS	AC	CN	BP	
618						CH
624	CP	SS			BP	
658	CP	SS			BP	
661	CP	SS	AC	CN	BP	
667						CH
702		SSU			BP	
706		SS			BP	
717					BP	
720		SS				
722	CP	SS		CN	BP	
724		SS			BP	
743	CP	SS	AC		BP	
749	CP	SS			BP	
768	CP	SS	AC	CN	BP	
771	CP		AC		BP	
777						CH
791		SS			BP	
796						CH
797	CP	SS	AC	CN	BP	
814	CP	SS		CN	BP	

PLANT NUMBER	PSES TECHNOLOGY COSTED					
830					BP	CH
845	CP		AC			
846						CH
862	CP	SS	AC		BP	
874	CP	SS				
880						CH
887	CP	SS			BP	
905	CPU	SS	AC		BP	
912						CH
917	CP					
929		SS			BP	
931						CH
932						CH
944					BP	CH
958					BP	
975		SS			BP	
976		SS			BP	
987					BP	CH
988						CH
992		SS			BP	
997	CP	SS			BP	
1006	CP		AC		BP	
1011	CP					
1018	CP	SS		CN	BP	
1026						CH
1047		SS			BP	
1052	CP	SS			BP	
1053	CP	SS			BP	
1057					BP	CH
1064						CH
1069	CP					
1076						CH
1083	CP	SS			BP	
1085					BP	CH
1086		SS			BP	
1091	CP	SS	AC	CN	BP	
1094			AC		BP	
1107		SS				CH
1117		SS			BP	
1126	CPU	SS	AC	CN	BP	
1162		SS				
1163	CP	SS		CN	BP	
1172		SS			BP	
1173					BP	CH
1175						CH
1181	CP		AC		BP	
1188	CP	SS				
1191	CP	SS	AC	CN	BP	
1194		SS			BP	CH
1195					BP	

002076

PLANT NUMBER	PSES TECHNOLOGY COSTED					
1197	CP	SS			BP	
1202		SS			BP	
1219			AC		BP	
1220		SS			BP	
1223	CP				BP	
1224			AC		BP	
1234		SS			BP	
1236	CP	SS			BP	
1237		SS			BP	
1249	CP	SS		CN	BP	
1253		SS				
1255		SS				
1264	CP	SS	AC	CN	BP	
1277	CP	SS			BP	
1310	CP	SS			BP	
1313					BP	CH
1314					BP	
1320		SS			BP	CH
1322	CP	SS			BP	
1326		SS			BP	
1351	CP	SS	AC	CN	BP	
1352					BP	CH
1356	CP	SS	AC	CN	BP	
1357	CPU	SS			BP	
1361	CP	SS	AC	CN	BP	
1371						CH
1386						CH
1426	CP			CN	BP	
1432	CP	SS			BP	
1433						CH
1437		SS		CN	BP	
1450					BP	CH
1478	CP	SS	AC	CN	BP	
1504	CP	SS			BP	
1507		SS			BP	
1528		SS			BP	
1534	CPU	SS			BP	
1535						CH
1539	CP	SS			BP	
1548						CH
1556		SS				
1560	CP	SS	AC	CN	BP	
1562	CP	SS				
1564						CH
1566						CH
1575					BP	CH
1595		SS			BP	
1601				CN		
1608	CP	SS	AC	CN	BP	
1621	CP	SS				

002077

PLANT NUMBER	PSES TECHNOLOGY COSTED					
1622	CP	SS			BP	
1628	CP	SS	AC	CN	BP	
1645	CP	SS		CN	BP	
1653		SS				
1657	CP	SSU		CN	BP	
1659	CP	SS	AC	CN	BP	
1666	CP	SS	AC	CN	BP	
1667	CP	SS			BP	
1706		SS			BP	
1716	CP	SS	AC	CN	BP	
1718						CH
1740	CP	SSU			BP	
1742	CP	SS			BP	
1743	CP	SS		CN	BP	
1744	CP	SS	AC	CN	BP	
1748	CP	SS	AC			
1751	CP				BP	CH
1764	CP	SS			BP	
1773		SS			BP	
1788		SS			BP	
1793	CP	SS	AC	CN	BP	
1797	MONITORING COSTS ONLY					
1801	CP	SS				
1805		SS			BP	
1808						CH
1812						CH
1826	CP	SS	AC	CN	BP	
1832		SS			BP	
1833	CP	SS			BP	
1838						CH
1843						CH
1848	CPU			CN		CH
1853	CP	SS		CN	BP	
1861	CP			CN		
1876	CP	SS	AC	CN	BP	
1887						CH
1888						CH
1891		SS			BP	
1894	CP	SS	AC	CN	BP	
1899	CP	SS			BP	
1904	CP	SS			BP	
1924		SS				
1931	CP	SS			BP	
1936	CP		AC		BP	
1945		SS				
1948		SS				
1970		SS				
1971	CP	SS			BP	
1974					BP	
1988						CH

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PLANT NUMBER	PSES TECHNOLOGY COSTED					
1993		SS			BP	CH
2001		SS				
2004		SS			BP	
2007	CP	SS	AC	CN	BP	
2018	CP		AC		BP	
2022						CH
2033						CH
2037	CP	SS			BP	
2050						CH
2057		SS				
2070	CP	SS	AC	CN	BP	
2075	CP	SS				
2080	CP					
2084		SS			BP	
2093	CP	SS			BP	
2108	MONITORING COSTS ONLY					
2117	CP	SS			BP	
2123	CP					
2129	CP	SS	AC	CN	BP	
2147						CH
2176	CP	SS			BP	
2177		SS				
2184		SS		CN	BP	
2191					BP	
2214						CH
2232	CP	SS		CN	BP	
2241	CP	SS			BP	
2243	CP	SS	AC	CN	BP	
2250	CP	SS			BP	
2253						CH
2259	CP	SS	AC		BP	
2261	CP	SS	AC		BP	
2262						CH
2288		SS			BP	CH
2293		SS			BP	
2300	CP	SS			BP	
2311	CP	SS			BP	
2318	CP	SS			BP	
2341	CP	SS			BP	
2346	CP					
2348	CP		AC		BP	
2350	CP	SS	AC		BP	
2359		SS			BP	
2402						CH
2411	CP					
2426	MONITORING COSTS ONLY					
2432			AC			
2436	CP					
2442	CP	SS	AC		BP	
2459	CP	SS			BP	

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PLANT NUMBER	PSES TECHNOLOGY COSTED					
2462	CP	SS			BP	
2465	CP	SS	AC	CN	BP	
2469	CP	SS			BP	
2485	CP	SS			BP	
2487	CP	SS	AC		BP	
2495	CP	SS			BP	
2498	CP	SS			BP	CH
2501	CP	SS				
2507	MONITORING COSTS ONLY					
2517	CP	SS			BP	
2521						CH
2524	CP	SS			BP	
2539	CP	SS	AC		BP	
2548	CP	SS	AC	CN	BP	
2565	CP	SS	AC		BP	
2571						CH
2578	MONITORING COSTS ONLY					
2581						CH
2608						CH
2609	CP					
2634			AC		BP	
2635	CP	SSU			BP	
2636	CP	SS				
2641		SS			BP	
2642						CH
2646	CP	SS			BP	
2647	MONITORING COSTS ONLY					
2666		SS			BP	
2677	CP	SS	AC	CN	BP	
2679	CP					
2685		SS				
2699			AC			
2714	CP	SS			BP	
2736		SS			BP	
2741	CP	SS			BP	
2748		SS			BP	
2756	CP	SS	AC	CN	BP	
2776	CP	SS	AC	CN	BP	
2779		SS				
2793		SS			BP	
2794			AC			
2796					BP	
2805	MONITORING COSTS ONLY					
2810						CH
2814						CH
4001	CP	SS	AC		BP	
4003	CP	SS			BP	
4006	CP	SS	AC	CN	BP	
4007		SS			BP	
4008	CP	SS		CN	BP	

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PLANT NUMBER	PSES TECHNOLOGY COSTED					
4009						CH
4014	CP	SSU			BP	
4022					BP	
4023		SS				
4024	CP				BP	CH
4026	CP	SS	AC	CN	BP	
4027	CP	SS		CN	BP	
4032	CP	SS	AC	CN	BP	
4042	MONITORING COSTS ONLY					
4043	CP					
4044	CP	SS	AC	CN	BP	
4046						CH
4047	CP	SSU		CN	BP	
4048						CH
4050	CP	SS			BP	
4052						CH
4057	CP	SS			BP	
4064						CH
4066						CH
4070	CP	SS			BP	
4072	CP	SS	AC	CN	BP	

NOTES:

CP - CHEMICAL PRECIPITATION
CPU - CHEMICAL PRECIPITATION UPGRADES
SS - STEAM STRIPPING
SSU - STEAM STRIPPING UPGRADES
AC - ACTIVATED CARBON
CN - CYANIDE DESTRUCTION
BP - BIOLOGICAL PACKAGE
CH - CONTRACT HAULING

002081

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB - 7 1992

OFFICE OF WATER

MEMORANDUM

SUBJECT: Supplement to the Record of the Proposed Amendments to the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category Regulation

FROM: George M. Jett
Project Officer
Engineering & Analysis Division (WH-552)

TO: The Record

Attached is an erratum and supplemental information for the record of the proposed amendments for the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Point Source Category regulation that were proposed in the Federal Register on December 6, 1991 (56 FR 63897).

In reviewing the proposed regulation support document ("Supplement to the OCPSF Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category", EPA 440/1-91/009a, pages 01877-02015, Vol. III of the record), EPA has found several errors that may affect a reviewer's ability to adequately evaluate supporting information to the December 6, 1991 proposal. The erratum for EPA 440/1-91/009a was added to the record on January 22, 1992.

Correction of the errors found in EPA 440/1-91/009a required a reassessment of the economic analysis. The resulting erratum to the economic support document (Re-Evaluation of the Economic Impact Analysis of Effluent Limitations Guidelines for the Organic Chemicals, Plastics, and Synthetic Fibers Industry Using Revised Compliance Costs) is included in this supplement.

Also, two record memorandum, one which was inadvertently left out of the January 22, 1992 submission and another which has been generated to assist reviewers in their comment responses, are now added to the proposed OCPSF record.

The attached supplement completes the record for the December 6, 1991 proposed OCPSF rulemaking package.

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INTER OFFICE MEMO

January 8, 1992

TO: OCPSF Record

FROM: Art Shattuck AS

SUBJECT: Omission of Plant 1293T from Table III-8 of the Supplement to the OCPSF Development Document
SAIC Project No. 01-0835-03-0127-000

During my review of the subject document, I determined that Plant 1293T had been improperly omitted from Table III-8, "Detention Time Analysis for the 18 Remanded Pollutants". A revised Table III-8 is attached. Based on the inclusion of Plant 1293T and its associated detention time, the costing methodology for revised in-plant biological treatment systems will be changed as follows:

- For Pollutant #34 (2,4-Dimethylphenol), all BAT Subpart J and PSES plants with raw waste concentrations greater than 10 mg/l will be costed for an in-plant biological treatment system with a detention time of 413 hours; plants with raw waste concentrations above trigger levels but below 10 mg/l will be costed for an in-plant biological treatment system with a detention time of 84 hours.

- For Pollutant #55 (Naphthalene), all BAT Subpart J and PSES plants with raw waste concentrations greater than 3 mg/l will be costed for an in-plant biological treatment system with a detention time of 413 hours; plants with raw waste concentrations above trigger levels but below 3 mg/l will be costed for an in-plant biological treatment system with a detention time of 84 hours.

- For Pollutant #80 (Fluorene), all BAT Subpart J and PSES plants with raw waste concentrations greater than 0.5 mg/l will be costed for an in-plant biological treatment system with a detention time of 413 hours; plants with raw waste concentrations above trigger levels but below 0.5 mg/l will be costed for an in-plant biological treatment system with a detention time of 84 hours.

- For the remaining 15 remanded pollutants (excluding phenol), all BAT Subpart J and PSES plants with raw waste concentrations above trigger levels will be costed for an in-plant biological treatment system with a detention time of 84 hours.

The impact of this change in the costing methodology is that 52 PSES facilities receive revised in-plant biological treatment costs based

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on detention time changes; costs for BAT Subpart J plants remain unchanged. Table 1 lists the PSES plants affected by the change in costing methodology and indicates the change in detention time and the remanded pollutant which caused the change. Table 2 presents the revised in-plant biological treatment system costs before and after the change in the costing methodology.

AS/dg
Attachment

cc: E. Forsht, USEPA, Washington, DC
G. Jett, USEPA, Washington, DC

REVISED TABLE III-8

DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS

Pollutant No.	Plant No.	Average Influent Concentration (ppm)	Average Effluent Concentration (ppm)	Detention Times (hours)	Source Document for Detention Time
1 (Acenaphthene)	12 F 1293 T 306 V	0.102 0.876 3.850	ND (Not Detected) ND 0.013	62 413 36	308 Questionnaire C12 12 Plant Report Verification Report
34 (2,4-Dimethylphenol)	12 F 3033 T 306 V 1293 T	0.697 4.592 9.967 29.868	0.013 0.014 0.0102 ND	62 NA 36 413	308 Questionnaire C12 -- Verification Report 12 Plant Report
39 (Fluoranthene)	851 V 1293 T 306 V	0.133 1.572 5.225	0.0102 0.0115 0.0158	34 413 36	Verification Report 12 Plant Report Verification Report
55 (Naphthalene)	2631 V 695 V 2430 V 3033 T 384 T 1630 V 851 V 12 F 1293 T	0.232 0.250 0.327 0.520 1.040 1.411 2.255 2.275 20.964	0.017 ND 0.0112 ND ND ND ND 0.012 ND	45 -- 4.5 -- 17 72 34 62 413	Verification Report -- 308 Supplemental Questionnaire -- 12 Plant Report 308 Supplemental Questionnaire Verification Report 308 Questionnaire C12 12 Plant Report
66 (Bis[2-Ethylhexyl] phthalate)	948 F 948 V	1.097 4.396	0.043 0.053	72 72	Verification Report Verification Report
68 (Di-n-Butylphthalate)	948 F 948 V	0.377 2.265	0.013 0.03	72 72	Verification Report Verification Report
70 (Diethylphthalate)	948 V 948 F	0.433 1.220	0.001 0.023	72 72	Verification Report Verification Report
71 (Dimethylphthalate)	948 V 948 F	0.134 0.207	0.037 ND	72 72	Verification Report Verification Report
72 (Benzo(a)Anthracene)	1293 T 306 V	0.308 1.585	ND 0.056	413 36	12 Plant Report Verification Report

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REVISED TABLE III-8 (CONTINUED)

DETENTION TIME ANALYSIS FOR THE 18 REMANDED POLLUTANTS

Pollutant No.	Plant No.	Average Influent Concentration (ppm)	Average Effluent Concentration (ppm)	Detention Times (hours)	Source Document for Detention Time
76 (Chrysene)	1293 T	0.266	ND	413	12 Plant Report
	384 T	0.312	ND	17	12 Plant Report
	306 V	1.082	ND	36	Verification Report
77 (Acenaphthylene)	1293 T	0.472	ND	413	12 Plant Report
	1650 V	0.641	ND	72	308 Supplemental Questionnaire
	306 V	9.758	0.013	72	Verification Report
78 (Anthracene)	851 V	0.494	0.0107	34	Verification Report
	1293 T	0.694	ND	413	12 Plant Report
	306 V	2.105	ND	36	Verification Report
80 (Fluorene)	1650 V	0.167	ND	42	308 Supplemental Questionnaire
	851 V	0.475	ND	34	Verification Report
	1293 T	1.232	ND	413	12 Plant Report
81 (Phenanthrene)	1650 V	0.166	ND	72	308 Supplemental Questionnaire
	2313 T	0.612	0.025	72	12 Plant Report
	851 V	2.452	ND	34	Verification Report
	1293 T	3.285	ND	413	12 Plant Report
	306 V	8.450	0.017	36	Verification Report
84 (Pyrene)	851 V	0.246	0.0165	34	Verification Report
	1293 T	1.023	0.0103	413	12 Plant Report
	306 V	3.083	0.016	36	Verification Report

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TABLE 1
PSES PLANTS AFFECTED BY THE
CHANGE IN COSTING METHODOLOGY

PLANT #	DETENTION TIME CHANGE	POLLUTANT
PART ABC PLANTS (15 facilities):		
79	84 413	Naphthalene
430	84 - 413	Naphthalene
830	84 - 413	Naphthalene
944	84 - 413	Naphthalene
1047	84 - 413	Naphthalene
1094	84 - 413	Naphthalene
1194	84 - 413	Naphthalene
1220	84 - 413	Naphthalene
1234	84 - 413	Naphthalene
1356	130 - 413	2,4-Dimethylphenol, Naphthalene
1507	84 - 413	Naphthalene
1832	84 - 413	Naphthalene
1904	84 - 413	Naphthalene, Fluorene
2084	84 - 413	Naphthalene
2666	84 - 413	Naphthalene
PART A PLANTS (37 facilities):		
51	130 - 413	2,4-Dimethylphenol
72	130 - 413	2,4-Dimethylphenol
110	130 - 413	2,4-Dimethylphenol
149	130 - 413	2,4-Dimethylphenol
161	130 - 413	2,4-Dimethylphenol
196	130 - 413	2,4-Dimethylphenol
262	130 - 413	2,4-Dimethylphenol
293	130 - 413	2,4-Dimethylphenol
326	130 - 413	2,4-Dimethylphenol
433	130 - 413	2,4-Dimethylphenol
607	130 - 413	2,4-Dimethylphenol
768	130 - 413	2,4-Dimethylphenol
797	130 - 413	2,4-Dimethylphenol
814	130 - 413	2,4-Dimethylphenol
1091	130 - 413	2,4-Dimethylphenol
1126	130 - 413	2,4-Dimethylphenol
1191	130 - 413	2,4-Dimethylphenol
1264	130 - 413	2,4-Dimethylphenol
1361	130 - 413	2,4-Dimethylphenol
1478	130 - 413	2,4-Dimethylphenol
1560	130 - 413	2,4-Dimethylphenol

TABLE 1
PSES PLANTS AFFECTED BY THE
CHANGE IN COSTING METHODOLOGY

PLANT #	DETENTION TIME CHANGE	POLLUTANT
PLANT A PLANTS (37 facilities) cont'd:		
1608	130 - 413	2,4-Dimethylphenol
1659	130 - 413	2,4-Dimethylphenol
1666	130 - 413	2,4-Dimethylphenol
1716	130 - 413	2,4-Dimethylphenol
1744	130 - 413	2,4-Dimethylphenol
1793	130 - 413	2,4-Dimethylphenol
1876	130 - 413	2,4-Dimethylphenol
1894	130 - 413	2,4-Dimethylphenol
2007	130 - 413	2,4-Dimethylphenol
2129	130 - 413	2,4-Dimethylphenol
2465	130 - 413	2,4-Dimethylphenol
2548	130 - 413	2,4-Dimethylphenol
2677	130 - 413	2,4-Dimethylphenol
4006	130 - 413	2,4-Dimethylphenol
4026	130 - 413	2,4-Dimethylphenol
4072	130 - 413	2,4-Dimethylphenol

Science Applications International Corporation
An Employee-Owned Company

February 6, 1992

Mr. George Jett
USEPA (WH-552)
401 M Street, S.W.
Washington, DC 20460

SUBJECT: BAT and PSES Technology Flowrates
SAIC Project No.: 01-0835-03-0127-000

Dear Mr. Jett:

Please find attached the BAT and PSES technologies costed with their associated flowrates. These flowrates correspond to the cost compliance cost estimates presented in Appendix III-B, pages III-B1 through III-B14, of the erratum to the Supplement to the Development Document.

If you have any questions, please don't hesitate to call me at (201) 599-0100.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Soterios (Steve) Stravrou
Chemical Engineer

SS/dg
Attachments

cc: E.H. Forsht - USEPA
A. Shattuck - SAIC

One Sears Drive, Paramus, New Jersey 07652 (201) 599-0100
Other SAIC Offices: Albuquerque, Boston, Colorado Springs, Dayton, Huntsville, Las Vegas, Los Angeles, McLean, Oak Ridge, Orlando, Palo Alto, Seattle, Tucson

2090

PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER											
1											
12	SS	0.012					CN	0.012	BP	0.021	
15	SS	0.0016	AC	0.0016	CP	0.0019	CN	0.0072	BP	0.0016	
33											
61	SS	0.02			CP	0.02	CN	0.02	BP	0.02	
63					CPU	0.457					
76	SS	0.0904	AC	0.088	CP	0.104	CN	0.4	BP	0.088	
83					CP	0.0063					
87	SS	0.1624							BP	0.0011	
101											
102											
105	SSU	0.1292	AC	0.1258	CP	0.1487	CN	0.5719	BP	0.1258	
112											CH 0.00025
114	SS	0.254			CP	0.254			BP	0.089	
154					CP	0.04					
155	SS	0.397			CP	0.397	CN	0.397	BP	0.397	
159											
177	SS	0.026			CP	0.026			BP	0.209	
180	193										CH 0.0005
193 ←	SS	0.348							BP	0.348	
195 ←	195		AC	0.1232	CPU	0.1456	CN	0.56	BP	0.1232	
205 ←	205		AC	0.088	CP	0.104			BP	0.088	
225					CP	0.2016	CN	0.0288	BP	0.1728	
227	SS	0.02323									
250					CP	0.207					
254					CP	0.253					
259											
260	SS	0.044			CP	0.044	CN	0.044	BP	0.044	
267	SS	0.3444			CP	0.768	CN	0.768	BP	0.1483	
269									BP	0.009	
284					CP	0.06			BP	0.0075	
294											
296					CP	0.654			BP	0.0499	
301	SS	1.0848	AC	1.056	CP	1.248	CN	4.8	BP	1.056	
352					CP	0.0021			BP	0.0172	
384	SS	1.253			CP	1.358			BP	2.493	
387					CP	13.8					
392	SS	0.029									
394	SS	0.0452									
399					CPU	8.54					
412	SS	0.045							BP	0.045	
415	SS	1.48			CP	2.504			BP	0.68	
443	SS	0.0042	AC	0.0042	CP	0.0042	CN	0.0042			
444									BP	0.041	
446	SS	0.0101			CP	0.0151			BP	0.0221	

PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

ANT MBER												
447	SS	0.5396			CP	0.5396	CN	0.5396	BP	0.5396	CH	0.0001
451							CN	0.0043				
481	SS	0.0043			CPU	0.3614	CN	1.39	BP	0.3058		
485	SS	0.3141	AC	0.3058	CP	0.0057	CN	0.0057	BP	0.0057		
486	SS	0.0057			CP	0.0442	CN	0.17	BP	0.0374		
488	SS	0.0384	AC	0.0374	CP	0.0878						
500											CH	0.000028
502												
518	SS	0.1185	AC	0.2595	CP	0.177	CN	0.5	BP	0.2595		
523							CN	0.144				
525												
536	SS	0.00727	AC	0.00727	CP	0.00727	CN	0.00727	BP	0.00727		
569									BP	0.046		
580											CH	0.00013
602												
608	SS	0.7			CP	0.0013	CN	0.00374	BP	0.0019		
611	SS	0.0009	AC	0.0019	CP	0.0468						
614					CP	0.00144			BP	0.00144		
633	SS	0.00144			CP	1.42			BP	1.42		
657	SS	0.05							BP	0.33		
662	SS	0.285			CP	0.411						
663	SS	0.499			CP	0.062						
664	SS	0.385			CP	0.385					CH	0.00028
669												
682					CP	1.628			BP	0.488		
683	SS	0.488			CP	0.857			BP	0.898		
695					CPU	0.898					CH	0.00034
709												
727					CP	0.644						
741												
758												
775	SS	0.492			CPU	0.492						
802					CP	0.973						
811												
814	SS	0.5198			CP	0.598	CN	2.3	BP	0.506		
819	SS	1.016	AC	1.016	CP	1.016	CN	1.016	BP	1.016		
825	SS	0.104			CP	0.186						
844												
851	SS	1.349					CN	0.9851	BP	0.9288		
859												
866												
871	SS	0.0353			CPU	0.3501						
876	SS	0.276										
877	SS	0.0237	AC	0.0519	CP	0.0354	CN	0.1	BP	0.0519		

PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER										
883										
888										
908					CP	0.554				
909	SS	0.621			CP	0.2			BP	0.621
913	SSU	1.956			CP	1.759			BP	0.233
938							CN	0.492		
942										
948	SS	0.28			CP	0.841			BP	0.189
956											CH	0.00016
962	SS	0.03			CP	0.03				
970					CP	0.635				
973					CP	0.325	CN	1.25	BP	0.275
984					CP	0.03				
990					CP	0.062				
991											CH	0.00001
992	SS	0.016								
1012					CP	0.579				
1020					CP	0.191				
1033											CH	0.0002
8 + 1038					CP	1.988			BP	0.155
9 + 1059					CPU	1.511				
1061					CP	0.2627	CN	0.2627		
1062										
1067					CP	0.02			BP	0.04
1133									BP	0.07
1137					CP	1.0545			BP	0.5772
1139	SS	0.0234							BP	0.00078
1148					CP	2.29				
1149	SS	1.8734								
1157											CH	0.0001
1203					CP	0.115				
1241					CP	0.28			BP	0.28
1249	SS	0.0129			CP	0.0132	CN	0.103	BP	0.0538
1267										
1299										
1319										
1323	SS	0.00462					CN	0.00462	BP	0.00462
1327	SS	0.61			CP	0.61	CN	0.61	BP	0.61
1340	SS	0.3234			CP	0.21983			BP	0.314
1343	SS	0.291	AC	0.291	CP	0.291				
1348					CPU	0.0028				
1349										
1389					CP	0.415				
1407	SS	0.415			CP	0.415				
09 — 1409	SS	1.09			CP	1.09			BP	1.09

PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

LANT UMBER												
1414	SS	0.006			CP	0.276						
1438					CP	0.105						
1439	SS	0.12	AC	0.225								
1446			AC	0.0931								
1464	SS	0.091										
1494	SS	0.497	AC	1.289	CP	1.289						
1520	SS	0.0142	AC	0.0138	CP	0.0163	CN	0.0628	BP	0.0138		
1522	SS	1.7			CPU	5.71						
1524					CP	0.0637						
1532					CP	0.117			BP	0.027		
1569	SS	0.1			CP	0.1			BP	0.05		
1572					CPU	2.725						
1593												
1609	SS	0.22			CP	0.27						
1616					CP	0.111						
1617	SS	0.8065										
1618	SS	0.068							BP	0.068		
1624	SS	0.00073			CP	0.00073						
1643												
1647	SS	0.367			CP	0.125						
1650	SS	0.91			CP	9.155	CN	8.343	BP	9.307		
1656											CH	0.00001
1670									BP	0.015	CH	0.0003
1684												
1688					CP	0.165						
1695	SS	0.614			CP	1.049			BP	1.513		
1698	SS	0.005										
1714	SS	0.0181			CP	0.0181						
1717					CP	0.0198						
1724	SS	0.0018	AC	0.0018	CP	0.0018			BP	0.0018		
1753					CP	1.505						
1766					CP	0.294						
1769	SS	2.6	AC	2.2	CPU	3.1						
1774					CP	3.3						
1785	SSU	0.0938			CPU	0.75			BP	0.392		
1802					CP	0.54						
1839	SS	0.0053			CP	0.0053						
1869	SS	0.526										
1877	SS	0.0859	AC	0.0836	CP	0.0988	CN	0.38	BP	0.0836		
1881					CP	0.0225						
1890					CP	0.156	CN	0.0724	BP	0.059		
1905					CP	0.00817			BP	0.00817		
1910			AC	0.1404	CP	0.1659	CN	0.638	BP	0.1404		
1911					CP	0.358			BP	0.352		
1928	SS	0.0038			CP	0.0038			BP	0.0038		

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PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER												
1937	SS	0.0568	AC	0.0553	CP	0.0653	CN	0.2513	BP	0.0553		
1943												
1973					CP	1.18						
1977												
1986												
2009	SS	0.0374							BP	0.186		
2020												
2026	SS	0.01										
2030	SS	0.148	AC	0.1441	CPU	0.1703	CN	0.655	BP	0.1441		
2047					CP	0.052						
2049					CP	0.031	CN	0.031				
2055												
2062	SS	0.0112			CP	0.0077						
2073	SS	1.076			CP	0.472			BP	0.472		
2090							CN	0.0922				
2110					CP	0.0187			BP	0.002		
2148					CP	0.807	CN	0.807				
2181												
2193											CH	0.0002
[illegible]98	2198 2206				CP	0.211						
[illegible]	SS	0.1							BP	0.1		
2221	SS	0.172			CP	0.172						
2222	2221				CP	1.5						
2227	SS	0.593			CP	3.97						
2228	SS	0.00302			CP	0.00302						
2236					CP	0.00565			BP	0.06		
2242	SS	0.014			CP	0.1506						
2254					CP	0.6152			BP	0.032		
2268	SS	0.299	AC	0.17	CP	0.035						
2272	SS	1.127			CP	0.8055			BP	0.322		
2281			AC	0.0041	CP	0.0049			BP	0.0041		
2292	SS	0.0077	AC	0.0075	CPU	0.0088	CN	0.034	BP	0.0075		
2296												
2307												
2313												
2315					CP	0.221	CN	0.1105				
2316	SS	0.0007	AC	0.0007	CP	0.0008	CN	0.003	BP	0.0007		
2322	SS	0.2644	AC	0.2574	CP	0.3042	CN	1.17	BP	0.2574		
2328												
2345					CP	0.1597						
2353												
2360					CP	0.47						
2364					CP	0.0089						
2365	SS	0.0061							BP	0.0231		
2368					CP	0.938						

PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

ANT MBER												
376	SS	0.051										
390												
394	SS	0.00658			CP	1.987						
399												
400												
419					CP	0.0359						
429	SS	0.0034	AC	0.0033	CPU	0.0039	CN	0.015	BP	0.0033		
430	SS	2.179			CP	1.307			BP	2.179		
445					CP	0.43						
447					CPU	0.0058						
450	SS	0.824			CP	0.684						
461					CP	0.0083			BP	0.0011		
471												
474	SS	0.29			CPU	0.312	CN	0.334	BP	0.022		
481	SS	0.2079			CP	0.92						
527					CP	1.25	CN	2.25				
528	SS	0.652			CP	1.377			BP	0.443		
531	SS	0.185										
533					CP	0.252						
536	2536											
	2537				CP	0.0287						
541	SS	0.25	AC	0.25	CP	0.25	CN	0.25				
2551	2541											
2556												
2573	SS	0.219			CP	0.219	CN	0.219	BP	0.219		
2590	SS	0.001			CP	0.001			BP	0.001		
2592					CP	0.456						
2606											CH	0.00001
2626												
2631	SS	1.2747			CP	0.1557			BP	0.1154		
2633					CP	1.51						
2668												
2673	SS	0.0146			CP	0.0022			BP	0.0022		
2678					CP	0.152						
2680	SS	0.045	AC	0.051	CP	0.006						
2692					CPU	0.0441						
2693												
2695	SS	0.969			CP	0.979						
2701	SS	0.506										
2711	SS	0.0371										
2735	SS	0.355			CP	2.165			BP	1.81		
2739					CPU	0.1242	CN	0.5063				
2763					CP	0.616						
2764					CP	0.787						
2767					CP	0.0117			BP	0.0117		

PLANT BY PLANT BAT TECHNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER										
2770	SS	0.03			CP	0.03				
2771	SS	0.0371								
2781	SS	0.0043	AC	0.0042	CP	0.0049	CN	0.019	BP	0.0042
2786					CP	0.0192			BP	0.2828
2795	SS	0.569			CP	0.569				
2816					CP	3.004			BP	0.274
2818									BP	0.01
3033									BP	0.14
4002										
4010										
4017										
4018	SS	0.0127	AC	0.0123	CP	0.0146	CN	0.056	BP	0.0123
4021					CP	0.0854	CN	0.0854	BP	0.0854
4037	SS	0.039	AC	0.039	CP	0.039	CN	0.039	BP	0.039
4040	SS	0.0074					CN	0.0074	BP	0.0074
4051					CP	0.116				
4055			AC	0.0015					BP	0.0015

NOTES:

CP - CHEMICAL PRECIPITATION
CPU - CHEMICAL PRECIPITATION UPGRADES
SS - STEAM STRIPPING
SSU - STEAM STRIPPING UPGRADES
AC - ACTIVATED CARBON
CN - CYANIDE DESTRUCTION
BP - BIOLOGICAL PACKAGE

PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER												
2					CP	0.002						
5	SS	0.02719							BP	0.00272		
10	SS	0.00124			CP	0.00186			BP	0.0415		
22	SS	0.019	AC	0.0415	CP	0.0283						
30	SS	0.2027							BP	0.64		
33			AC	0.05	CP	0.075			BP	0.1187		
49	SS	0.1187							BP	0.0528		
51	SS	0.0542	AC	0.0528	CP	0.0624	CN	0.0624	BP	0.00596		
52	SS	0.00482			CP	0.00227						
58											CH	0.0005
71									BP	0.0022		
72	SSU	0.0023	AC	0.0022	CPU	0.0026	CN	0.0026	BP	0.0065		
79	SS	0.0065									CH	0.0002
88									BP	0.0324		
93									BP	0.004		
94	SS	0.004	AC	0.004	CP	0.004			BP	0.0017		
110	SS	0.0017	AC	0.0017	CP	0.002	CN	0.002			CH	0.0001
111									BP	0.0021		
119	SS	0.0022							BP	0.005		
120	SS	0.005			CP	0.005			BP	0.0157		
22	SS	0.0157							BP	0.002		
43	SS	0.003			CP	0.002	CN	0.002	BP	0.0066		
149	SS	0.0067	AC	0.0066	CP	0.0077	CN	0.0077			CH	0.0002
158									BP	0.1358		
161	SS	0.1395	AC	0.1358	CP	0.1605	CN	0.1605			CH	0.0003
162									BP	0.006		
163	SS	0.006	AC	0.006	CP	0.006	CN	0.006				
166			AC	0.015					BP	0.1034		
196	SS	0.1062	AC	0.1034	CP	0.1222	CN	0.1222	BP	0.086		
199			AC	0.086					BP	0.0016		
203	SS	0.0016							BP	0.0156		
206	SS	0.0071			CPU	0.0107						
209									BP	0.0018	CH	0.0008
212					CPU	0.0004			BP	0.246		
214	SS	0.213			CP	0.098			BP	0.0034		
220	SS	0.0034							BP	0.2915		
221	SS	0.0698			CP	0.0715						
232	SS	0.105							BP	0.9		
240	SS	0.8143			CP	0.1145						
244									BP	0.01623		
249	SS	0.0162			CP	0.0162			BP	0.28		
257			AC	0.1	CP	0.04			BP	0.0011		
262	SS	0.0011	AC	0.0011	CP	0.0013	CN	0.0013	BP	0.0013		
266	SS	0.0013			CP	0.0013						
276	SS	0.7							BP	0.697		
283	SSU	0.697										

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PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER												
285												
292	SS	0.0344			CP	0.0344	CN	0.0344	BP	0.0344	CH	0.00002
293	SS	0.1424	AC	0.1386	CPU	0.1638	CN	0.1638	BP	0.1386		
297					CP	0.041			BP	0.0008	CH	0.00005
299					CP	0.153						
302	SS	0.032							BP	0.032		
310	SS	0.02178							BP	0.02143		
321	SS	0.0015							BP	0.0015		
326	SS	0.009	AC	0.0088	CP	0.0104	CN	0.0104	BP	0.0088		
334	SS	0.0009			CP	0.0009			BP	0.0038		
348												
354	SS	0.0453	AC	0.0453	CP	0.0453			BP	0.0453		
357												
417											CH	0.0002
423	SS	0.345			CP	0.03						
428												
430	SS	0.33			CP	0.74	CN	0.702	BP	1.2159	CH	0.0005
433	SS	0.0217	AC	0.0211	CP	0.025	CN	0.025	BP	0.0211		
438	SS	0.051							BP	0.0508		
449												
51 — 451												
458	SS	0.88					CN	0.34	BP	0.8	CH	0.0001
468	SS	0.0086			CP	0.0088	CN	0.0088	BP	0.0036		
492									BP	0.00235	CH	0.00023
494	SSU	0.431							BP	0.431		
508											CH	0.0002
522	SS	0.065	AC	0.065	CP	0.065	CN	0.065	BP	0.065		
529	SS	0.003										
543	SS	0.011							BP	0.011		
544											CH	0.00005
567	SS	0.001	AC	0.001	CP	0.001			BP	0.001		
592	SS	0.0225							BP	0.0225		
605											CH	0.00037
607	SS	0.0136	AC	0.0132	CP	0.0156	CN	0.0156	BP	0.0132		
618											CH	0.0005
624	SS	0.7444			CP	0.1414			BP	0.9684		
658	SS	0.0265			CP	0.0271			BP	0.111		
661	SS	0.00096	AC	0.00096	CP	0.00096	CN	0.00096	BP	0.00096		
667											CH	0.00003
702	SSU	0.0044							BP	0.0044		
706	SS	0.0045							BP	0.0035		
717									BP	0.264		
720	SS	0.0424										
722	SS	1.798			CP	0.254	CN	1.5435	BP	0.2548		
724	SS	0.0016							BP	0.0016		
'43	SS	0.0042	AC	0.0042	CP	0.0042			BP	0.0042		
— 743												

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PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER												
749	SS	0.0095			CP	0.0142			BP	0.0208		
768	SS	0.0007	AC	0.0007	CP	0.0008	CN	0.0008	BP	0.0007		
771			AC	0.0331	CP	0.0331			BP	0.0478		
777											CH	0.0001
791	SS	0.0031							BP	0.0031		
796											CH	0.0003
797	SS	0.0023	AC	0.0022	CP	0.0026	CN	0.0026	BP	0.0022		
814	SS	0.519			CP	0.598	CN	0.598	BP	0.506		
830									BP	0.00064	CH	0.00032
845			AC	0.0111	CP	0.0111					CH	0.0003
846									BP	0.06002		
862	SS	0.06002	AC	0.06002	CP	0.06002						
874	SS	0.257			CP	0.257					CH	0.00006
880									BP	0.1982		
887	SS	0.1982			CP	0.1068			BP	0.0016		
905	SS	0.0016	AC	0.0016	CPU	0.0016					CH	0.00029
912												
917					CP	0.018			BP	0.0008		
929	SS	0.0008									CH	0.00049
931 + 931											CH	0.00001
932 + 932											CH	0.00045
944									BP	0.0009		
958									BP	0.0188		
975	SS	0.012							BP	0.011		
976	SS	0.12							BP	0.12		
987									BP	0.0007	CH	0.0009
988											CH	0.0004
992	SS	0.016							BP	0.016		
997	SS	0.0025			CP	0.0025			BP	0.0025		
1006			AC	0.002	CP	0.002			BP	0.002		
1011					CP	0.12						
1018	SS	0.0476			CP	0.0476	CN	0.0476	BP	0.0476		
1026											CH	0.0005
1047	SS	0.1							BP	0.125		
1052	SS	0.0164			CP	0.0244			BP	0.0358		
1053	SS	0.0135			CP	0.00354			BP	0.00354		
1057									BP	0.0006	CH	0.0002
1064											CH	0.00015
1069					CP	0.457						
1076											CH	0.00014
1083	SS	0.0013			CP	0.0019			BP	0.0028		
1085									BP	0.0012	CH	0.0006
1086	SS	0.073							BP	0.073		
1091	SS	0.0678	AC	0.066	CP	0.078	CN	0.078	BP	0.066		
1094			AC	0.0686					BP	0.0686		
07	SS	0.036									CH	0.00002

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2100

PLANT NUMBER	PLANT BY PLANT PSES TECNOLOGIES COSTED WITH ASSOCIATED FLOWRATES (MGD).										
1117	SS	0.00472							BP	0.00072	
1126	SS	0.1469	AC	0.143	CPU	0.169	CN	0.169	BP	0.143	
1162	SS	0.127									
1163	SS	0.0135			CP	0.0053	CN	0.0082	BP	0.0296	
1172	SS	0.1642							BP	0.1642	
1173									BP	0.0006	CH 0.000503
1175											CH 0.0004
1181			AC	0.0251	CP	0.0251			BP	0.0251	
1188	SS	0.051			CP	0.014					
1191	SS	0.0068	AC	0.0066	CP	0.0078	CN	0.0078	BP	0.0078	
1194	SS	0.00117							BP	0.00179	CH 0.000115
1195									BP	0.0021	
1197	SS	0.0014			CP	0.0021			BP	0.0031	
1202	SS	0.0175							BP	0.015	
1219			AC	0.316					BP	0.316	
1220	SS	0.0033							BP	0.0022	
1223					CP	0.0026			BP	0.0026	
1224			AC	0.122					BP	0.122	
1234	SS	0.01							BP	0.01	
1236	SS 1237	0.03			CP	0.0307			BP	0.1253	
37	SS	0.007							BP	0.00702	
1249	SS 1249	0.0129			CP	0.0132	CN	0.0132	BP	0.0538	
1253	SS	0.0078									
1255	SS	0.02145									
1264	SS	0.0011	AC	0.0011	CP	0.0013	CN	0.0013	BP	0.0011	
1277	SS	0.013			CP	0.013			BP	0.107	
1310	SS	3.347			CP	0.08			BP	0.08	
1313									BP	0.00052	CH 0.00026
1314									BP	0.00057	
1320	SS	0.00191							BP	0.00191	CH 0.00011
1322	SS	0.025			CP	0.0125			BP	0.0125	
1326	SS	0.002							BP	0.01612	
1351	SS	0.0042	AC	0.0042	CP	0.0042	CN	0.0042	BP	0.0042	
1352									BP	0.00052	CH 0.00026
1356	SS	0.0021	AC	0.0021	CP	0.0021	CN	0.0021	BP	0.0021	
1357	SS	0.0006			CPU	0.0006			BP	0.0026	
1361	SS	0.0572	AC	0.0557	CP	0.0658	CN	0.0658	BP	0.0557	
1371											CH 0.0005
1386											CH 0.0001
1426					CP	0.0936	CN	0.0936	BP	0.0936	
1432	SS	0.0194			CP	0.0354			BP	0.0249	
1433											CH 0.000032
1437	SS	0.0945					CN	0.0045	BP	0.0945	
1450									BP	0.00052	CH 0.00026
1478	SS	0.001	AC	0.001	CP	0.0012	CN	0.0012	BP	0.001	
04 1504	SS	0.021			CP	0.016			BP	0.016	

PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER												
1507	SS	0.166							BP	0.166		
1528	SS	0.00121							BP	0.00121		
1534	SS	0.001			CPU	0.3814			BP	0.007		
1535											CH	0.00002
1539	SS	0.1362			CP	0.1362			BP	0.202		
1548											CH	0.00017
1556	SS	0.0295										
1560	SS	0.0011	AC	0.0011	CP	0.0013	CN	0.0013	BP	0.0011		
1562	SS	0.0571			CP	0.0736						
1564											CH	0.00017
1566											CH	0.0001
1575									BP	0.00052	CH	0.00059
1595	SS	0.0267							BP	0.0267		
1601							CN	0.0233				
1608	SS	0.0147	AC	0.0143	CP	0.0169	CN	0.0169	BP	0.0143		
1621	SS	0.03			CP	0.05						
1622	SS	0.0175			CP	0.0179			BP	0.0731		
1628	SS	0.003	AC	0.003	CP	0.003	CN	0.003	BP	0.003		
1645	SS	0.0036			CP	0.0036	CN	0.0036	BP	0.0036		
53	SS	1653 0.71										
57	SSU	1657 0.54			CP	0.54	CN	0.54	BP	0.54		
1659	SS	0.0316	AC	0.0308	CP	0.0364	CN	0.0364	BP	0.0308		
1666	SS	0.0113	AC	0.011	CP	0.013	CN	0.013	BP	0.011		
1667	SS	0.1635			CP	0.1635			BP	0.1635		
1706	SS	0.6							BP	0.6		
1716	SS	0.0228	AC	0.0222	CP	0.0263	CN	0.0263	BP	0.0222		
1718											CH	0.0003
1740	SSU	1.238			CP	0.388			BP	0.075		
1742	SS	0.024			CP	0.024			BP	0.024		
1743	SS	0.00351			CP	0.00351	CN	0.00351	BP	0.00351		
1744	SS	0.0011	AC	0.0011	CP	0.0013	CN	0.0013	BP	0.0011		
1748	SS	0.469	AC	0.469	CP	0.355						
1751					CP	0.0007			BP	0.00104	CH	0.0005
1764	SS	0.022			CP	0.0153			BP	0.0202		
1773	SS	0.004							BP	0.004		
1788	SS	0.0212							BP	0.0423		
1793	SS	0.0009	AC	0.00088	CP	0.0104	CN	0.0104	BP	0.00088		
1797												
1801	SS	0.0029			CP	0.0029						
1805	SS	0.087							BP	0.087		
1808											CH	0.00035
1812											CH	0.0002
1826	SS	0.02	AC	0.02	CP	0.02	CN	0.02	BP	0.02		
1832	SS	0.0024							BP	0.004		
1833	SS	0.058			CP	0.054			BP	0.054		
1838											CH	0.00029

1833

1838

PLANT NUMBER	PLANT BY PLANT PSES TECNOLOGIES COSTED WITH ASSOCIATED FLOWRATES (MGD).										
1843										CH	0.0001
1848					CPU	0.00052	CN	0.00052		CH	0.00089
1853	SS	0.7395			CP	0.7395	CN	0.7395	BP	0.7395	
1861					CP	0.0217	CN	0.0217			
1876	SS	0.0111	AC	0.0108	CP	0.0127	CN	0.0127	BP	0.0108	
1887										CH	0.0004
1888										CH	0.00016
1891	SS	0.233							BP	0.2326	
1894	SS	0.0075	AC	0.0073	CP	0.0086	CN	0.0086	BP	0.0073	
1899	SS	0.048			CP	0.048			BP	0.048	
1904	SS	1.107			CP	1.0372			BP	1.27	
1924	SS	0.04									
1931	SS	0.003			CP	0.0044			BP	0.0065	
1936			AC	0.0262	CP	0.0131			BP	0.0131	
1945	SS	0.0102									
1948	SS	0.0359									
1970	SS	0.004									
1971	SS	0.014			CP	0.0051			BP	0.0161	
1974									BP	0.0104	
1988	1993										
93	SS	0.0095							BP	0.009	CH 0.0004
001	SS 2021	0.008									CH 0.00025
2004	SS	0.006							BP	0.085	
2007	SS	0.0038	AC	0.0037	CP	0.0044	CN	0.0044	BP	0.0037	
2018			AC	0.16	CP	0.16			BP	0.16	
2022											CH 0.00007
2033											CH 0.00019
2037	SS	0.0021			CP	0.0022			BP	0.0089	
2050											CH 0.0005
2057	SS	0.02405									
2070	SS	0.24	AC	0.24	CP	0.24	CN	0.24	BP	0.24	
2075	SS	0.0525			CP	0.01984					
2080					CP	0.036					
2084	SS	0.024							BP	0.048	
2093	SS	0.385			CP	0.125			BP	0.125	
2108											
2117	SS	0.035			CP	0.035			BP	0.035	
2123					CP	0.155					
2129	SS	0.0111	AC	0.0108	CP	0.0127	CN	0.0127	BP	0.0108	
2147											CH 0.0004
2176	SS	0.0116			CP	0.0116			BP	0.0116	
2177	SS	1.2									
2184	SS	0.015					CN	0.015	BP	0.015	
2191									BP	0.002	
2214											CH 0.00031
32	SS	0.269			CP	0.014	CN	0.0693	BP	0.1	

2232

PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER												
2241	SS	0.35463			CP	0.355			BP	0.3984		
2243	SS	0.282	AC	0.282	CP	0.282	CN	0.282	BP	0.282		
2250	SS	0.0013			CP	0.0013			BP	0.0055		
2253											CH	0.0005
2259	SS	0.005	AC	0.005	CP	0.005			BP	0.005		
2261	SS	0.0648	AC	0.0648	CP	0.0648			BP	0.0648		
2262											CH	0.0001
2288	SS	0.00179							BP	0.0018	CH	0.00025
2293	SS	0.0065							BP	0.00526		
2300	SS	0.349			CP	0.349			BP	0.286		
2311	SS	0.00498			CP	0.00743			BP	0.0109		
2318	SS	0.0023			CP	0.0023			BP	0.0094		
2341	SS	0.23			CP	0.149			BP	0.4547		
2346					CP	1.0865						
2348			AC	0.0156	CP	0.0156			BP	0.0156		
2350	SS	0.0056	AC	0.0056	CP	0.0056			BP	0.0056		
2359	SS	0.0006							BP	0.0006		
2402											CH	0.00008
2411					CP	0.382						
2426												
32	2432		AC	0.0208								
36	2436				CP	1.656						
2442	SS	0.00084	AC	0.00084	CP	0.00084			BP	0.00084		
2459	SS	0.008			CP	0.008			BP	0.008		
2462	SS	0.065			CP	0.065						
2465	SS	0.0108	AC	0.0106	CP	0.0125	CN	0.0125	BP	0.0106		
2469	SS	0.0009			CP	0.0014			BP	0.0021		
2485	SS	0.553			CP	0.243			BP	0.553		
2487	SS	0.0492	AC	0.0492	CP	0.0492			BP	0.0492		
2495	SS	0.15			CP	0.042			BP	0.1201		
2498	SS	0.0036			CP	0.0053			BP	0.0078		
2501	SS	0.00608			CP	0.00796			BP	0.00795	CH	0.00002
2507												
2517	SS	0.0196			CP	0.0293			BP	0.0429		
2521											CH	0.00032
2524	SS	0.0018			CP	0.0018			BP	0.0073		
2539	SS	0.0251	AC	0.0477	CP	0.0326			BP	0.0477		
2548	SS	0.0294	AC	0.0286	CP	0.0338	CN	0.0338	BP	0.0286		
2565	SS	0.155	AC	0.155	CP	0.155			BP	0.155		
2571											CH	0.0005
2578												
2581											CH	0.00001
2608											CH	0.0002
2609					CP	0.03189						
2634			AC	0.012					BP	0.012		
35	SSU	0.71			CP	0.075			BP	0.71		
2635												

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PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER											
2636	SS	0.00503			CP	0.0016					
2641	SS	0.0564							BP	0.056	
2642											CH 0.000064
2646	SS	0.098			CP	0.002			BP	0.098	
2647											
2666	SS	0.001							BP	0.004	
2677	SS	0.0513	AC	0.0499	CP	0.059	CN	0.059	BP	0.0499	
2679					CP	0.0645					
2685	SS	0.143									
2699			AC	0.0035							
2714	SS	0.0007			CP	0.0007			BP	0.0007	
2736	SS	0.133							BP	0.133	
2741	SS	0.0298			CP	0.0298			BP	0.0298	
2748	SS	0.0983							BP	0.1417	
2756	SS	0.529	AC	0.529	CP	0.529	CN	0.529	BP	0.529	
2776	SS	0.00551	AC	0.00551	CP	0.00551	CN	0.00551	BP	0.00551	
2779	SS	0.09766									
2793	SS	0.085							BP	0.043	
2794			AC	0.62							
2796											
05 — 2805									BP	0.151	
310 — 2810											
2814											CH 0.00049
4001	SS	0.01183	AC	0.01183	CP	0.01183			BP	0.01183	CH 0.0002
4003	SS	0.064			CP	0.064			BP	0.064	
4006	SS	0.0079	AC	0.0077	CP	0.0091	CN	0.0091	BP	0.0077	
4007	SS	0.06							BP	0.06	
4008	SS	0.03			CP	0.03	CN	0.03	BP	0.03	
4009											CH 0.0002
4014	SSU	0.00065			CP	0.00065			BP	0.00065	
4022									BP	0.0035	
4023	SS	1.177									
4024					CP	0.0006			BP	0.0009	CH 0.0004
4026	SS	0.0271	AC	0.0264	CP	0.0312	CN	0.0312	BP	0.0264	
4027	SS	0.0412			CP	0.0412	CN	0.0412	BP	0.0412	
4032	SS	0.0012	AC	0.0012	CP	0.0012	CN	0.0012	BP	0.0012	
4042											
4043					CP	0.0504					
4044	SS	0.1031	AC	0.1031	CP	0.1031	CN	0.1031	BP	0.1031	
4046											CH 0.0001
4047	SSU	0.009			CP	0.009	CN	0.009	BP	0.009	
4048											CH 0.000054
4050	SS	0.0013			CP	0.0019			BP	0.0028	
4052											CH 0.0003
4057	SS	0.00237			CP	0.00354			BP	0.00519	
064 — 4064											CH 0.00005

PLANT BY PLANT PSES TECNOLOGIES COSTED
WITH ASSOCIATED FLOWRATES (MGD).

PLANT NUMBER						
4066					BP 0.00345	CH 0.00021
4070	SS 0.00083		CP 0.00084		BP 0.0033	
4072	SS 0.0034	AC 0.0033	CP 0.0039	CN 0.0039		

NOTES:

CP - CHEMICAL PRECIPITATION
CPU - CHEMICAL PRECIPITATION UPGRADES
SS - STEAM STRIPPING
SSU - STEAM STRIPPING UPGRADES
AC - ACTIVATED CARBON
CN - CYANIDE DESTRUCTION
BP - BIOLOGICAL PACKAGE
CH - CONTRACT HAULING

Name and Description of Replaced Variables in Data File NCOSTS.SSD

PLANT	Plant identification number
BATCCV2	BAT Capital cost - Option 1 (August 1991)
BATCCVX	Replacement BAT Capital cost - Option 1 (January 1992)
BATOMV2	BAT O&M cost - Option 1 (August 1991)
BATOMVX	Replacement BAT O&M cost - Option 1 (August 1991)
BATLV2	BAT Land cost - Option 1 (August 1991)
BATLVX	BAT Land cost - Option 1 (January 1992)
BATSV2C	BAT sludge capital cost - Option 1 (August 1991)
BATSVXC	BAT sludge capital cost - Option 1 (January 1992)
BATSV2O	BAT sludge O&M cost - Option 1 (August 1991)
BATSVXO	BAT sludge O&M cost - Option 1 (January 1992)
BATMV2	BAT monitoring cost - Option 1 (August 1991)
BATMVX	BAT monitoring cost - Option 1 (January 1992)
BATHV2	BAT hauling cost - Option 1 (August 1991)
BATHVX	BAT hauling cost - Option 1 (January 1992)
PSESCCV2	PSES Capital cost - Option 1 (August 1991)
PSESCCVX	PSES Capital cost - Option 2 (January 1992)
PSESOMV2	PSES O&M cost - Option 1 (August 1991)
PSESOMVX	PSES O&M cost - Option 2 (January 1992)
PSESLV2	PSES Land cost - Option 1 (August 1991)
PSESLVX	PSES Land cost - Option 2 (January 1992)
PSESSV2C	PSES sludge capital cost - Option 1 (August 1991)
PSESSVXC	PSES sludge capital cost - Option 2 (January 1992)
PSESSV2O	PSES sludge O&M cost - Option 1 (August 1991)
PSESSVXO	PSES sludge O&M cost - Option 2 (January 1992)
PSESMV2	PSES monitoring cost - Option 1 (August 1991)
PSESMVX	PSES monitoring cost - Option 2 (January 1992)
PSESHV2	PSES hauling cost - Option 1 (August 1991)
PSESHVX	PSES hauling cost - Option 2 (January 1992)

The "VX" suffix variables replace "V2" suffix variables for control Option 1 presented in the August 1991 Re-evaluation of the Economic Impact Analysis of OCPSF Effluent Limitations Guidelines. Plants with cost changes for any cost element are presented on the attached printout.

PLANTS WITH PSES COST CHANGES 1/92

OBS	PLANT	PSESCCV2	PSESOMV2	PSESLV2	PSESSV2C	PSESSV2O	PSESMV2	PSESHV2	PSESCCVX	PSESOMVX	PSESLVX	PSESSVXC	PSESSVXO	PSESMVX
1	51	1326705	968057	62256	116126	25010	29539	0	1504443	970503	74771	116126	25010	29539
2	72	137176	118699	21329	0	0	29539	0	174759	120426	22113	0	0	29539
3	79	533543	47130	50984	0	0	33782	0	609506	49394	64822	0	0	33782
4	110	907786	141183	21394	3722	802	29539	0	941778	142910	21778	3722	802	29539
5	149	980434	229157	35950	14330	3086	29539	0	1040705	230985	38366	14330	3086	29539
6	161	1771583	2293628	89448	298690	64328	29539	0	2084075	2296395	116658	298691	64328	29539
7	196	1607634	1771764	78477	227414	48978	29539	0	1872042	1774434	99727	227414	48978	29539
8	262	893723	129141	118701	2419	521	29539	0	922672	130868	119272	2419	521	29539
9	293	1442499	2294075	31040	0	0	29539	0	1758967	2296850	41391	0	0	29539
10	326	1004916	266160	32810	19354	4168	29539	0	1073924	268071	35446	19354	4168	29539
11	430	11015425	1071365	203168	748510	186036	41206	0	42169485	2030712	709662	748510	186036	41206
12	433	1113272	465597	16101	46525	10020	29539	0	1220449	467760	18187	46525	10020	29539
13	607	1047815	338302	30763	29032	6252	29539	0	1132003	340329	33877	29032	6252	29539
14	768	882084	120627	26562	1489	321	29539	0	906879	122354	26809	1489	321	29539
15	797	917763	150943	11227	4839	1042	29539	0	955346	152670	11520	4839	1042	29539
16	814	7518560	1191471	52582	604877	150337	41206	0	18371051	1589253	117475	604877	150337	41206
17	830	30606	32470	5089	0	0	33782	142496	62290	34628	5816	0	0	33782
18	944	35037	32470	3108	0	0	33782	200385	70364	34628	3552	0	0	33782
19	1047	783628	137673	22917	0	0	33782	0	1148662	141110	53794	0	0	33782
20	1091	1404174	1176775	40951	145158	31262	29539	0	1606481	1179293	50057	145158	31262	29539
21	1094	507293	1074692	49185	0	0	29539	0	762934	1077848	69366	0	0	29539
22	1126	1462609	2365012	61950	0	0	29539	0	1785276	2367798	82889	0	0	29539
23	1191	987471	229310	9627	14516	3126	29539	0	1052633	231186	10364	14516	3126	29539
24	1194	500571	42770	11226	0	0	33782	51210	545470	44928	12135	0	0	33782
25	1220	504651	44257	2996	0	0	33782	0	553161	46415	3312	0	0	33782
26	1234	549632	50412	9099	0	0	33782	0	642231	52824	12400	0	0	33782

OBS	PSESHVX	BATCCV2	BATOMV2	BATLV2	BATSV2C	BATSV2O	BATMV2	BATHV2	BATCCVX	BATOMVX	BATLVX	BATSVXC	BATSVXO	BATMVX	BATHVX
1	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
2	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
3	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
4	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
5	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
6	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
7	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
8	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
9	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
10	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
11	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
12	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
13	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
14	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
15	0	0	0	0	0	0	0	0	6225611	1332591	48218	604877	150337	41206	0
16	0	6225611	1332591	48218	604877	150337	41206	0	.	.	.	.	.	.	.
17	142496	0	0	0	0	0	0	0	.	.	.	.	.	.	.
18	200385	0	0	0	0	0	0	0	.	.	.	.	.	.	.
19	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
20	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
21	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
22	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
23	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
24	51210	0	0	0	0	0	0	0	.	.	.	.	.	.	.
25	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.
26	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.

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OBS	PLANT	PSESCCV2	PSESOMV2	PSESLV2	PSESSV2C	PSESSV2O	PSESHV2	PSESCCVX	PSESOMVX	PSESLVX	PSESSVXC	PSESSVXO	PSESHVX	BATCCV2	BATOMV2	BATLV2	BATSV2C	BATSV2O	BATHV2	BATCCVX	BATOMVX	BATLVX	BATSVXC	BATSVXO	BATHVX	BATHVX
27	1264	893723	129141	27681	2419	521	29539	0	922672	130868	27814	2419	521	29539	0	0	0	0	0	0	0	.	.	.	.	.
28	1356	915860	148951	29722	3908	842	29539	0	952757	150678	30456	3908	842	29539	0	0	0	0	0	0	0	.	.	.	.	.
29	1361	1344159	1013886	21708	122454	26373	29539	0	1527456	1016348	26180	122454	26373	29539	0	0	0	0	0	0	0	.	.	.	.	.
30	1478	891043	127076	10255	2233	481	29539	0	919033	128803	10326	2233	481	29539	0	0	0	0	0	0	0	.	.	.	.	.
31	1507	853252	208976	21963	0	0	33782	0	1287795	212558	54190	0	0	33782	0	0	0	0	0	0	0	.	.	.	.	.
32	1560	893723	129141	24438	2419	521	29539	0	922672	130868	24555	2419	521	29539	0	0	0	0	0	0	0	.	.	.	.	.
33	1608	1057652	356104	14576	31451	6774	29539	0	1145306	358154	16117	31451	6774	29539	0	0	0	0	0	0	0	.	.	.	.	.
34	1659	1183942	620102	52451	67740	14589	29539	0	1315283	622379	60630	67740	14589	29539	0	0	0	0	0	0	0	.	.	.	.	.
35	1666	1027171	302448	171721	24193	5210	29539	0	1104071	304422	187427	24193	5210	29539	0	0	0	0	0	0	0	.	.	.	.	.
36	1716	1121608	483178	47680	48944	10541	29539	0	1231704	485356	54019	48944	10541	29539	0	0	0	0	0	0	0	.	.	.	.	.
37	1744	893723	129141	27681	2419	521	29539	0	922672	130868	27814	2419	521	29539	0	0	0	0	0	0	0	.	.	.	.	.
38	1793	888334	124547	125773	19354	4168	29539	0	915111	126274	126704	19354	4168	29539	0	0	0	0	0	0	0	.	.	.	.	.
39	1832	518839	43496	8491	0	0	33782	0	580427	45654	10085	0	0	33782	0	0	0	0	0	0	0	.	.	.	.	.
40	1876	1025204	299180	13649	23635	5090	29539	0	1101414	301149	14884	23635	5090	29539	0	0	0	0	0	0	0	.	.	.	.	.
41	1894	988521	241087	38836	16005	3447	29539	0	1051686	242944	41618	16005	3447	29539	0	0	0	0	0	0	0	.	.	.	.	.
42	1904	11403060	2693218	205772	273759	97227	41206	0	44007030	3688304	734492	273759	97227	41206	0	0	0	0	0	0	0	.	.	.	.	.
43	2007	942638	178678	34348	8188	1764	26827	0	989217	180405	35860	8188	1764	26827	0	0	0	0	0	0	0	.	.	.	.	.
44	2084	645715	65109	69176	0	0	33782	0	854280	68111	131138	0	0	33782	0	0	0	0	0	0	0	.	.	.	.	.
45	2129	1025204	299180	39870	23635	5090	29539	0	1101414	301149	43479	23635	5090	29539	0	0	0	0	0	0	0	.	.	.	.	.
46	2465	1023252	295822	10553	23262	5010	29539	0	1098767	297786	11498	23263	5010	29539	0	0	0	0	0	0	0	.	.	.	.	.
47	2548	1168425	585208	37695	62902	13547	29539	0	1294562	587662	43380	62902	13547	29539	0	0	0	0	0	0	0	.	.	.	.	.
48	2666	518839	42765	3064	0	0	33782	0	580427	44923	3639	0	0	33782	0	0	0	0	0	0	0	.	.	.	.	.
49	2677	1309025	922324	16233	109799	23647	29539	0	1481098	924751	19412	109799	23647	29539	0	0	0	0	0	0	0	.	.	.	.	.
50	4006	993010	247810	60731	16935	3647	29539	0	1057778	249682	65230	16935	3647	29539	0	0	0	0	0	0	0	.	.	.	.	.
51	4026	1152601	550172	50023	58063	12505	29539	0	1273388	552403	57276	58063	12505	29539	0	0	0	0	0	0	0	.	.	.	.	.
52	4072	936540	171437	10905	7258	1563	29539	0	980909	173164	11340	7258	1563	29539	0	0	0	0	0	0	0	.	.	.	.	.

OBS	PLANT	PSESCCV2	PSESOMV2	PSESLV2	PSESSV2C	PSESSV2O	PSESMV2	PSESHV2	PSESCCVX	PSESOMVX	PSESLVX	PSESSVXC	PSESSVXO	PSESMVX	PSESHVX	BATCCV2	BATOMV2	BATLV2	BATSV2C	BATSV2O	BATMV2	BATHV2	BATCCVX	BATOMVX	BATLVX	BATSVXC	BATSVXO	BATMVX	BATHVX
1	412	0	0	0	0	0	0	0	.	.	.	.	.	.	.	642285	82906	69000	0	0	26827	0	572195	81880	62487	0	0	26827	0
2	446	0	0	0	0	0	0	0	.	.	.	.	.	.	.	919901	82783	5349	28101	6052	26827	0	870823	81870	5165	28101	6052	26827	0
3	536	0	0	0	0	0	0	0	.	.	.	.	.	.	.	989126	240404	16403	13529	2914	26827	0	944485	239229	16051	13529	2914	26827	0
4	857	0	0	0	0	0	0	0	.	.	.	.	.	.	.	4149193	393797	141987	374795	133111	29539	0	11957032	685730	192648	374795	133111	29539	0
5	1241	0	0	0	0	0	0	0	.	.	.	.	.	.	.	808568	100348	36200	521080	112224	26827	0	635556	99018	24064	521080	112224	26827	0
6	1650	0	0	0	0	0	0	0	.	.	.	.	.	.	.	71050018	5988312	1228685	1732309	645153	57597	0	20575507	4527482	1058825	1732309	645153	57597	0
7	1928	0	0	0	0	0	0	0	.	.	.	.	.	.	.	859108	76427	5729	7072	1523	26827	0	826194	75304	5583	7072	1523	26827	0
8	2030	0	0	0	0	0	0	0	.	.	.	.	.	.	.	1312598	1389196	79420	0	0	41206	0	1437358	1390413	84990	0	0	41206	0
9	2206	0	0	0	0	0	0	0	.	.	.	.	.	.	.	779120	136702	7225	0	0	26827	0	674950	135546	5916	0	0	26827	0