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ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 129]

ADVANCE NOTICE OF PROPOSED RULEMAKING FOR

TOXIC POLLUTANT EFFLUENT STANDARDS

Notice is hereby given that the Environmental Protection Agency is altering the "Proposed Toxic Pollutant Effluent Standards" published in 38 Federal Register 35388, et seq., December 27, 1973, as modified by the correction published in 39 Federal Register 10603 et seq., March 21, 1974; and that the Agency intends at the earliest practicable date to publish revised proposed toxic pollutant effluent standards.

As recited in 38 FR 35388, et seq., the proposed standards published on that date were formulated and published within certain judicially prescribed time limitations. Because of these limitations, the Agency acknowledged that the underlying data base might not be adequate to provide valid scientific justification for parts of the proposed standards. Nevertheless, it was the Agency's expectation as of December 27, 1973, that the subsequent hearings would provide sufficient information to promulgate fully supportable final standards.

In an effort to provide additional data needed to support final effluent standards, staff representatives of the Environmental Protection Agency sought to introduce evidence at the hearing. This evidence was rejected by the Administrative Law Judge and the appeal of this decision was

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disallowed. It is apparent that the course of action which the staff sought to follow went beyond the bounds imposed by section 307(a) of the Federal Water Pollution Control Act and the formal rulemaking provisions of the Administrative Procedure Act.

EPA received comments from 39 objectors represented during the course of the public hearing and 143 written comments from the public. These can be summarized under the following general headings.

A. Toxicological considerations and safety factors

B. Hydrodynamic Considerations

C. Treatment Technology

D. Analytical methods

E. Economic impact

F. Appropriateness of applicability to various categories of sources.

G. Definitions

The entire record, including that portion excluded by the Administrative Law Judge, consists of approximately 13,600 pages containing the EPA Statement of Basis and Purpose and its attachments, objector affidavits, EPA rebuttal and/or clarification affidavits, testimony of the cross examination of expert witnesses and the written public comments.

In summary, the record of the hearing which was held on standards proposed December 27, 1973, demonstrates that the Agency's proposed standards were inadequately developed and documented. The record

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does not contain sufficient evidence to support modifications in the proposed standards, and the record may not legally be supplemented. Thus, the Agency has no alternative but to reconsider the entire matter in the light of all evidence which was adduced by objectors at the hearing, all evidence which the Environmental Protection Agency staff sought to adduce at the hearing, and such other evidence as the Agency deems appropriate. After such consideration is completed, revised proposed standards will be published.

This Advance Notice of Proposed Rulemaking declares the intention of the Environmental Protection Agency to hold a series of technical symposia at Regional Offices, meeting the requirement for public participation of section 101(e), and to require information under authority of Section 308(2). The information gained from these symposia and the letters authorized by Section 308 will be considered along with other information and written comments as the Agency compiles the Statement of Basis and Purpose for the subsequent proposed rulemaking. Thirty days after publication of the proposed rule the required public hearing notice will be given and the hearing will be held shortly thereafter.

Section 307(a)(2) provides as follows:

> "Within one hundred and eighty days after the date of publication of any list or revision thereof, containing toxic pollutants or combination of pollutants under paragraph (1) of this subsection, the Administrator, in accordance with Section 553 of title 5 of the United States Code, shall publish a proposed effluent standard (or a prohibition) for such pollutant or combination of pollutants which shall take into account the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms

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and the nature and extent of the effect of the toxic pollutant on such organisms, and he shall publish a notice for a public hearing on such proposed standard to be held within thirty days. As soon as possible after such hearing, but not later than six months after the publication of the proposed effluent standard (or prohibition), unless the Administrator finds, on the record, that a modification of such proposed standard (or prohibition) is justified based upon a preponderance of evidence adduced at such hearings, such standard (or prohibition) shall be promulgated."

Section 308 provides as follows:

"Whenever required to carry out the objective of this Act, including but not limited to (1) developing or assisting in the development of any effluent limitation, or other limitation, prohibition, or effluent standard, pretreatment standard, or standard of performance under this Act; (2) determining whether any person is in violation of any such effluent limitation, or other limitation, prohibition or effluent standard, pretreatment standard, or standard of performance; (3) any requirement established under this section; ....the Administrator shall require the owner or operator of any point source to (i) establish and maintain such records, (ii) make such reports; (iii) install, use, and maintain such monitoring equipment or methods (including where appropriate, biological monitoring methods), (iv) sample such effluents (in accordance with such methods, at such locations, at such intervals, and in such manner as the Administrator shall prescribe), and (v) provide such other information as he may reasonably require."

The Administrator is required to protect trade secrets that, if made public might divulge methods or processes, by considering appropriate records, reports or information confidential in accordance with the purposes of section 1905 of the title 18 of the United States Code.

This advance notice presents the approach and effluent limitations under consideration by the Agency to prohibit the discharge of toxic pollutants in toxic amounts and identifies information that is necessary to propose effluent standards for the toxic pollutants listed below:

1. Aldrin (1, 2, 3 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro-1, 4-endo-exo-5, 8-dimethanonaphthalene).

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Dieldrin (1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-1, 4-endo-exo-5, 8-dimethanonaphthalene).

2. Benzidine and its salts (4, 4'-diaminobiphenyl).

3. Cadmium and all cadmium compounds.

4. Cyanide and all cyanide compounds.

5. DDD (TDE) [1, 1-dichloro-2, 2-bis (p-chlorophenyl) ethane and some o, p'-isomer].

DDE [1, 1-dichloro-2, 2-bis (p-chlorophenyl) ethylene].

DDT [1, 1, 1-trichloro-2, 2-bis (p-chlorophenyl) ethane and some o, p'-isomer].

6. Endrin (1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-1, 4-endo-endo-5, 8-dimethanonaphthalene).

7. Mercury and all mercury compounds.

8. Polychlorinated biphenyls (PCB's) mixtures of chlorinated biphenyl compounds with various percentages of chlorination.

9. Toxaphene (chlorinated camphene).

The criteria and rationale employed to select these pollutants were summarized in 38 FR 24342 dated September 7, 1973.

The Agency, under authority of section 308 of the Act, intends to request certain pertinent information from owners or operators of significant point sources discharging toxic pollutants into navigable waters. The primary purpose of obtaining such information is to increase the technical data base upon which these standards may be modified to assure equitability and effectiveness. The data provided and concerns identified will assist the EPA staff in selecting issues for technical discussion at the intended public symposia. Accordingly the Agency

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intends to request information that will provide a description of:

1) Sources of each toxic pollutant originating from manufacturing processes involved which contribute to the facility's wastewater flow such that the concentration and the weight per day of the toxic pollutant in the effluent discharged may be understood,

2) Measures taken or planned to reduce or eliminate each source of toxic pollutant in the discharge system,

3) Effluent dicharge treatment facilities including the influent and effluent concentration of each toxic pollutant and rate of flow being discharged, as well as the unit operations and unit processes being used,

4) Effluent disposal arrangements at the manufacturing site which are pertinent to compliance with these standards, and

5) Monitoring measures and records needed to demonstrate the effectiveness of toxic pollutant(s) control.

The Agency intends to conduct six (6) public symposia in EPA Regional Offices to consider any technical problems posed by this ANPR. Annoucement of times, dates and places will be published.

The symposia will provide a technical forum for the exchange of information between EPA and the public concerning the data needs for subsequent proposed rulemaking, and will address hydrodynamics, analytical methods, toxicological criteria, categories of discharge sources, wastewater management technology, format and limits of standards and administrative matters.

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Findings from the Proposed Rulemaking and Hearing

The issues raised below have been considered and this Advance Notice of Proposed Rulemaking reflects the tentative direction which the Agency intends to pursue in resolving them.

. Toxicological Considerations:

Areas of concern prompted by publication of the Proposed Toxic Pollutant Effluent Standards, as published in 38 Federal Register 35388, et seq., 27 December 1973 were (a) persistence or fate of the toxic material was unknown or unpredictable, (b) correlation between laboratory bioassays and measured toxicity in the natural environment were incompletely established, or were not made at all, (c) the basis for making decisions on some toxicological factors was either arbitrary, invalid, or unsubstantiated, (d) the effect of sub-lethal concentrations of the toxic pollutant in long-term exposures is unknown, particularly in terms of factors such as behavior abnormalities and inhibition of growth rate, and (e) the proposed analytical techniques for toxic pollutant determination for field investigations were inadequate.

It was stated that the small size of the experimental animal group, the short duration of exposure, and the short duration of the total experiment all seriously impaired the value of the data used to derive risk estimates for lifetime human exposures to benzidine via drinking water. The effect of pH on the precipitation of cadmium, the effect of natural physical/chemical complexing to remove cadmium from the environment and the effect of varying receiving water hardness and alkalinity on the aquatic cadmium toxicity were stated to be factors that were as yet unexplained in natural waters.

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It was argued that the toxicity of any cyanide compound to aquatic organisms is dependent upon the degree of dissociation, the degree of metallic complexing, the concentration of the toxic species of the cyanide, the pH of the receiving water, and the degree of decomposition due to ultra-violet radiation and that these factors were not explained sufficiently. Specific criticisms of the toxicological basis for the proposed mercury standard dealt largely with the extent of methylation in natural environments. It was stated that the rates of methylation vs. demethylation were unknown, that some natural processes detoxify mercury compounds, and that since the concentration of the toxic species is methylmercury, only that form should be the basis for a proposed standard. Statements were made that compounds and mixtures containing less than five chlorine atoms are more biodegradable and less toxic in the natural environment than those PCB homologs containing five or more chlorine atoms, and that these data were not taken into account in formulating the proposed standards for PCB's. Criticisms were raised relative to selecting toxaphene as a material requiring an effluent standard as well as the hypothesis that the toxicological mechanism of toxaphene action is to decrease collagen synthesis and thereby affect final bone formation.

. Hydrodynamic Considerations:

Under the broad heading of hydrodynamics several areas were criticized such as, (1) low flow cutoff, the "10 cfs" limitation, (2) upper flow cutoff at 10,000 cfs, (3) the use of selected safety factors, (4) solutions to hydrodynamic problems, (5) the immediate 1:10 diffusion, and (6) the use of the probable 7 day in 10 year design flow.

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. Treatment Technology:

The public record shows an almost unanimous conclusion by industry that, even if adequate technology were available to design, construct, and operate treatment facilities capable of achieving proposed standards, the task could not be accomplished within one year of promulgation unless the facility is already in compliance. A few industrial representatives stated that the standards could not be met in 3 or more years because treatment methods do not exist or have not yet been demonstrated that would meet the proposed standards. Others contended that application of available treatment technology capable of achieving proposed effluent limits was economically unfeasible.

The above position was not countered successfully in the hearing record. However, the record shows that benzidene in wastewaters has been successfully destroyed by nitrous acid treatment. Cadmium concentrations in certain mining wastewaters can be reduced to required low levels by well-established precipitation and filtration techniques, but the disposal of the voluminous sludge presents serious logistic problems. Successful cyanide treatment methods to achieve complete cyanide destruction in wastewaters have been in use for many years, but problems exist in applying the technology to wastewaters containing substances which interfere with the desired reaction. Methods to reduce mercury concentrations in certain wastewater are in successful use and can be augmented to meet effluent limits. PCB's in wastewaters are being destroyed by high temperature incineration but the method may not be universally applicable. Treatment technology currently is under development for endrin manufacturing wastewater treatment in a promising pilot

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scale project jointly supported by industrial and EPA funds. The methods being tested are expected to be applicable in whole or in part to other chlorinated hydrocarbons such as toxaphene, aldrin-dieldrin and DDT.

. Analytical Methods:

The limit of detection for nearly all substances (DDT, aldrin-dieldrin, benzidine, mercury, PCB's, and possibly toxaphene and endrin) was noted as a problem because of the proposed allowable concentration levels. Numerous hearing record questions were raised concerning accuracy, precision and confidence levels (especially for cyanide, mercury, cadmium and PCB's). Various other issues were advanced including:

(1) Cost involved in performing analytical methods may be significant.

(2) The cyanide definition specified "simple cyanides" while the analytical methodology was for total cyanides. Further questions were raised as to whether free cyanides and those materials which may yield free cyanides in receiving water should be measured.

(3) Standardization of sampling techniques was believed necessary by commentors.

(4) An analytical method for detecting the higher chlorinated PCB's was suggested.

(5) Interferences hindering reliability of analysis were discussed.

(6) Physical (sorbed/dissolved) state of substance to be regulated was suggested to be important.

(7) Problems in quantitation of the toxic substances were found to exist for several substances.

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Steps to Follow for Rulemaking

In drafting a proposed standard this Agency intends to follow the format used in 38 FR 35388 Proposed Toxic Pollutant Effluent Standards published in the December 27, 1973, issue of the Federal Register. The format which was proposed discussed applicability, definitions, abbreviations, compliance and effective date, followed by a subpart for each of the nine toxic pollutants listed above which discussed applicability, definitions, determinations of weights and concentrations and the effluent standard.

A summary of the basis and purpose of the proposed effluent standards is intended to be prepared and published at the time of proposed rulemaking and should include: toxicological data; water quality criteria data; hydrodynamic data; availability of treatment technology; analytical limits; the appropriateness of applicability to various source categories; the digest of letters, comments, testimony, affidavits presented during the course of the public hearings, and the brief of the record filed by the objectors; and calculations of the acute and chronic limitations for the standards. In addition the documents should provide information concerning the persistence and degradability of the toxic pollutants, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms, and the nature and extent of the effect of the toxic pollutant on such organisms.

Comments, objections and suggestions for modification of the materials addressed in this Advance Notice are solicited and should be submitted in writing within 60 days after publication of this Advance

Notice to Dr. C. Hugh Thomspon, Hazardous and Toxic Substance Branch, (WH 595) Division of Technical Standards, Environmental Protection Agency, 401 M. St., Southwest, Washington, D.C. 20460.

Date:

James Agee
Assistant Administrator

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The following information is provided as an Advance Notice of Proposed Rulemaking which is indicative of the manner in which the Agency intends to use data and concepts to subsequently propose the Toxic Pollutant Effluent Standards. This information is provided in two subparts dealing with general terminology to be used and specific effluent limitations for each toxic pollutant. Under Subpart I - General the following areas are covered: hydrodynamic considerations, analytical considerations, toxicological considerations, expression of the effluent limitations as standard values, and administrative procedures which are intended to be followed:

Subpart I - General

A. Hydrodynamic Considerations:

1. The Agency is considering the following hydrodynamic definitions of terms used in Subpart II. The definitions published in 38 FR 35388 et seq., December 27, 1973, are applicable unless modified herein.

(a) "Coastal Waters" means any water of the open sea lying seaward of the baseline from which the territorial sea is measured under the Convention of the Territorial Sea and the Contiguous Zone (15 UST 1606; TIAS 5639).

(b) "Embayments" means any water body adjoining a larger water body such as a Great Lake or river, with limited geographic and/or hydraulic connection to that larger water body. The flow movement of an embayment is primarily in response to seiches.

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(c) "Ephemeral Stream" means any stream that carries water only after rains or periods of snow melt and includes intermittent streams which carry water most of the time but cease to flow occasionally because evaporation and seepage into their beds and banks exceed available stream flow.

(d) "Estuary" means any water body between the baseline from which the territorial sea is measured and the landward limit of tidal influence where the salinity is 0.5 parts per thousand or more.

(e) "Great Lake" means Lake Erie, Lake Superior, Lake Michigan, Lake Ontario, or Lake Huron.

(f) "Lake or Impoundment" means any water body, except a Great Lake, the Great Salt Lake, Utah, and Special Waters, in which the flow velocity is impeded by a natural or man-made barrier in such a way that water is stored for 120 days or more as determined by volumetric displacement using mean annual flow, provided that this term shall not include an impoundment, sump, retention pond or similar structure constructed for the storage, retention or disposal of wastewater.

(g) "Special Waters" means any water body which has been legally designated as a refuge, sanctuary, or drinking water supply reservoir, or any water body that does not mix vertically because of permanent density stratification or that does not have a surface outflow.

(h) "Stream" means any water body having a flow gradient except as otherwise defined in this subpart. This term shall not include any body of water which has been designed and constructed for the specific

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purpose of conveyance or treatment of wastewater.

(i) "Actual Flow" means the rate of flow of the water body measured at the point of pollutant discharge (but exclusive of the waste discharge flow).

(j) "Period of Seiche"means the time required for the water body surface to traverse through one complete seiche cycle.

(k) "Seiche Flushing Rate" means the ratio of new water to total flow moving past the discharge point during a seiche.

(l) "Tidal Cycle" means the traversing of the tidal water body surface through one complete cycle which at a minimum includes the rise to high tide from mean level, the fall to low tide and the rise back to mean sea level.

(m) "Tidal Exchange Ratio" means the ratio of new ocean water to total tidal flow moving past the discharge point during a flood tide.

(n) "Tidal Prism" means the volume of water contained in the estuary between mean high water and mean low water due to the characteristic seiche.

(o) "Immediate Vicinity" means an area of one-half the water depth at the discharge vertically and no more than ten times the water depth at the discharge measured in the net flow direction.

(p) "Fresh Water" means those water bodies whose salinity is 0.5 parts per thousand or less.

(q) "Salt Water" means those water bodes whose salinity is greater than 0.5 parts per thousand .

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(r) "Seiche Prism" means the volume of water contained in the embayment between mean high water and mean low water due to the the characteristic seiche.

2. The Agency is considering the following methods and terms in determinining computation of the flow used in Subpart II.

(a) Design flow of:

(1) Coastal Water or Great Lake - Means that flow in cubic feet per second calculated from the product of the minimum velocity available for dilution in feet per second times the minimum vertical spread for the effluent plume in terms of feet times the minimum horizontal spread of the effluent plume expressed in terms of feet. Where the discharger is unable to or does not care to make the appropriate measurement, the computations may be done assuming minimum velocity available (0.1 ft/sec.), minimum vertical spread (1/4 of depth) and minimum horizontal spread (10 depths) which reduces to the flow in cubic feet per second being equal to the depth at point of discharge squared divided by four. In the case of the Great Lakes, the depth of the summer thermocline or the depth to the bottom should be used, whichever is the lesser.

(ii) Embayment means that flow in cubic feet per second calculated from the summation of the design flows of all the tributaries entering the embayment plus the 30 day average waste stream flow (representative of normal operations), plus the product of the seiche flushing rate times the seiche prism landward from the point of discharge, the seiche factor being divided by the period of seiche.

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This is represented in the following relationship:

Flow of embayment = (flows of tributaries + 30 day wastestream flow) + $\frac{(\text{seiche flushing rate} \times \text{seiche prism})}{\text{period of seiche}}$

or

$$Q_{emb} = \left(Q_{1+2\ \ldots\ +Q_w}\right) + \frac{RP}{T}$$

where:

Q_{emb} = flow of embayment

$Q_{1+2\ldots}$ = sum of flow of tributaries entering embayment upstream from discharge

Q_w = 30 day average wastestream flow

R = seiche flushing rate

P = seiche prism landward from the point of discharge

T = period of seiche

(iii) Estuaries means the flow in cubic feet per second calculated from the summation of the design flows of all the tributaries entering the estuary upstream from the discharge plus the 30 day average waste stream flow (representative of normal operations) the entire sum being multiplied by the ratio of the salinity of the ocean at the mouth of the estuary to the salinity determined as the difference in receiving water salinities at the water surface above the point of discharge and at the mouth of estuary. In estuaries which have little or no tributary inflow, the flow shall be calculated in cubic feet per second from the summation of the 30 day average waste stream flow plus the quantity of the tidal exchange ratio times the

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tidal prism upstream from the point of discharge and divided by the duration of the tidal cycle. These are represented in the following relationships:

(aa) Estuary with tributary

Flow of estuary = (flows of tributaries + 30 day wastestream flow) x

$$\frac{\text{salinity of ocean at mouth of estuary}}{\text{salinity of ocean at mouth - salinity above point of discharge}}$$

or

$$Q_{est} = Q_{1+2+\ldots} + Q_w \frac{S_o}{S_o - S_d}$$

where:

Q_{est} = flow of estuary

$Q_{1+2\ \ldots}$ = sum of flow of tributaries entering estuaries upstream from discharge

Q_w = 30 day average wastestream flow

S_o = salinity of ocean at mouth of estuary

S_d = salinity above point of discharge

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(bb) Estuary without tributary

Flow of estuary = 30 day wastestream flow + $\frac{\text{(tidal exchange x prism upstream)}}{\text{duration of tidal cycle}}$

or

$$Q_{est} = Q_{w} + RP/T$$

where:

Q_{est} = flow of estuary

Q_{w} = 30 day average wastestream flow

R = tidal exchange ratio

P = tidal prism upstream from wastestream discharge point

T = duration of tidal cycle

(iv) Lake or Impoundment means the probable low rate of flow that occurs during a period of 30 consecutive days once in 5 years at the outlet or cumulative total of outlets of the lake or impoundment, except when the water is retained for one year or more, then this design flow shall be divided by the number of years of retention, which is necessary to reduce bioaccumulation of toxic materials.

(v) Streams means the probable low rate of flow that occurs during a period of 30 consecutive days once in 5 years immediately downstream from the facility discharging the pollutant. For systems with flow control, the design flow would be the minimum 30 consecutive day low flow released subsequently to

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obtaining normal pool water elevation and the beginning of normal operations. Discharges downstream from peaking power hydro impoundment facilities must discharge proportionally to stream flow or be designed from the minimum 4 consecutive hourly release during a 24 hour period.

B. Analytical Considerations

1. The Agency intends to use the following definitions of the toxic substances.

a. Aldrin-dieldrin

(i) "Aldrin" means the compound aldrin as identified by the chemical name, 1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro-1, 4-endo-exo-5, 8-dimethanonaphthalene.

(ii) "Dieldrin" means the compound dieldrin as identified by the chemical name 1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-1, 4-endo-exo-5, 8-dimethanonaphthalene.

b. Benzidine

"Benzidine" means the compound benzidine and its salts as identified by the chemical name 4-4'-diaminobiphenyl.

c. Cadmium

"Cadmium" means the element cadmium alone or in compound.

d. Cyanide

"Cyanide" means free cyanide ion or molecular hydrogen cyanide (HCN) as detected by the specified techniques.

e. DDT

"DDT" means the compound DDT, DDD, and DDE as identified by the chemical names (DDT) 1, 1, 1-trichloro-2, 2-bis(p-chlorophenyl) ethane and some o, p'-isomer, (DDD)(TDE) 1, 1-dichloro-2, 2-bis (p-chlorophenyl)

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ethane and some o,p'-isomer, (DDE) 1,1-dichloro-2,2-bis (p-chlorophenyl) ethylene.

f. Endrin

"Endrin" means the compound endrin as identified by the chemical name 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,,5,6,7,8,8a-octahydro-1,4-endo-endo-5,8-dimethanonaphthalene.

g. Mercury

"Mercury" means the element mercury , alone or in compound.

h. Polychlorinated Biphenyls

"Polychlorinated biphenyls (PCB's)" means biphenyls which have been chlorinated to varying degrees.

i. Toxaphene

"Toxaphene" means a material consisting of technical grade chlorinated camphene having the approximate formula of $C_{10}H_{10}Cl_8$ and containing 67-69% chlorine, which is normally a mixture.

2. Analytical Methods

The Agency solicits comments on the analytical methods identified below which are intended for use in quantifying the nine toxic pollutants. Appropriate comments include whether these methods are sufficiently sensitive, selective, reliable and accurate, whether the methods are appropriate for routine use, whether the necessary equipment and reagents will be available within the time allowed, whether the costs involved are reasonable, and whether sampling techniques and storage are problems. A description of the

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analytical methods which are intended to be used to quantify each of the nine toxic pollutant are as follows:

a. Aldrin-dieldrin, endrin, toxaphene, DDT:

Gas chromatagraphic method

40 CFR, Part 130, June 29, 1973.

b. Benzidine:

(i) The Chloramine-T method.

Modification was offered by the Benzidine Task Force, Synthetic Organic Chemical Manufacturers Association, which itself is a modification of the method of Butt and Strafford, J. Applied chemical 6:525-39, 1956. This is to be used by the manufacturers of benzidene and benzidene-based dyes.

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(ii) Mass balance method.

Stipulation of Fact on Benzidine, signed by the American Cyanamid Company, the Synthetic Organic Chemical Manufacturers Association (SOCMA) and the EPA, admitted into evidence June 6, 1974, p. 17. This method is to be used by the benzidine-based dye users and allows the user to control his potential discharge by knowing the warranted amount of benzidine he is using per day.

c. Cadmium:

Atomic absorption method.

ASTM1/, p. 692; Standard Methods 2/ p. 210; EPA 3/ p. 101.

1. Annual Book of Standards, Part 23, Water, Atmospheric Analysis, Available from American Society for Testing and Materials.
2. Standard Methods for the Examination of Water and Wastewater 13th Edition, 1971. Available from the American Public Health Assoc.
3. Methods for Chemical Analysis of Water and Wastes, Available from Superintendent of Documents, U.S. Govt. Printing Office. (Stock #5501-0067)

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d. Cyanide:

(i) For discharges which have inorganic complexing interferences: colorimetric method, a modification of ASTM Method D 2036-72, Method A, proposed in the affidavit of Dr. Sebastian Caruso (Exhibit 45) on behalf of the American Iron and Steel Institute.

(ii) For discharges which have organic complexing interferences: colorimetric method, Roberts, R.F., and Jackson, B. Analyst 96: 209(1971).

d. Mercury:

Flameless Atomic absorption

ASTM Method D3223-73 or JAWWA 64(1):20-25, January 1972.

e. Polychlorinated Biphenyls:

Gas chromatographic method

Available from Methods Development and Quality Assurance Research Laboratory, National Environmental Research Center, USEPA, Cincinnati, Ohio 45268.

3. Special considerations

(a) Increased Sensitivity:

The sample volumes for organochlorine pesticides are increased to the range of 500-1000 ml in order to achieve a level of sensitivity below the acute limit. This is feasible where the interference from undersirable co-extractives can be tolerated.

(b) Forms of pollutant to be measured:

Unless specifically excepted, the parameters to be measured and reported shall be the total concentrations or weights of the toxic substances

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determined by the listed analytical methods, excluding the weights or concentrations of any associated elements or compounds. Concentrations of elements shall refer to the dissolved portion while weights of elements shall refer to the total element present.

C. Toxicological Considerations:

1. Acute & Chronic Limits

The Agency staff intends to use the limits indicated below (Table I) to derive effluent standards that adequately protect against both acute and chronic toxicity for important organisms in the aquatic environment.

TABLE I
TOXICOLOGICAL BASIS FOR STANDARD DERIVATION

	Acute Toxicity		Chronic Toxicity	
	fresh water ug/l	salt water ug/l	fresh water ug/l	salt water ug/l
Aldrin-Dieldrin	0.5	0.7.	0.003	0.003
Benzidine	2500	-	.018	-
Cadmium- Hardness as $\leq$ $CaCo_3$ 100 mg/l	70		0.4	-
Cadmium - Hardness as $>$ $CaCO_3$ 100 mg/l	2000	320	3.0	5.0
Cyanide	100	100	-	-
DDT	0.36	0.24	0.003	0.003
Endrin	0.4	0.4	0.003	0.003
Mercury	50	50	0.05	0.10
PCB's	280	100	0.01	0.01
Toxaphene	2.0	2.0	0.04	0.02

D. Standard values:

The effluent discharge limitation(s) for any facility subject to provisions of this regulation shall meet the requirements specified for both acute protection and for chronic protection and are so specified

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in the standards section as concentration and weight limitations respectively.

1. Acute Protection:

To protect against acute toxicological damage, the concentration of any substance subject to the provisions of this regulation at the boundary of the immediate vicinity of the discharge shall be 1/10 the acute toxicity, and the effluent concentration shall not exceed the acute toxicity limit as found in Table I.

2. Chronic protection.

To protect against chronic toxicity there shall be a maximum daily loading limit permitted for each pollutant based upon the flow of the receiving water body. The maximum daily load is determined by converting the chronic toxicity (TableI) to pounds per day (or Kg/day) using the design flow of the receiving water body. The pounds per day (or Kg/day) is found by multiplying the product of the concentration in ug/l (the chronic toxicity - Table I) and the receiving water body flow by a conversion factor. The numerical values of the conversion factor are

5.4×10^{-3} $\frac{\#/day}{cfs \times ug/l}$ or 8.6×10^{-2} $\frac{Kg/day}{\frac{m}{sec} \times ug/l}$ for each of the pollutants found in Table II.

The loading numbers found in Table II must be multiplied by the individual receiving water body flow in cfs or cubic meters/sec into which the discharge will occur.

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The Agency intends that the standards will be net standards. All background amounts of the pollutant(s) whether or not from the same water body into which discharge is being made, or amounts in water supplies (but not plant site runoff or production material impurities) are to be substracted from the discharge amounts to arrive at the amount to be considered allowable for the chronic standard.

TABLE II

Streams & Lakes

	Chronic Toxicity	Loading Number	
	ug/l	lb/day/cfs	$kg/day/m^3/s$
Aldrin Dieldrin	0.003	0.000016	0.00026
Benzidine	0.018	0.000097	0.0016
Cadmium (Soft water)	0.4	0.0022	0.035
(Hard water)	3.0	0.016	0.26
DDT	0.003	0.000016	0.00026
Endrin	0.003	0.000016	0.00026
Mercury	0.05	0.00027	0.0043
PCB's	0.01	0.000054	0.00086
Toxaphene	0.04	0.00022	0.0035

Estuaries and Coastal Waters

	Chronic Toxicity	Loading Number	
	ug/l	lb/day/cfs	$kg/day/m^3/s$
Aldrin Dieldrin	0.003	0.000016	0.00026
Benzidine	No Numbers Recommended (Criteria based on drinking water)		
Cadmium	5.0	0.027	0.43
DDT	0.003	0.000016	0.00026
Endrin	0.003	0.000016	0.00026
Mercury	0.10	0.00054	0.0086
PCB's	0.01	0.000054	0.00086
Toxaphene	0.02	0.00011	0.0017

$.000054 \times 180{,}000 = 10^{-4}$ lbs

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E. Applicability

1. Definitions:

It is intended that the following modifications be made for the source definitions published in 38 FR 35388, et seq., December 27, 1973:

"Capacitor manufacturing" means the manufacture and/or refurbishing of industrial or commercial capacitors (fixed and variable) or electronic capacitors.

"Transformer manufacturing" means the manufacture and/or refurbishing of power, distribution, instrument and specialty transformers or radio frequency or voice transformers.

"Benzidine manufacturing" means establishments engaged in manufacturing or preparation of benzidine and benzidine intermediates from technical chemicals.

"Polychlorinated biphenyl manufacturing" means any establishment engaged in manufacturing or preparation of polychlorinated biphenyls as an end product or as an intermediate.

"Polychlorinated biphenyl recovering" means any establishment engaged in recovering used or waste polychlorinated biphenyls from capacitors, transformers, or other end uses.

"Polychlorinated biphenyl regenerating" means any establishment engaged in regenerating used or waste polychlorinated biphenyls.

2. Categories of Sources:

The Agency intends to designate the following categories of sources for the listed pollutants:

For Aldrin-Dieldrin the categories of sources applicable to section 307(a) will be aldrin-dieldrin pesticides manufacturing and/or formulating facilities constituting a point source discharging into navigable waters.

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For benzidine the categories of sources applicable to section 307(a) will be any benzidine manufacturing plants, dye manufacturing and formulating facilities, textile mills, hospitals or laboratories constituting a point source discharging into navigable waters. The category of source, cyclic organic chemicals, has been exlcuded because the category includes many industries which do not have any benzidine in their effluent. The category benzidine manufacturing plant is more specific and the one intended to be regulated.

For cadmium the categories of sources applicable to section 307(a) will be any ferrous metal production, non-ferrous metal smelting and refining, petroleum refining, oil and gas extraction, industrial inorganic chemicals, industrial organic chemicals, bituminous coal and lignite mining, alkalies and chlorine, storage or primary battery manufacturing, electroplating, metal mining, or agricultural fertilizer manufacturing facility constituting a point source discharging into navigable waters.

For cyanide the categories of sources applicable to section 307(a) will be any petroleum refining, ferrous metal production, industrial organic chemicals, industrial inorganic chemicals, electroplating, non-ferrous metal smelting and refining, or metal mining facility constituting a point source discharging into navigable waters.

For DDT the categories of sources applicable to section 307(a) will be any DDT manufacturing or formulating facility constituting a point source discharging into navigable waters.

For endrin the categories of sources applicable to section 307(a) will be any endrin manufacturing or formulating facility constituting a point source discharging into navigable waters.

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For mercury the categories of sources applicable to section 307(a) will be any paper and allied product, oil and gas extraction, industrial organic chemical, industrial inorganic chemical, non-ferrous metal smelting and refining, lumber and wood products except furniture, bituminous coal and lignite mining, storage or primary battery manufacturing, or metal mining facility constituting a point source discharging into navigable waters. The category of sources, ferrous metal production has been excluded because data supplemental to the hearing record stated, by affidavit, that ferrous metal production facilities do not discharge mercury in toxic amounts as specified by these effluent limitations.

For PCB's the categories of sources applicable to section 307(a) will be any polychlorinated biphenyl manufacturing, recovering and regenerating, pesticide manufacturing, capacitor manufacturing, or transformer manufacturing facility constituting a point source discharging into navigable waters. The Agency intends to exlude railroad rolling stock while in transit, but to include marshalling yards, and railroad round houses and repair facilities as categories of sources for PCB's.

For toxaphene the categories of sources applicable to section 307(a) will be any toxaphene manufacturing or formulating facility constituting a point source discharging into navigable waters.

At present, publicly owned (or exclusively non-industrial wastewater treatment works are not designated as a sourcew category for toxic pollutant effluent standards. Such standards normally cannot be achieved by such treatment works. However, under section 307(b) of the Act, industrial users could be required by the treatment works to apply the degree of pretreatment necessary to prevent toxic pollutants from

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passing through the treatment works or interfering with the operation of the treatment works.

F. Compliance

1. The standards set forth in this ANPR will be effective one year after promulgation.

2. To comply with these standards, the owners or operators of each applicable manufacturing site constituting a point source discharging into navigable waters shall meet provisions in either (a) or (b) below:

(a) Within one year from promulgation:

(1) obtain an NPDES permit demonstrating full compliance, or

(2) obtain an NPDES permit providing for a phased compliance within the following two year period, provided that any special additional conditions imposed by other water pollution control requirements under the Act do not allow for less stringent effluent limitations than those of section 307.

(b) If for technological or other substantial and documented reasons the requirements above are not met and it is so demonstrated to the Regional Administrator, he may require at least completion of the following toxic pollutant control measures within one to three years:

(1) inventory sources of each listed toxic pollutant contributing to the rate of wastewater flow and concentration discharged.

(2) plans for in-plant corrective action to segregate, eliminate, reduce or otherwise safely dispose of each toxic pollutant.

(3) preliminary and final plans for the construction of new or renovated terminal wastewater treatment facilities.

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(4) plans for the conduct of studies considered necessary prior to the design of treatment works capable of achieving toxic pollutant effluent standards.

(5) construction of interim on-line terminal treatment facilities for partial control.

(6) construction of complete treatment facilities to effect compliance with this regulation.

(7) monitor acute and chronic effects of the discharge upon receiving waters.

3. The Regional Administrator may, under the demonstrated circumstances of (b) above, examine and resolve, on a case-by-case basis: special salinity situations caused by more than one tributary or effluent discharge entering an estuary of concern; examine and adjust the appropriateness of the immediate vicinity definition to control the discharge of toxic pollutants in toxic amounts, recognizing economic and technological feasibility; or determine a revised allocation of the discharge chronic limitation when the standard provides an incremental increase over that amount of the toxic pollutant existing in any receiving water that may be hazardous to aquatic organisms or to the consumers of aquatic organisms or to the users of the water.

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Subpart II - Proposed Effluent Standards

A. The proposed effluent standard for Aldrin-Dieldrin

The effluent discharge of any facility subject to the provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutants shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of aldrin-dieldrin shall not exceed 0.5 ug/l for discharges into fresh water bodies or 0.7 ug/l for discharges into salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 these concentrations at the boundary of the immediate vicinity.

(4) The total daily weight of aldrin-dieldrin discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake shall not exceed 0.00026 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.07 Kg/day or 0.16 pounds/day regardless of receiving water flow.

(b) Estuary or coastal water shall not exceed 0.00026 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.07 Kg/day or 0.16 pounds/day regardless of receiving water flow.

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B. The proposed effluent standard for Benzidine.

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of benzidine shall not exceed 2500 ug/l for discharges into fresh water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 this concentration at the boundary of the immediate vicinity.

(4) The total daily weight of benzidine discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake, water shall not exceed 0.0016 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000098 times the receiving water body design flow as defined in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.43 Kg/day or 0.98 pounds/day regardless of receiving water flow.

C. The proposed effluent standard for Cadmium.

The effluent discharge of any facility subject to provision of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

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(3) The effluent concentration of cadmium shall not exceed 70 ug/l for discharges into fresh water bodies with a hardness less than or equal to 100 mg/l as $CaCO_3$ or 2000 ug/l for discharges into fresh water bodies with a hardness greater than 100 mg/l as $CaCO_3$ or 320 ug/l for discharges into salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 these concentrations at the boundary of the immediate vicinity.

(4) The total daily weight of Cadmium discharged into a/an:

(a) Stream, lake or impoundment, embayment, a Great Lake with a hardness less than or equal to 100 mg/l as $CaCO_3$ shall not exceed 0.035 times the receiving water body design flow in m^3/sec to give Kg/day or 0.0022 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, at which time no facility shall discharge in excess of 9.8 Kg/day or 21.6 pounds/day regardless of receiving water flow.

(b) Stream, lake or impoundment, embayment, a Great Lake with hardness greater than 100 mg/l as $CaCO_3$ shall not exceed .26 times the receiving water body design flow in m^3/sec to give Kg/day or 0.016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 73.4 Kg/day or 162 pounds/day regardless of receiving water flow.

(c) Estuary or coastal water from any facility subject to this subpart shall not exceed 0.43 times the receiving water body design flow in m^3/sec to give Kg/day or 0.027 times the receiving water body flow as expressed

in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 122 Kg/day or 270 pounds/day regardless of receiving water flow.

D. The proposed effluent standard for Cyanide.

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of cyanide shall not exceed 100 ug/l for discharges into fresh and salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 this concentration at the boundary of the immediate vicinity.

E. The proposed effluent standard for DDT.

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of of the listed pollutant shall be prohibited until five days after measureable flows return.

(3) The effluent concentration of DDT shall not exceed 0.36 ug/l for discharges into fresh water bodies or 0.24 ug/l for discharges into salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 these concentrations at the boundary of the immediate vicinity.

(4) The total daily weight of DDT discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake shall not exceed 0.00026 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.07 Kg/day or 0.16 pounds/day regardless of receiving water flow.

(b) Estuary or coastal water from any facility subject to this subpart shall no exceed 0.00026 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.07 Kg/day or 0.16 pounds/day regardless of receiving water flow.

F. The proposed effluent standard for Endrin.

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of endrin shall not exceed 0.4 ug/l for discharges into fresh or salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 this concentration at the boundary of the immediate vicinity.

(4) The total daily weight of endrin discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake shall not exceed 0.00026 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.07 Kg/day or 0.16 pounds/day regardless of receiving water flow.

(b) Estuary or coastal water from any facility subject to this subpart shall not exceed 0.00026 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000016 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.07 Kg/day or 0.16 pounds/day regardless of receiving water flow.

G. The proposed effluent standard for Mercury.

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of mercury shall not exceed 50 ug/l for discharges into fresh and salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 this concentration at the boundary of the immediate vicinity.

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(4) The total daily weight of mercury discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake shall not exceed 0.0043 times the receiving water body design flow in m^3/sec to give Kg/day or 0.00027 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 1.22 Kg/day or 2.7 pounds/day regardless of receiving water flow.

(b) Estuary or coastal water from any facility subject to this subpart shall not exceed 0.0086 times the receiving water body design flow in m^3/sec to give Kg/day or 0.00054 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 2.5 Kg/day or 5.4 pound/day regardless of receiving water flow.

H. The proposed effluent standard for PCB's

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of PCB's shall not exceed 280 ug/l for discharges into fresh water bodies or 100 ug/l for discharges into salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 these concentrations at the boundary of the immediate vicinity.

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(4) The total daily weight of PCB's discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake shall not exceed 0.00086 times the receiving water body design flow in m/sec to give Kg/day or 0.000054 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.24 Kg/day or 0.54 pounds/day regardless of receiving water flow.

(b) Estuary or coastal water from any facility subject to this subpart shall not exceed 0.00086 times the receiving water body design flow in m^3/sec to give Kg/day or 0.000054 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.24 Kg/day or 0.54 pounds/day regardless of receiving water flow.

I. The proposed effluent standard for Toxaphene.

The effluent discharge of any facility subject to provisions of this part shall meet the following conditions:

(1) There shall be no opportunity for discharge into special waters.

(2) When the actual flow of ephemeral streams ceases, discharge of the listed pollutant shall be prohibited until five days after measurable flows return.

(3) The effluent concentration of toxaphene shall not exceed 2.0 ug/l for discharges into fresh or salt water bodies provided that the effluent shall be diffused such that the toxic pollutant concentration does not exceed 1/10 this concentration at the boundary of the immediate vicinity.

(4) The total daily weight of toxaphene discharged into a/an:

(a) Stream, lake or impoundment, embayment, or a Great Lake shall not exceed 0.0035 times the receiving water body design flow in m^3/sec to give Kg/day or 0.00022 times the receiving water body design flow in cfs to give pounds/day unless there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.98 Kg/day or 2.2 pounds/day regardless of receiving water flow.

(b) Estuary or coastal water from any facility subject to this subpart shall not exceed 0.0017 times the receiving water body design flow in m^3/sec to give Kg/day or 0.00011 times the receiving water body design flow in cfs to give pounds/day unlescs there is more than one discharge point in the immediate vicinity, in which case no facility shall discharge in excess of 0.49 Kg/day or 1.1 pounds/day regardless of receiving water flow.

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