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Water

Wastewater Treatment Ponds

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US ENVIRONMENTAL PROTECTION AGENCY
TECHNICAL BULLETIN

WASTEWATER TREATMENT PONDS
(Supplement to Federal Guidelines: Design, Operation and Maintenance of Wastewater Treatment Facilities)

1. PURPOSE:

This Bulletin presents technical information which will be used by US EPA Regional Administrators to review grant applications involving wastewater treatment ponds.

2. RELATED PUBLICATIONS:

This Bulletin supplements the Federal Guidelines Design, Operation, and Maintenance of Municipal Wastewater Treatment Plants. Additional design information can be found in EPA Technology Transfer publications:

1. Upgrading Lagoons, EPA-625/4-73-0016, Aug. 1973 (1)

2. Performance and Upgrading of Wastewater Stabilization Ponds, US EPA Technology Transfer Design Seminars, 1977 (3)

3. Process Design Manual: Wastewater Treatment Facilities for Sewered Small Communities, EPA-625/1-77-009, Oct. 1977 (42)

4. Process Design Manual: Design of Municipal Wastewater Stabilization Ponds (in preparation, ERIC, US EPA, Cincinnati, OH)

Operation and maintenance information can be found in:

5. Operations Manual - Stabilization Ponds, EPA-430/9-77-012, August 1977

3. TERMINOLOGY:

A wide variety of often conflicting terms is used to describe wastewater treatment ponds. For the purpose of this Bulletin a wastewater treatment (stabilization) pond is defined as a basin within which natural stabilization processes occur. The oxygen necessary to sustain some of these processes can come from photosynthetic and/or mechanical sources. Ponds are also characterized by the hydraulic flow pattern in use. The following terminology is used for the ponds discussed in the Bulletin:

A. <u>Oxidation Pond</u> - A pond which is aerobic throughout. The depth is shallow to permit light penetration to support the photosynthetic activity of contained algae. The oxygen sources to support aerobic stabilization are from algae activity and wind action at the liquid surface.

B. <u>Facultative Pond</u> - A pond having an aerobic zone near the surface with a gradient to anaerobic conditions near the bottom. Oxygen sources are the same as described for oxidation ponds, but the oxygen provided cannot maintain total aerobic conditions in the deeper facultative pond. These are the most common types of domestic waste stabilization ponds in the U.S.

C. <u>Aerated/Partial Mix Pond</u> - A pond designed for mechanical aeration as the oxygen source. The mixing intensity is not sufficient to keep all solids in suspension. As a result, there will be some sludge deposition and related anaerobic zones at or near the pond bottom. The incomplete mixing also permits light penetration and can result in significant algae growth at times. Algae and turbulence at the liquid surface will provide some dissolved oxygen (DO), but the design is usually based on mechanical aeration as the sole oxygen source.

D. <u>Aerated/Complete Mix Pond</u> - A pond designed for mechanical aeration as the oxygen source, and also with sufficient mixing intensity to keep solids in suspension. Algae will generally not be a factor due to the turbulent conditions and lack of light penetration.

Many complete mix ponds are actually designed as a variation of the activated sludge process including clarification and sludge recycle. Such complete mix systems must continue to satisfy the basic secondary treatment requirements of 40 CFR, Part 133. However, pond systems that might have a complete mix aeration cell (for odor control or partial oxidation of strong wastes) followed by partial mix or facultative cells could be subject to the suspended solids criteria presented in this bulletin.

E. <u>Continuous Discharge Pond</u> - A pond designed without imposed constraints on discharge. The actual discharge may be intermittent due to low seasonal flow or seasonal evaporation, etc., but the design would permit continuous unrestricted discharge. All of the ponds described above (A, B, C, D) can be designed for this mode of operation.

F. Controlled Discharge Pond - A pond designed to retain the wastewater without discharge for a significant period of time (6 months to one year). Discharge is then planned for a relatively short period (1-3 weeks) when pond characteristics are compatible with receiving water conditions. It might be possible to design any of the ponds defined above (A, B, C, D) for this mode of operation. However, the long detention period reduces the need for mechanical aeration so this mode of operation is most commonly found with facultative ponds.

G. Complete Retention Pond - A pond designed for evaporation and/or seepage as the hydraulic pathway so there is no discharge to surface waters. The method may be acceptable in locations having suitable climatic conditions and with proper regard for ground water protection, odor control, and water rights. These ponds would be similar in configuration to the previously described oxidation type having a shallow depth and large surface area to provide maximum potential for evaporation. Another type of "no discharge" pond would be a component in a land treatment system. These are discussed in a later section of this Bulletin.

Typical design factors for these different types of ponds are summarized in Table 2.

4. USE OF THE CRITERIA:

Projects involving waste treatment ponds proposed for Federal financial assistance from EPA will be based on the criteria contained in this Technical Bulletin. Approval can be given to different designs if reasonable assurance can be given to the EPA Regional Administrator that satisfactory performance will be achieved.

The criteria in this Technical Bulletin are intended to provide a typical baseline of engineering practice, and must be applied with engineering judgment on a case-by-case basis. The EPA Regional Administrator will review each project to identify and resolve additional factors important to the design of a specific project. Responsibility for satisfactory performance, however, remains with the grant applicant.

It is the policy of EPA to encourage the use of innovative technology. Such technology may be eligible for an increased percentage of federal funding as defined by section 202(a)(2) of the Clean Water Act of 1977 (P.L. 95-217). EPA Regional Administrators will give full consideration to innovative technologies which may not be included in this Bulletin.

5. PERFORMANCE REQUIREMENTS:

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for publicly owned treatment works. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the EPA Administrator. The EPA published information on secondary treatment in August 1973 in 40 CFR Part 133.(4). This contained criteria for biochemical oxygen demand (BOD), suspended solids (SS), fecal coliform bacteria and pH. Subsequently, the requirements for fecal coliform were deleted from 40 CFR Part 133 on July 25, 1976, leaving BOD, SS, and pH as originally defined.

Wastewater treatment ponds have historically been accepted as a secondary treatment process and have been particularly advantageous for smaller communities. Treatment performance with respect to BOD removal has been generally acceptable if ponds were conservatively designed and properly operated. Treatment performance with respect to suspended solids is often complicated by the presence of algae cells in the pond effluent. After considerable study and discussion the EPA published revised suspended solids limitations for wastewater treatment ponds on October 7, 1977.

The effluent criteria currently applicable to wastewater treatment ponds are:

(a) BOD_5 - The arithmetic mean for 30 consecutive days shall not exceed 30 mg/l or 85% removal, whichever results in the lesser effluent concentration.

The arithmetic mean of the values for 7 consecutive days shall not exceed 45 mg/l.

(b) Suspended Solids - Wastewater treatment ponds which are the sole process for secondary treatment and with maximum facility design capacity of 2 MGD or less and which meet the BOD limitations as prescribed by 40 CFR 133.102(a), are required to meet an effluent limitation for suspended solids in accordance with values set by the state or appropriate EPA Regional Office. The current values set by the States and Regional Offices are listed below. These values correspond to a 30 day consecutive average or an average over the period of discharge when the duration of the discharge is less than 30 days. In some cases States have developed additional values, such as weekly averages or daily maximums for compliance monitoring purposes. These additional values are not indicated in the chart below.

TABLE 1

Location	Suspended Solids Limit (mg/l)
Alabama	90
Alaska	70
Arizona	90
Arkansas	90
California	95
Colorado	
Aerated Ponds	75
All others	105
Connecticut	N.C.
Delaware	N.C.
District of Columbia	N.C.
Florida	N.C.
Georgia	90
Guam	N.C.
Hawaii	N.C.
Idaho	N.C.
Illinois	37
Indiana	70
Iowa	
Controlled Discharge, 3 cell	case-by-case but not greater than 80
All others	80
Kansas	80
Kentucky	N.C.
Louisiana	90
Maine	45
Maryland	90
Massachusetts	N.C.
Michigan	
Controlled Seasonal Discharge	
Summer	70
Winter	40
Minnesota	N.C.
Mississippi	90
Missouri	80
Montana	100
Nebraska	80

North Carolina	90
North Dakota	
North & East of Missouri River	60
South & West of Missouri River	100
Nevada	90
New Hampshire	45
New Jersey	N.C.
New Mexico	90
New York	70
Ohio	65
Oklahoma	90
Oregon	
East of Cascade Mts.	85
West of Cascade Mts.	50
Pennsylvania	N.C.
Puerto Rico	N.C.
Rhode Island	45
South Carolina	90
South Dakota	110
Tennessee	100
Texas	90
Utah	N.C.
Vermont	55
Virginia	
East of Blue Ridge Mts.	60
West of Blue Ridge Mts.	78
Eastern slope counties Loudoun, Fauquier, Rappahannock Madison, Green, Albemarle, Nelson Amherst, Bedford, Franklin, Patrick	case-by-case application of 60/78 limits
Virgin Islands	N.C.
Washington	75
West Virginia	80
Wisconsin	60
Wyoming	100
Trust Territories & N. Marianas	N.C.

Notes:

1. N.C. - no change from existing criteria

2. The values set for Iowa and Virginia incorporate a specific case-by-case provision; however, in accordance with 40 CFR 133.103(c), adjustments of the suspended solids limitations for individual ponds in all states are to be authorized on a case-by-case basis.

3. The values tabulated above can be considered as interim. Further revision and refinement will be possible as additional data becomes available.

4. Wastewater treatment ponds with a maximum facility design capacity in excess of 2 MGD will have to satisfy the basic suspended solids requirements of 40 CFR Part 133 (i.e.: 30 mg/l or 85% removal on a 30 day average and, 45 mg/l on a 7 day average). Other ponds that are not eligible for an adjustment in suspended solids limitations include: basins or ponds used as a final polishing step for other secondary treatment systems and ponds which include complete-mix aeration and sludge recycle since these systems are in essence a variation of the activated sludge process.

(c) pH - The effluent values for pH shall remain within the range of 6.0 to 9.0, unless variations are due to natural causes (i.e.: natural pH of wastewater and/or phenomena resulting from biological activity in the pond). Adjustment of pH is only required where inorganic chemicals are added for treatment or contributions from industrial sources cause the pH to be outside the range of 6.0 to 9.0.

More stringent performance requirements than defined above may be necessary to meet other criteria such as State water quality standards, including disinfection requirements. In such cases the criteria contained in this Bulletin will have to be adjusted accordingly.

6. BACKGROUND:

There are more than 5,000 publicly owned wastewater treatment ponds in the United States. Generally, these ponds are located in small communities and are designed for flows less than 2 MGD. Ponds have been used where land is available because operation is simple and operating costs are small. The low energy requirements of these systems are particularly attractive. The great majority of the existing systems are continuous flow facultative or oxidation ponds.

There is a wide variation in the design of these systems; and until recently comprehensive performance data were lacking. An extensive evaluation of four facultative and five aerated ponds supported by the EPA has provided considerable information on the capabilities of these studies and is available from the Municipal Environmental Research Laboratory, US EPA, Cincinnati, Ohio 45268. A brief summary of these studies can be found in the reference (3) previously cited.

Regarding the ability of continuous flow facultative and oxidation ponds to meet secondary treatment requirements the data indicate that:

(a) The BOD level in general is satisfactory and could be achieved in all cases by improved design. Natural oxygen sources (i.e.: algae, surface turbulence) are reduced or eliminated during the winter in ice covered ponds. The BOD levels would not be met under these conditions for short detention time systems.

(b) The suspended solids level is generally not achieved because of the algae in the effluent.

(c) The pH of the effluent varies markedly depending on alkalinity CO_2 relationships. The variation is, however, rarely sufficient to require pH adjustment.

Aerated ponds with properly designed suspended solids separation can meet the adjusted requirements. Since partial-mix systems permit some algae growth, suspended solids can be high at times.

Controlled discharge ponds have been used in northern climates and can meet the requirements if properly operated. Such ponds and other long retention, multiple cell systems achieve significant reductions in fecal coliform levels. A fecal coliform concentration of approximately 200/100 ml can be achieved without disinfection if adequate hydraulic residence times are provided.

As indicated above, the responsible factor for suspended solids performance in the general case was algae. Algae are naturally present in wastewater treatment ponds and the non-aerated types are specifically designed to rely on photosynthetic oxygenation. Algae cells, which are an integral part of the treatment system, do not settle readily and may be carried out of the pond as suspended solids in the effluent. Methods for removing algae from pond effluents have been developed and are described in a later section.

Each state had the options to retain current values, to determine an adjusted value for the entire state, or to determine several values for appropriate contiguous geographical areas. As shown in Table 1, all three options were utilized by various states. The basic procedures to determine these adjusted values were conducted by the states, with the assistance of the applicable EPA Regional Office if needed. Only those ponds meeting the BOD requirements were eligible for inclusion in the statistical analysis. The new suspended solids value was to be equal to the effluent concentration achieved 90% of the time.

In some cases the data base for the analysis was quite limited and in all cases additional data are being collected. A periodic re-evaluation of this expanding data base could result in further changes so the values are considered "interim."

7. DESIGN FEATURES:

Typical design parameters for continuous flow ponds are given in Table 2.

Most existing wastewater ponds were designed within the range of parameters listed in Table 2. There are many local modifications employed. It is not uncommon for state agencies and EPA regions to have specific criteria for pond design. Several attempts have been made to develop a more rational basis for facultative pond design and are available in the engineering literature (31,29,38). None of these can be used to consistently predict performance of actual ponds in a variety of settings. The probable cause is the variations in hydraulic residence times that occur in actual systems. Until methods are available to more accurately define hydraulic residence time, pond design will probably remain an empirical procedure based on successful past experience.

The unique features of controlled discharge ponds are long term retention and periodic, controlled discharge usually once or twice a year. Ponds of this type have operated satisfactorily in the north central U.S. using the following design criteria:

Overall organic loading: 20-25 pounds BOD_5/acre.

Liquid depth: not more than 6 feet for the first cell, not more than 8 feet for subsequent cells.

Hydraulic detention: At least 6 months above the 2 foot liquid level (including precipitation), but not less than the period of ice cover.

Number of cells: At least 3 for reliability, with piping flexibility for parallel or series operation.

The design of the controlled discharge pond must include an analysis showing that receiving stream water quality standards will be maintained during discharge intervals, and that the receiving watercourses can accomodate the discharge rate from the pond. The design must also include a recommended discharge schedule.

TABLE 2 DESIGN PARAMETERS WASTEWATER PONDS (25,33)

Type of Pond	Detention Time (days)	Depth (ft)	BOD loading (lb/acre/day)	Number of Cells	Size of Cell (acre)
Oxidation	10-40	1.5-3	60-120	3+	2-10
Facultative					
Winter Average Air Temperature					
Above 60°F	25-40	3.5	40-80	3-4	2-10
32° - 60°F	40-60	4-6	20-40	3-4	2-10
Below 32°F	80-180	5-7	10-20	3-4+	2-10+
Partial Mix Aerated	7-20	8-10	30-100	3+	2-10

Selecting the optimum day and hour for release of the pond contents is critical to the success of this method. The operation and maintenance manual must include instructions on how to correlate pond discharge with effluent and stream quality. The pond contents and stream must be carefully examined, before and during the release of the pond contents.

In a typical program, discharge of effluents follows a consistent pattern for all ponds. The following steps are usually taken:

(a) Isolate the cell to be discharged, usually the final one in the series, by valving-off the inlet line from the preceding cell.

(b) Arrange to analyze samples for BOD, suspended solids, volatile suspended solids, pH, and other parameters which may be required for a particular location.

(c) Plan to work so as to spend full time on control of the discharge throughout the period.

(d) Sample contents of the cell to be discharged for dissolved oxygen, noting turbidity, color, and any unusual conditions.

(e) Note conditions in the stream to receive the effluent.

(f) Notify the state regulatory agency of results of these observations and plans for discharge and obtain approval.

(g) If discharge is approved, commence discharge and continue so long as weather is favorable, dissolved oxygen is near or above saturation values and turbidity is not excessive following the prearranged discharge flow pattern among the cells. Usually this consists of drawing down the last two cells in the series (if there are three or more) to about 18-24 inches after isolation; interrupting the discharge for a week or more to divert raw waste to a cell which has been drawn down and resting the initial cell before its discharge. When this first cell is drawn down to about 24 inches depth, the usual series flow pattern, without discharge, is resumed. During discharge to the receiving waters samples are taken at least three times each day near the discharge pipe for immediate dissolved oxygen analysis. Additional testing may be required for suspended solids.

Experience with these ponds is limited to northern states with seasonal and climatic influences on algae growth. The concept will be quite effective for BOD removal in any location and, if suspended solids are within the limits given in Table 1, it should be effective in warmer climates. The process will also work with a more frequent discharge cycle than semi-annually, depending on receiving water conditions and requirements. Operating the isolation cell on a fill and draw batch basis is similar to the "phase isolation" technique discussed in a later section for pond upgrading.

The design of partial mix aerated ponds is commonly based on first order reaction rate equations for completed mixed flow even though by definition the ponds are not completely mixed. As indicated in Table 1 at least 3 cells are usually provided. The aeration is usually tapered with higher intensity near the inlet of the first cell and a quiescent zone near the end of the final cell.

The detention time or pond volume is based on the low temperature winter time reaction rates. The oxygen requirements are based on the higher temperature summer reaction rates. No allowance is made for photosynthetic oxygenation even though algae will be present. An allowance must be made for sludge accumulation and for winter ice formation in northern climates. In Alaska, which might represent the worst case, an allowance of 5% is made for sludge storage and 15% for ice formation in calculating total pond volume. The total depth of the pond is then based on the requirements for the type of aeration equipment chosen. Special attention is required for design of surface aerators in cold climates because of ice problems.

Partial-mix ponds may have high suspended solids on an infrequent basis due to algae. If these values exceed the limits given in Table 1 it may be possible to operate the final cell in an intermittent discharge mode during algae blooms.

Complete retention ponds may be feasible in locations with low cost land and high evaporation rates. Many existing complete retention systems probably depend to a greater degree than is desirable on seepage. Many states are adopting increasingly stringent seepage requirements for wastewater pond systems.

Design features common to most pond systems include earthen dikes and inlet and outlet works. Designs can usually be based on a balanced cut and fill so that most of the excavated material can be used in dike construction. Outside slopes of dikes are usually 3:1 or flatter to permit grass mowing. Inside slopes are steeper, ranging from 2:1 to 3:1. When the size of pond cells are much greater than 10 acres or if the system is in a particularly windy location the inside slopes of the dikes should be protected from wave erosion. Membrane liners are easily punctured and some are sensitive to solar radiation so it is common practice to overlay at least the above water portion with soil and rip rap.

The inlet structure for small ponds is generally at the center. For large ponds the use of inlet diffusers with multiple outlet ports is desirable to distribute suspended solids over a larger area. Transfer and outlet structures should permit lowering the water level at a rate of less than 1 foot per week when the facility is receiving its normal load. Manhole type structures are commonly used with either valved piping or adjustable "stop log" type overflow gates used to control depth.

8. GENERAL CONSIDERATIONS:

The following criteria apply to the waste treatment ponds covered in this Bulletin.

(a) Pathogen Control

Natural die-off of pathogens is very effective in long retention time facultative and controlled discharge ponds. Fecal coliform concentrations of approximately 200/100 ml can be achieved without disinfection if adequate hydraulic residence times are provided. A positive disinfection technique may be necessary for ponds to comply with site specific discharge requirements. Chlorination can achieve the required fecal coliform reductions. A mathematical model designed to be applicable to most pond systems, along with monographs which can be used to calculate chlorine dosages to yield adequate residuals without lysing algae cells, is presented in reference (10).

(b) Control of Short Circuiting

Short circuiting of flow occurs to varying degrees in most existing ponds. In a study of a multiple cell system, it was found that the actual detention time in the cells varied from 25 to 89 percent of the theoretical design detention time, (27).

The use of multiple cells operated in series and multiple port inlet structures is effective in reducing short circuiting. In-basin baffles can also be effective but special attention is required in northern climates to avoid problems with ice. Multiple cells are probably the most effective approach. No less than 3 cells will be provided for ponds covered by this Bulletin.

(c) Seepage Control

Lining of the pond bottom and inner dike surfaces may be necessary if compaction of the in-situ soils does not produce an acceptable level of impermeability. In general, all of the states in the U.S. require protection of the beneficial use of ground water beneath a pond. Only a few states define a specific seepage limitation. Most states do not have a specific value but decide on a case-by-case basis for protection of ground water. Lining materials range from locally available clays, bentonite, asphalt, concrete, soil cement, and various membranes. Some of the low seepage rates required would be difficult to achieve with soil stabilization techniques so constructed liners or membranes might be necessary. Reference (28) describes in complete detail techniques for pond lining.

(d) Sludge Accumulation

Sludge will accumulate to varying degrees on the bottom of all of the ponds covered by this Bulletin. Most of the accumulation will occur at or near the inlet structures. Decomposition of these benthic sludge deposits is via anaerobic processes. This sludge can in time exert a significant oxygen demand on the system. The problem is particularly critical in northern temperate climates where a temperature induced "turnover" of pond contents can occur in the spring and fall of each year. This "turnover" can resuspend some of the benthic material and result in odor as well as temporary effluent quality problems.

Sludge will accumulate at faster rates in ponds in cold climates since the low winter temperatures inhibit the anaerobic reactions. In Alaska, which is probably the worst case, it is common practice to reserve up to 5% of the design volume for sludge accumulation.

9. UPGRADING TECHNIQUES:

Algae removal may still be necessary for: ponds greater than 2 mgd capacity, ponds not meeting the BOD requirements and ponds discharging to water quality limiting stream segments. A number of techniques for upgrading have been studied in recent years.

(a) Land Application

Land application of pond effluents is an excellent technique for final treatment. Reference (22) discusses in detail the basic land treatment modes and variations. Wastewater treatment ponds and/or treatment storage pond combinations are often the most cost effective way to achieve the preapplication treatment levels recommended by EPA prior to the final land treatment step.

(b) Conversion to Controlled Discharge

An existing continuous discharge pond can be converted to a controlled discharge pond if the previously outlined conditions are met. Usually additional land area will be required to obtain the volume required for controlled discharge.

(c) Intermittent Sand Filtration

Experimental research and practical operation of full scale facilities has demonstrated the effectiveness of intermittent sand filtration for upgrading lagoon effluents. As with all wastewater treatment systems, performance is dependent on proper operation and maintenance. However, less operator skill and manpower is required for operation of intermittent sand filters than with most other upgrading systems. Experience indicates that a high quality effluent may be achieved at a relatively low cost. Intermittent sand filtration is not a new technique. Rather, it is the application of an old technique to the problem of upgrading lagoon effluents. Intermittent sand filtration is similar to the practice of slow sand filtration in potable water treatment or the slow sand filtration of raw sewage which was practiced during the early 1900's. Intermittent sand filtration of lagoon effluents is the application of lagoon effluent on a periodic or intermittent basis to a sand filter bed. As the wastewater passes through the sand filter bed, suspended solids and organic matter are removed through a combination of physical straining and biological degradation processes. The particulate matter collects in the top 5 to 7.5 cm (2 to 3 inches) of the sand filter bed. This buildup of organic matter eventually clogs the top 5 to 7.5 cm (2 to 3 inches) of the sand filter bed and prevents the passage of the effluent through the sand filter. The sand filter is then taken out of service and the top layer of clogged sand is removed. The sand filter is then put back into service and the spent sand is either discarded or washed and used as replacement sand for the sand filter.

The development of intermittent sand filtration to upgrade lagoon effluents has been demonstrated with pilot scale and full scale systems treating effluents from facultative, aerated, and anaerobic ponds. Typical design criteria for full scale systems are given in Table 3. References (3), (14) should be consulted for details.

Table 3. Design Criteria for Full Scale Intermittent Sand Filter Systems at Mount Shasta, California; Moriarty, New Mexico; and Ailey, Georgia

Parameter	Mount Shasta	Moriarty	Ailey
Design Q (mgd)	1.2	0.4	0.08
Lagoon Type	Aerated	Partial mix aerated	Facultative
Filter Area (acre)	0.5	0.082	0.14
No. Filters	6	8	2
Hydraulic Loading (mgad)	0.7	0.6	0.4
Effective Size (mm)	0.37	0.20	0.50
Uniformity Coeff.	5.1	4.1	4.0

(d) Rock Filter

The rock filter is essentially a porous rock embankment at the end of a pond system through which the pond effluent is allowed to flow. Suspended solids settle out on the rock surfaces and in the void spaces and then are biologically degraded. Typical filter construction uses rocks greater than 1 inch and less than 5 inches in diameter with most of the rocks approximately a 2 inch size. Recommended hydraulic loadings range from 9 gallons/ft^3/day in warm weather to 3 gallon/ft^3/day in cold weather. Reference (3) should be consulted for details.

(e) Chemical Treatments

Chemical treatments for coagulation-flocculation and settling of suspended solids have been tried with pond systems with success. Both external mechanical treatments and in-pond treatments have been demonstrated.

Coagulation followed by sedimentation, and possibly filtration, has been used extensively for the removal of suspended and colloidal material from water. In the case of the chemical treatment of wastewater treatment pond effluents the data are not comprehensive (12). Lime, alum, and ferric salts are the most commonly used coagulating agents. Because of the many variables, a pilot testing program will usually be necessary to ensure proper operation of the system. There must be a satisfactory method of ultimate disposition of resultant sludges. Unless designed for constant flow, close control of the process is required to obtain satisfactory performance. Depending on the alkalinity of the wastewater, the operating cost of the chemicals for this method can be relatively high. Additional information is contained in references (1), (2), (18), (12), (24), and (25).

In-pond chemical treatment in a controlled discharge pond has been sucessfully demonstrated in Canada. Techniques using high concentrations of chlorine with a long contact time followed by settling and filtration have also been shown to reduce algae suspended solids.

(f) Natural In-Pond Removal

A technique called "phase isolation" for algae removal has been studied. It was developed in the pond system serving the city of Woodland, CA., and consists of a batch fill and draw operation with a detention time of two to three weeks. The results of studies on the Woodland system indicated that the process was not consistent. Wind action resuspended bottom deposits at times and in late summer and early fall different types of algae developed that would not settle. Suspended solids in the effluents ranged from less than 30 mg/l to over 60 mg/l.

Other natural approaches include the use of filter feeding fish for algae removal and other techniques in the emerging aquaculture technology. The use of aquatic plants such as hyacinths and duckweed has been shown to control algae development. The mechanism is the shading effect of these floating plants which restricts the light transmission needed for algae growth. Supplemental aeration is then usually required to maintain desired oxygen levels in the pond.

(g) Mechanical Removal

Techniques in this category would include centrifugation, microstraining with a 1 micron polyester fabric, dissolved air flotation and granular media filtration. All have been successfully demonstrated. References (3), (27) contain specific details.

10. FUTURE ACTION:

The information contained in this Bulletin will be modified as additional field experience becomes available. Those having such information are encouraged to submit it to the Director, Municipal Construction Division (WH-547), Office of Water Program Operations, Environmental Protection Agency, Washington, D.C. 20460.

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APPENDIX

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FRIDAY, AUGUST 17, 1973
WASHINGTON, D.C.

Volume 38 ■ Number 159

PART II

ENVIRONMENTAL PROTECTION AGENCY

■

WATER PROGRAMS

Secondary Treatment Information

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER D—WATER PROGRAMS

PART 133—SECONDARY TREATMENT INFORMATION

On April 30, 1973, notice was published in the FEDERAL REGISTER that the Environmental Protection Agency was proposing information on secondary treatment pursuant to section 304(d)(1) of the Federal Water Pollution Control Act Amendments of 1972 (the Act). Reference should be made to the preamble of the proposed rulemaking for a description of the purposes and intended use of the regulation.

Written comments on the proposed rulemaking were invited and received from interested parties. The Environmental Protection Agency has carefully considered all comments received. All written comments are on file with the Agency.

The regulation has been reorganized and rewritten to improve clarity. Major changes that were made as a result of comments received are summarized below:

(a) The terms "1-week" and "1-month" as used in § 133.102 (a) and (b) of the proposed rulemaking have been changed to 7 consecutive days and 30 consecutive days respectively (See § 133.102 (a), (b), and (c)).

(b) Some comments indicated that the proposed rulemaking appeared to require 85 percent removal of biochemical oxygen demand and suspended solids only in cases when a treatment works would treat a substantial portion of extremely high strength industrial waste (See § 133.102(g) of the proposed rulemaking). The intent was that in no case should the percentage removal of biochemical oxygen demand and suspended solids in a 30 day period be less than 85 percent. This has been clarified in the regulation. In addition, it has been expressed as percent remaining rather than percent removal calculated using the arithmetic means of the values for influent and effluent samples collected in a 30 day period (See § 133.102(a) and (b)).

(c) Comments were made as to the difficulty of achieving 85 percent removal of biochemical oxygen demand and suspended solids during wet weather for treatment works receiving flows from combined sewer systems. Recognizing this, a paragraph was added which will allow waiver or adjustment of that requirement on a case-by-case basis (See § 133.103(a)).

(d) The definition of a 24-hour composite sample (See § 133.102(c) of the proposed rulemaking) was deleted from the regulation. The sampling requirements for publicly owned treatment works will be established in guidelines issued pursuant to sections 304(g) and 402 of the Act.

(e) In § 133.103 of the proposed rulemaking, it was recognized that secondary treatment processes are subject to upsets over which little or no control may be exercised. This provision has been deleted. It is no longer considered necessary in this regulation since procedures for notice and review of upset incidents will be included in discharge permits issued pursuant to section 402 of the Act.

(f) Paragraph (f) of § 133.102 of the proposed rulemaking, which relates to treatment works which receive substantial portions of high strength industrial wastes, has been rewritten for clarity. In addition, a provision has been added which limits the use of the upwards adjustment provision to only those cases in which the flow or loading from an industry category exceeds 10 percent of the design flow or loading of the treatment works. This intended to reduce or eliminate the administrative burden which would be involved in making insignificant adjustments in the biochemical oxygen demand and suspended solids criteria (See § 133.103(b)).

The major comments for which changes were not made are discussed below:

(a) Comments were received which recommended that the regulation be written to allow effluent limitations to be based on the treatment necessary to meet water quality standards. No change has been made in the regulations because the Act and its legislative history clearly show that the regulation is to be based on the capabilities of secondary treatment technology and not ambient water quality effects.

(b) A number of comments were received which pointed out that waste stabilization ponds alone are not generally capable of achieving the proposed effluent quality in terms of suspended solids and fecal coliform bacteria. A few commenters expressed the opposite view. The Agency is of the opinion that with proper design (including solids separation processes and disinfection in some cases) and operation, the level of effluent quality specified can be achieved with waste stabilization ponds. A technical bulletin will be published in the near future which will provide guidance on the design and operation of waste stabilization ponds.

(c) Disinfection must be employed in order to achieve the fecal coliform bacteria levels specified. A few commenters argued that disinfectant is not a secondary treatment process and therefore the fecal coliform bacteria requirements should be deleted. No changes were made because disinfection is considered by the Agency to be an important element of secondary treatment which is necessary for protection of public health (See § 133.102(c)).

Effective date. These regulations shall become effective on August 17, 1973.

JOHN QUARLES,
Acting Administrator

AUGUST 14, 1973.

Chapter I of title 40 of the Code of Federal Regulations is amended by adding a new Part 133 as follows:

AUTHORITY: Secs. 304()(1), 301(b)(1)(B), Federal Water Pollution Control Act Amendments, 1972, P.L. 92-500.

§ 133.100 Purpose.

This part provides information on the level of effluent quality attainable through the application of secondary treatment.

§ 133.101 Authority.

The information contained in this Part is provided pursuant to sections 304(d)(1) and 301(b)(1)(B) of the Federal Water Pollution Control Act Amendments of 1972, PL 92-500 (the Act).

§ 133.102 Secondary treatment.

The following paragraphs describe the minimum level of effluent quality attainable by secondary treatment in terms of the parameters biochemical oxygen demand, suspended solids, fecal coliform bacteria and pH. All requirements for each parameter shall be achieved except as provided for in § 133.103.

(a) *Biochemical oxygen demand (five-day).* (1) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 30 milligrams per liter.

(2) The arithmetic mean of the values for effluent samples collected in a period of seven consecutive days shall not exceed 45 milligrams per liter.

(3) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85 percent removal).

(b) *Suspended solids.* (1) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 30 milligrams per liter.

(2) The arithmetic mean of the values for effluent samples collected in a period of seven consecutive days shall not exceed 45 milligrams per liter.

(3) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85 percent removal).

(c) *Fecal coliform bacteria.* (1) The geometric mean of the value for effluent samples collected in a period of 30 consecutive days shall not exceed 200 per 100 milliliters.

(2) The geometric mean of the values for effluent samples collected in a period of seven consecutive days shall not exceed 400 per 100 milliliters.

(d) *pH*. The effluent values for pH shall remain within the limits of 6.0 to 9.0.

§ 133.103 **Special considerations.**

(a) *Combined sewers.* Secondary treatment may not be capable of meeting the percentage removal requirements of paragraphs (a)(3) and (b)(3) of § 133.102 during wet weather in treatment works which receive flows from combined sewers (sewers which are designed to transport both storm water and sanitary sewage). For such treatment works, the decision must be made on a case-by-case basis as to whether any attainable percentage removal level can be defined, and if so, what that level should be.

(b) *Industrial wastes.* For certain industrial categories, the discharge to navigable waters of biochemical oxygen demand and suspended solids permitted under sections 301(b)(1)(A)(i) or 306 of the Act may be less stringent than the values given in paragraphs (a)(1) and (b)(1) of § 133.102. In cases when wastes would be introduced from such an industrial category into a publicly owned treatment works, the values for biochemical oxygen demand and suspended solids in paragraphs (a)(1) and (b)(1) of § 133.102 may be adjusted upwards provided that: (1) the permitted discharge of such pollutants, attributable to the industrial category, would not be greater than that which would be permitted under sections 301(b)(1)(a)(i) or 306 of the Act if such industrial category were to discharge directly into the navigable waters, and (2) the flow or loading of such pollutants introduced by the industrial category exceeds 10 percent of the design flow or loading of the publicly owned treatment works. When such an adjustment is made, the values for biochemical oxygen demand or suspended solids in paragraphs (a)(2) and (b)(2) of § 133.102 should be adjusted proportionally.

§ 133.104 **Sampling and test procedures.**

(a) Sampling and test procedures for pollutants listed in § 133.102 shall be in accordance with guidelines promulgated by the Administrator pursuant to sections 304(g) and 402 of the Act.

(b) Chemical oxygen demand (COD) or total organic carbon (TOC) may be substituted for biochemical oxygen demand (BOD) when a long-term BOD:COD or BOD:TOC correlation has been demonstrated.

[FR Doc.73-17194 Filed 8-16-73;8:45 am]

federal register

WEDNESDAY, NOVEMBER 15, 1978
PART IV

ENVIRONMENTAL PROTECTION AGENCY

■

WASTEWATER TREATMENT PONDS

Suspended Solids Limitations

[6560-01-M]

ENVIRONMENTAL PROTECTION AGENCY

[FRL-10064]

SECONDARY TREATMENT INFORMATION REGULATION

Suspended Solids Limitations for Wastewater Treatment Ponds

On October 7, 1977, the Environmental Protection Agency (EPA) published in the FEDERAL REGISTER (42 FR 54666) a final amendment to the secondary treatment information regulation applicable to the suspended solids limitations for certain municipal wastewater treatment ponds. The secondary treatment information regulation, 40 CFR 133, contains effluent limitations in terms of biochemical oxygen demand, suspended solids and pH which must be achieved by municipal wastewater treatment plants.

The amendment added a new paragraph (c) to § 133.103 of 40 CFR 133. This allows a case-by-case adjustment in suspended solids limitations for publicly owned waste stabilization ponds, if: The pond has a design capacity of 2 million gallons per day or less; ponds are the sole process for secondary treatment; and, the pond meets the biochemical oxygen demand limitations as prescribed by 40 CFR 133.102(a). Ponds that are not eligible for this adjustment include: Basins or ponds used as a final polishing step for other secondary treatment systems, and ponds which include complete-mix aeration and sludge recycle or return since these systems are in essence a variation of the activated sludge process. Aerated ponds without sludge recycle, however, are eligible for adjustments provided the other specific requirements are met.

The amended suspended solids limitations were determined by statistical analysis of available data. The acceptable limit was defined as that concentration achieved 90 percent of the time by waste stabilization ponds that are achieving the biochemical oxygen demand limitations of 40 CFR 133.102(a). Each State was considered separately as well as appropriate contiguous geographic areas within a State or group of States. The analysis was done by the States or the applicable EPA regional office in cooperation with the States.

A considerable amount of latitude was allowed in developing these values to account for varying conditions affecting pond use and performance across the country. Categorizations within States based on factors such as geographic location, seasonal variation and the type of pond were permitted. In some instances, the values presented below reflect these factors.

In accordance with the amended regulation, a single value corresponding to the concentration achievable 90 percent of the time may be used to establish the suspended solids limitations for ponds within a State. The concentration achievable 90 percent of the time has been generally accepted as corresponding to a 30 consecutive day average (or an average value over the period of discharge when entire duration of the discharge is less than 30 days). This interpretation is consistent with the analysis which was used as the basis for the other suspended solids and biochemical oxygen demand limitations contained in 40 CFR 133.

For this reason, a single suspended solid concentration has been listed below for ponds (or subcategory of ponds) within a State. In some cases, however, the States and EPA regional offices have agreed upon additional values, such as weekly averages or daily maximums, which will be used for compliance monitoring purposes within those States.

In some cases the data base for the analysis was quite limited and in all cases additional data are being collected. A periodic reevaluation of this expanding data base will be conducted and could result in further changes in the suspended solids limitations listed below. Several EPA regional offices have already indicated their intent to conduct a reevaluation within 2 years or less. Even though publication of these values is not a formal rulemaking procedure, public comments are welcome and will be considered in any revisions. Comments should be submitted to Director, Municipal Construction Division (WH-547), Environmental Protection Agency, Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT:

Sherwood Reed or Alan Hais, Municipal Construction Division (WH-547), Office of Water Program Operations, Environmental Protection Agency, Washington, D.C. 20460, 202-426-8976.

Dated October 27, 1978.

THOMAS C. JORLING,
Assistant Administrator for Water and Waste Management.

[1505-01-C]

ENVIRONMENTAL PROTECTION AGENCY

Suspended Solids Limitations for Wastewater Treatment Ponds**

Location	Suspended Solids Limit* (mg/l)
Alabama	90
Alaska	70
Arizona	90
Arkansas	90
California	95
Colorado	
Aerated Ponds	75
All others	105
Connecticut	N.C.
Delaware	N.C.
District of Columbia	N.C.
Florida	N.C.
Georgia	90
Guam	N.C.
Hawaii	N.C.
Idaho	N.C.
Illinois	37
Indiana	70
Iowa	
Controlled Discharge, 3 cell	case-by-case but not greater than 80
All others	80
Kansas	80
Kentucky	N.C.
Louisiana	90
Maine	45
Maryland	90
Massachusetts	N.C.
Michigan	
Controlled Seasonal Discharge	
Summer	70
Winter	40
Minnesota	N.C.
Mississippi	90
Missouri	80
Montana	100
Nebraska	80
North Carolina	90
North Dakota	
North & East of Missouri River	60
South & West of Missouri River	100

Suspended Solids Limitations for Wastewater Treatment Ponds** (continued)

Location	Suspended Solids Limit* (mg/l)
Nevada	90
New Hampshire	45
New Jersey	N.C.
New Mexico	90
New York	70
Ohio	65
Oklahoma	90
Oregon	
East of Cascade Mts.	85
West of Cascade Mts.	50
Pennsylvania	N.C.
Puerto Rico	N.C.
Rhode Island	45
South Carolina	90
South Dakota	110
Tennessee	100
Texas	90
Utah	N.C.
Vermont	55
Virginia	
East of Blue Ridge Mts.	60
West of Blue Ridge Mts.	78
Eastern slope counties Loudoun, Fauquier, Rappahannock Madison, Green, Albemarle, Nelson Amherst, Bedford, Franklin, Patrick	case-by-case application of 60/78 limits
Virgin Islands	N.C.
Washington	75
West Virginia	80
Wisconsin	60
Wyoming	100
Trust Territories & N. Marianas	N.C.

NOTES:

N.C. - no change from existing criteria

* thirty consecutive day average or average over the period of discharge when the duration of the discharge is less than 30 days

** The values set for Iowa and Virginia incorporate a specific case-by-case provision; however, in accordance with 40 CFR 133.103(c), adjustments of the suspended solids limitations for individual ponds in all states are to be authorized on a case-by-case basis.

federal register

MONDAY, JULY 26, 1976

PART II:

ENVIRONMENTAL PROTECTION AGENCY

WATER PROGRAMS

Secondary Treatment Information

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER D—WATER PROGRAMS

[FRL 510-7]

PART 133—SECONDARY TREATMENT INFORMATION

Biochemical Oxygen Demand, Suspended Solids and pH

On August 15, 1975, notice was published in the FEDERAL REGISTER that the Environmental Protection Agency was proposing the amendment of the Secondary Treatment Information regulation contained in 40 CFR Part 133 and promulgated on August 17, 1973 pursuant to sections 301 and 304 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500, the Act). The proposed amendment was for the deletion of § 133.102(c) (limitations for fecal coliform bacteria) and the addition of § 133.103(c) ("Special Consideration" for clarification of the pH limitations contained in § 133.102(d)). Published in the FEDERAL REGISTER concurrently with the proposed amendment of 40 CFR Part 133 was a supplementary statement of EPA policy on the disinfection of municipal wastewater.

Written comments on the proposed rulemaking and statement of policy were invited and received from interested parties. The Environmental Protection Agency has carefully considered all comments received. All written comments are on file with the Agency.

Virtually all of the comments on the proposed rule changes concerned the intent and effect of the deletion of the fecal coliform bacteria limitations from 40 CFR Part 133 and the limiting of the pH requirements to processes using inorganic chemicals and/or those receiving significant industrial contributions.

The majority of the responses received indicated support for either one or both of the proposed amendments. The proposed amendment for deletion of the fecal coliform limitations from 40 CFR Part 133 specified reliance on State water quality standards for establishment of minimum disinfection requirements for publicly owned treatment works (POTW's). A significant majority of the responding State agencies (i.e., the agencies responsible for setting and implementing water quality standards) supported the amendment for deletion of the fecal coliform limits from 40 CFR Part 133.

The other principal comments received and the responses to them are summarized below:

(a) Several comments indicated support of an amendment to 40 CFR Part 133 to achieve flexibility in establishment of disinfection requirements but advocated alternatives other than the one proposed (i.e., deletion of the fecal coliform bacteria limitations from the Secondary Treatment Regulations). The alternatives suggested were: (1) Retaining the limits on fecal coliform bacteria in 40 CFR Part 133 but allowing a variance procedure to permit case-by-case exceptions, (2) raising the numerical limits on fecal coliform bacteria in 40 CFR Part 133, and (3) adopting a control parameter other than fecal coliform bacteria (e.g., total coliform bacteria or minimum chlorine residual).

Reliance on water quality standards for establishment of disinfection requirements for POTW's in lieu of limitations in 40 CFR Part 133 was selected by the Agency because the regulatory scheme established by the Act specifies the use of water quality standards for control of those pollutants which are not limited by uniformly applied effluent standards or for which more stringent limitations than those required by minimum effluent standards are required to achieve specific water quality needs. Development and implementation of water quality standards pursuant to the requirements of Pub. L. 92-500 are currently being carried out by the States so that transition to reliance on water quality standards for establishment of disinfection requirements for POTW's can be handled with a minimum amount of disruption.

The Agency also believes that because of the potential problems associated with the unnecessary use of disinfectants and the variable need for disinfection from one area of the country to another or one season to another, it is best to set disinfection requirements for POTW's on a case-by-case basis. By deleting the fecal coliform bacteria limitations from 40 CFR Part 133, the States will have the flexibility to establish disinfection requirements for POTW's in accordance with local needs. Accordingly, one of the alternate regulatory schemes suggested for control of disinfection practices, such use of total coliform bacteria as an indicator or less stringent limits on fecal coliform bacteria, may be appropriate for specific water quality needs and implemented locally. In other areas where disinfection of municipal wastewater discharges will be widely required in accordance with local water quality and public health needs, a general provision for disinfection with specific case-by-case exceptions may be appropriate.

(b) A number of comments disagreed with the proposed amendment for deletion of the fecal coliform bacteria limitations from 40 CFR Part 133 because it would shift the responsibility for implementation of disinfection requirements to the States and because the Agency had not supplied sufficient guidance to the States in the area of wastewater disinfection.

As indicated in the FEDERAL REGISTER notice of August 15, 1975, virtually every State and territory has water quality related standards pertaining to wastewater disinfection. Because the requirements of Pub. L. 92-500 are in the process of being implemented and control of municipal wastewater disinfection is in a transitional stage, State standards continue to dominate disinfection practices in most areas. Protection of public health from disease has been and continues to be a primary objective under the present system of control of disinfection of municipal wastewater by means of State standards. As noted previously, the majority of the State agencies responsible for establishment and implementation of disinfection requirements which responded with comments supported the proposed amendment. Several States submitted proposals for State disinfection requirements which were being considered for implementation in anticipation of the final amendment of 40 CFR Part 133 for deletion of the fecal coliform bacteria limitations.

Disinfection requirements for POTW's are and will continue to be enforceable conditions of permits issued under the authority of the National Pollutant Discharge Elimination System (NPDES). The Agency has prepared guidance for implementing the change in disinfection requirements for POTW's in NPDES permits. This guidance was prepared with the intent of simplifying the procedure for assigning effluent limitations for indicator organisms for municipal wastewater discharges so that the transition from effluent based disinfection requirements to water quality based requirements will be both efficient and effective.

The Agency has recently published in draft form, "Quality Criteria for Water" with the stated objective of providing the basis of judgment in several EPA and State programs that are associated with water quality considerations. Included in "Quality Criteria for Water" are chapters which provide guidance on standards for coliform bacteria and chlorine.

Also available to provide background guidance on municipal wastewater disinfection practices is the final "Task Force Report—Disinfection of Wastewater." The report is available from the General Services Administration (8FY), Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, Colorado 80225. The title and number of the report are: "Disinfection of Wastewater—Task Force Report," MCD-21: No. EPA-430/9-75-012.

(c) Several comments were received which questioned: (1) The impact of the deletion of the fecal coliform bacteria limitations from 40 CFR Part 133 on the use of chlorine and alternative disinfectants; (2) the potential inconsistency of the proposed rule change with section 101(a)(2) of the Act which specifies as an interim a national goal, wherever attainable, fishable and swimmable waters by 1983; and (3) the effect of the proposed deletion of the fecal coliform bacteria limits from 40 CFR Part 133 on reducing the potential hazard associated with the formation of carcinogenic compounds as a result of municipal wastewater disinfection. Similarly, other responses were received which commented that the FEDERAL REGISTER notices may jeopardize the protection of public health from disease because the notices appear to de-emphasize the importance of municipal wastewater disinfection.

The position of the Environmental Protection Agency has been and continues to be that the overriding criterion, with respect to decisions concerning the practice of municipal wastewater disinfection, is protection of public health from infectious disease. The Agency, however, also recognizes that protection of public health from disease can be maintained without continuous disinfection of all municipal wastewater discharges. Because chlorination is the wastewater disinfection process which is presently available for widespread application, retention of the fecal coliform bacteria limitations in 40 CFR Part 133 as originally promulgated would significantly increase the use of chlorine for wastewater disinfection in this country. The potential for problems such as toxicity to human and aquatic environments and excessive expenditure of valuable energy and monetary resources is increased unnecessarily as a result of a regulation which requires disinfection in certain instances where it is not necessary for the protection of public health from disease. It is the finding of the Agency that public health can be maintained in the future without inadvertently contributing to these problems.

The increase in the use of chlorine for sanitation purposes (including municipal wastewater disinfection) in this country prior to the implementation of Pub. L. 92–500 has been approximately the same as the annual rate of increase in the amount of wastewater discharged from POTW's—four percent. It is projected that the use of chlorine for municipal wastewater disinfection would increase by an average of approximately 10 percent per year during the period that Pub. L. 92–500 is being implemented (1973–1983) if continuous disinfection of municipal wastewater discharges remains as a requirement of 40 CFR Part 133. The difference in the amount of chlorine used for municipal wastewater disinfection, assuming an annual increase of 10 percent as opposed to 4 percent, would be 184,000 tons per year by 1983 which is greater than the estimated total use of chlorine for municipal wastewater disinfection in 1974. Furthermore, it is likely that the annual increase in the use of chlorine will be less than 4 percent per year as the effluent quality of discharges from POTW's improve (i.e., less disinfectant is generally required to achieve the same level of disinfection as effluent quality increases), as operational procedures for control of disinfection processes improve, and as the use of alternate disinfectants increases.

Concerning the use of alternate disinfection processes, the Agency has an extensive, on-going research and development program for the development and demonstration of alternate disinfection processes and improved control of chlorination processes. The "Task Force Report—Disinfection of Wastewater" summarizes the pertinent information concerning alternative processes for disinfection (including reliability, safety and cost) and describes the Agency's research and development program in the area of wastewater disinfection.

With regard to the use of chlorine for wastewater disinfection, the Agency recognizes the continuing need for the protection of public health from disease and does not believe there is conclusive evidence to warrant the prohibition of the use of chlorine for wastewater disinfection at the present time. The cost of chlorination/dechlorination should be compared to that of alternative disinfection processes when the need for disinfection and protection of aquatic life co-exist. Comparison of the costs for alternative disinfection processes to determine cost-effectiveness is required by law for projects involving the construction of disinfection facilities funded with construction grants under Title II of Pub. L. 92–500. Serious consideration should be given to use of alternate disinfection processes in those areas where organic compounds which can react with chlorine to form potentially toxic compounds are known to exist in the wastewater. However, it is recognized that chlorination processes will generally be the most cost effective at the present time. It is for this reason, in part, that establishment of disinfection requirements for POTW's on a case-by-case basis in accordance with specific water quality criteria is important.

Other responses commented that the deletion of the fecal coliform limitations from 40 CFR Part 133 is inconsistent with the goal of Pub. L. 92–500 for attainment of fishable and swimmable waters by 1983 and may jeopardize the integrity of that requirement of the Act.

Water quality standards define conditions necessary to meet the 1983 goal uses of Pub. L. 92–500. Deleting the effluent limitations from 40 CFR Part 133 does not preclude the achievement of the 1983 goal because water quality standards are established, in part, to protect public health and allow recreation in and on the water. In cases where water quality standards do not describe conditions necessary for fishable/swimmable water, the EPA Regional Administrator, in accordance with section 302 of the Act, can establish effluent limitations on a case-by-case basis after a public hearing on the costs and benefits of achieving those limits. As achievement of fishable/swimmable waters becomes imminent, we will be in a better position to re-evaluate the disinfection requirements for municipal wastewater discharges in consideration of the improved water quality at that time. In the interim, time will be available for investigation of cost-effective alternate disinfection processes and analysis of more conclusive data on the potential hazards associated with wastewater disinfection.

(d) Several comments were received which indicated opposition to the proposed amendment for deletion of the fecal coliform bacteria limitations from 40 CFR Part 133 because bacteriological monitoring is important for protection of public health. Other comments expressed either support for or opposition to the continued use of fecal coliform bacteria as an indicator of the pathogenic contamination of water or wastewater. Comments were also received which questioned the retaining of disinfection requirements for POTW's as enforceable conditions of NPDES permits.

Opposition to the deletion of the fecal coliform bacteria limitations from 40 CFR Part 133 on the basis of discontinuance of bacteriological monitoring or retention of disinfection requirements in permits is apparently based on a misunderstanding of the purpose of the Secondary Treatment Regulation. In accordance with the provisions of Pub. L. 92–500, secondary treatment is the minimum level of treatment required for POTW's; 40 CFR Part 133 defines that level of treatment in terms of effluent quality. The fecal coliform bacteria limitations in 40 CFR Part 133 were, in essence, a requirement for continuous disinfection of wastewater effluents from POTW's and fecal coliform bacteria were the measure of the effectiveness of the disinfection process. As such, the limitations on fecal coliform bacteria in 40 CFR Part 133 are not actual permit conditions for monitoring and effluent quality, although they will obviously affect the permit requirements for POTW's.

Monitoring requirements and effluent limitations for municipal wastewater effluents are set in accordance with the pollutant parameters for which control is necessary. In those instances where disinfection is required and coliform limitations are established, obviously bacteriological monitoring and effluent limitations pertaining to disinfection will be necessary and shall be required as NPDES permit conditions. In those instances where bacteriological monitoring is not required as a permit condition, it shall have been previously determined that disinfection and effluent limitations for coliform bacteria are not necessary at that particular time for that particular discharge.

Concerning the use of fecal coliform bacteria as an indicator of pathogenic contamination, it is recognized that just as there is not an ideal disinfection process presently available, there also is not an ideal indicator of pathogenic contamination at the present time. The EPA is presently conducting several studies for the development of new microbiological indicators for water and wastewater examination. However, the use of coliform bacteria has historically proven to be a valuable and practical indicator of the relative disease causing potential of water and wastewater. The Agency believes the continued use of the available microbiological indicators (including total and fecal coliform bacteria) is essential for the protection of the public from disease.

(e) Comments were received which recommended limits on residual chlorine either for protection of aquatic life (maximum chlorine residual) or to ensure adequate disinfection (minimum chlorine residual). The comment was also received that maintenance of a minimum chlorine residual is not an accurate indication of the effectiveness of the disinfection process.

Limits on the maximum chlorine residual in wastewater effluents are considered necessary in some areas where protection of aquatic life from toxicity is important. Several States have established standards limiting the amount of chlorine allowable in wastewater discharges to certain types of waters. Also, as indicated previously, "Quality Criteria for Water" has a chapter which suggests criteria for total chlorine residual for protection of salmonid fish and other freshwater and marine organisms. Limitations on residual chlorine in municipal wastewater effluents obviously must be an integral part of water quality considerations and such limitations will be established on a case-by-case basis in accordance with the degree of protection necessary.

Specification of a minimum chlorine residual in wastewater effluents to ensure adequate disinfection has not been the approach used by the Agency because it is process related and precludes the use of alternative disinfection processes. Although the Agency does not intend to dictate the effluent parameter used to measure the effectiveness of disinfection processes for POTW's after deletion of the fecal coliform bacteria limitations from 40 CFR Part 133, support of nonprocess related indicators, such as coliform bacteria, is maintained for the same reasons that fecal coliform bacteria were originally selected as a measure of effluent quality for 40 CFR Part 133. The use of a minimum chlorine residual is, however, recognized as a valuable parameter for process control of well designed chlorination facilities. If chlorine residual is considered for use as a process control for chlorination facilities, it is recommended that a range of chlorine concentrations (maximum and minimum) be specified to not only ensure effective disinfection, but also to limit the amount of chlorine used and remaining at the time of discharge.

(f) Some commenters expressed the opinion that deletion of the fecal coliform limitations from 40 CFR Part 133 and reliance on State water quality standards will jeopardize water quality and the protection of public health in interstate waters. 40 CFR 130.17(c) (4) (Policies and Procedures for Continuing Planning Process-Water Quality Standards) requires that "The State shall take into consideration the water quality standards of downstream waters and shall assure that its water quality standards provide for attainment of the water standards of downstream waters." The Administrator must approve or disapprove any State water quality standards in accordance with section 303 of Pub. L. 92-500, and thus has the authority to rule in cases where State water quality standards for interstate water are in conflict.

(g) A number of comments were received which recommended that both the amendments for deletion of the fecal coliform bacteria limitations from 40 CFR Part 133 and the clarification of the pH limitations be extended to apply to industrial effluent limitations. Section 304(d) (1) of Pub. L. 92-500 requires that the EPA "publish information * * * on the degree of effluent reduction attainable through the application of secondary treatment." The basis which is to be considered as a minimum for effluent limitations for industrial dischargers (Section 304(b) of Pub. L. 92-500) is, in part, the limits of available technology. In consideration of these statutory differences, effluent limitations for municipal and industrial discharges will logically vary with regard to the control of one or more pollutant parameters.

(h) A number of commenters disagreed with the amendment concerning the pH limitations because they believed that acidic or basic discharges from biological treatment processes can be harmful to receiving waters in the same way that discharges from chemical treatment processes or processes with significant industrial contributions can. Similarly, other comments indicated that, even if the pH of the effluent falls within the range of 6-9, discharges from any type of municipal wastewater treatment plant can adversely affect receiving waters depending on the characteristics of the water body. Still other comments cited information which indicates that the pH of wastewater effluents generally has no significant effect on receiving waters because of the natural buffering capacity of most waters. For this reason, these comments recommended that the pH limitations be entirely deleted from 40 CFR Part 133.

No changes in the amendment for pH limitation have been made in response to these comments. Pub. L. 92-500 and its legislative history clearly shows that the Secondary Treatment Regulation is to be based on the capabilities of secondary treatment technology and not ambient water quality effects (S. Rep. 92-12361 Leg. Hist. 309; S. Rep. 92-414, Leg. Hist. 1461). In accordance with this principle, neutralization has historically been considered a component part of those secondary treatment processes which use inorganic chemicals for the treatment of wastewater (e.g., lime precipitation or mineral addition processes) and those processes which receive significant industrial flows that have not been pretreated for neutralization of acidic or basic wastes. Neutralization prior to discharge, however, has generally not been considered an integral part of the process in secondary treatment facilities which incorporate strictly physical and biological treatment methods.

In cases where control of pH within the range of 6-9 is not sufficient to protect receiving waters or where discharges not subject to the pH limitations of 40 CFR Part 133 will adversely affect receiving water quality, effluent limitations for pH based on water quality requirements will apply on a case-by-case basis. "Quality Criteria for Water" contains information and possible criteria for establishment of water quality standards for pH. As is the case with all water quality based standards, effluent limitations for pH which are established to achieve specific water quality objectives may be more stringent than or require limits on pollutant parameters not controlled by effluent limited (technology-based) standards such as 40 CFR Part 133.

(i) Comments were made that the proposed amendment for the pH limitations was unclear with respect to its applicability in situations where inorganic chemicals, such as disinfectants and flocculants, are added to supplement physical/biological secondary treatment processes. The amendment for the pH limitations has been reorganized as indicated below. The provisions pertaining to pH are now set forth in their entirety in § 133.102(c).

In consideration of the foregoing, Part 133 of Chapter I of Title 40 of the Code of Federal Regulations is amended as set forth below.

(Sec. 304(d) (1) and 301(b) (1) (B) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1342, 1345 & 1361))

Dated: July 16, 1976.

RUSSELL E. TRAIN,
Administrator.

1. Section 133.102 is revised to read as follows:

§ 133.102 Secondary treatment.

The following paragraphs describe the minimum level of effluent quality attainable by secondary treatment in terms of the parameters—biochemical oxygen demand, suspended solids and pH. All requirements for each parameter shall be achieved except as provided for in § 133.103.

(a) *Biochemical Oxygen Demand (five-day)*. (1) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 30 milligrams per liter.

(2) The arithmetic mean of the values for effluent samples collected in a period of 7 consecutive days shall not exceed 45 milligrams per liter.

(3) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85 percent removal).

(b) *Suspended solids*. (1) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 30 milligrams per liter.

(2) The arithmetic mean of the values for effluent samples collected in a period of 7 consecutive days shall not exceed 45 milligrams per liter.

(3) The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days shall not exceed 15 percent of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85 percent removal).

(c) *pH*. The effluent values for pH shall be maintained within the limits of 6.0 to 9.0 unless the publicly owned treatment works demonstrates that:

(1) Inorganic chemicals are not added to the waste stream as part of the treatment process; and

(2) Contributions from industrial sources do not cause the pH of the effluent to be less than 6.0 or greater than 9.0.

[FR Doc.76-21249 Filed 7-23-76;8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

[FRL 510-8]

MUNICIPAL WASTEWATER DISINFECTION

Secondary Treatment

The Environmental Protection Agency has amended the Secondary Treatment Information regulation contained in 40 CFR Part 133 and promulgated pursuant to section 304(d)(1) of the Federal Water Pollution Control Act Amendments of 1972 (the Act). Section 301(b)(1)(B) of the Act requires the effluent limitations based on secondary treatment, be achieved for all publicly owned treatment works in existence on July 1, 1977, or approved for a construction grant prior to June 30, 1974 (for which construction must be completed within four years of approval). The amendment, published concurrently with this notification, deletes the fecal coliform bacteria limitations from the definition of secondary treatment.

At the time that 40 CFR Part 133 was first promulgated, limitations on fecal coliform bacteria were included in the definition of secondary treatment on the basis that disinfection is necessary for the protection of public health. In recognition of more recent information, it is now felt that it is environmentally sound to establish disinfection requirements for domestic wastewater discharges in accordance with water quality standards promulgated pursuant to section 302 and 303 of the Act and associated public health needs. In this manner, the necessary protection of public health can be assured, while achieving adequate safeguards against the adverse effects which could result from the excessive use of disinfectants.

In January 1974, an Environmental Protection Agency Task Force was formed to review EPA policy on wastewater disinfection and the use of chlorine. The Task Force recognized that chlorine and chlorine-based compounds are presently receiving essentially exclusive use for the disinfection of wastewater. While chlorine is an effective disinfectant with respect to meeting bacteriological standards and is adequately protecting public health, there are potential dangers associated with the use of chlorine. Disinfection of wastewater with chlorine can result in the formation of halogenated organic compounds which have been identified as potential carcinogens. Considerable data also exist to indicate that chlorination of wastewater can result in a residual chlorine level that is toxic to aquatic life. The Task Force concluded that in view of the fact that present policy inadvertently encourages the use of chlorine, a regulation which in certain instances requires disinfection unnecessarily further compounds the potential problems associated with the chlorination of wastewater.

Prior to the enactment of Pub. L. 92-500, domestic wastewater disinfection practice was, for the most part, controlled locally by the States. In proposing the deletion of the disinfection requirements from 40 CFR Part 133 and recommending reliance on water quality standards, the EPA made an assessment of the State standards relating to wastewater disinfection. It was determined that virtually all of the States and Territories have water quality related regulations pertaining to the disinfection of wastewater and that public health was adequately being maintained. In many instances, other than continuous disinfection was being practiced where the possibility of human contact with the receiving waters was remote.

Disinfection requirements have been and must continue to be directed at protecting the public health. Water quality standards which establish the need for disinfection must, as a minimum, include the following:

(1) Protection of public water supplies.

(2) Protection of fisheries and shellfish waters.

(3) Protection of irrigation and agricultural waters.

(4) Protection of waters where human contact is likely.

(5) Protection of interstate waters to which the above criteria apply.

The Agency published in draft form on October 10, 1975, Quality Criteria for Waters which is intended to be used as the basis for State water quality standards. Criteria for fecal coliform bacteria and chlorine are included. These criteria are available for use by the States in the development of water quality standards and the related disinfection requirements for publicly owned treatment works.

The benefits achieved by disinfection should be weighed against the environmental risks and costs. It is intended that the use of chlorine disinfection would be considered only when there are public health hazards to be controlled. The exclusive use of chlorine for disinfection should not be continued where protection of aquatic life is of primary consideration. Alternate means of disinfection and disinfectant control (dechlorination) must be considered where public health hazards and potential adverse impact on the aquatic and human environments co-exist. Disinfection should not be required in those instances where benefits are not present.

The final Task Force Report provides a compilation of the existing technical and scientific data related to the issues raised by wastewater disinfection. The report is divided into four main parts—Summary, Conclusions and Recommendations; Public Health Effects and Considerations; Toxic Effects on the Aquatic Environment; and Disinfection Process Alternatives. Also included in the report is a summary of the Agency's ongoing research and development program in the area of wastewater disinfection and alternate means of disinfection.

The report is available from the Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, Colorado 80225. The title and number of the report are "Disinfection of Wastewater—Task Force Report;" MCD-21; No. EPA-430/9-75-012.

RUSSELL E. TRAIN,
Administrator.

JULY 16, 1976.

[FR Doc.76-21250 Filed 7-23-76;8:45 am]

federal register

FRIDAY, OCTOBER 7, 1977

PART III

ENVIRONMENTAL PROTECTION AGENCY

■

WASTEWATER TREATMENT PONDS

Suspended Solids Limitations

[6560-01]

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER D—WATER PROGRAMS

[FRL 769-4]

PART 133—SECONDARY TREATMENT INFORMATION

Suspended Solids Limitations for Wastewater Treatment Ponds

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This rule amends the Secondary Treatment Information regulation to allow less stringent suspended solids limitations for wastewater treatment ponds. The amendment is based on the fact that properly designed and operated wastewater treatment ponds are a form of secondary treatment which may not be capable of achieving the suspended solids limitations contained in the Secondary Treatment Information regulation without supplemental treatment processes for removal of suspended solids (primarily algae).

EFFECTIVE DATE: November 7, 1977.

FOR FURTHER INFORMATION CONTACT:

Alan Hais, Municipal Construction Division (WH-547), Office of Water Program Operations, Environmental Protection Agency, Washington, D.C. 20460 (202-426-8976).

SUPPLEMENTARY INFORMATION: On September 2, 1976, notice was published in the FEDERAL REGISTER that the Environmental Protection Agency was proposing the amendment of the Secondary Treatment Information regulation (41 FR 37222). The Secondary Treatment Information regulation contains effluent limitations in terms of biochemical oxygen demand, suspended solids and pH which must be achieved by municipal wastewater treatment plants (publicly owned treatment works) in accordance with section 301(b) (1) (B) of the Federal Water Pollution Control Act Amendments of 1972 (FWPCA). The Secondary Treatment Information regulation was promulgated pursuant to section 304(d) (1) of the FWPCA on August 17, 1973 (38 FR 22298), and amended for deletion of the fecal coliform bacteria limitations and clarification of the pH requirement on July 26, 1976 (41 FR 30786).

Fifty-five (55) of the sixty (60) comments received in response to the proposed amendment supported adjusting the suspended solids limitations for wastewater treatment ponds. The final amendment is substantially the same as proposed, with the only significant change noted below. A number of the commenters, while agreeing in principle with the proposal, requested clarification on certain points. The responses to these and the other major comments are also discussed below.

DISCUSSION OF MAJOR COMMENTS

MAXIMUM FACILITY DESIGN CAPACITY

The proposed amendment (§ 133.103 (c) (special considerations) indicated, in part, that the suspended solids limitations could be adjusted for wastewater treatment ponds with a maximum facility design capacity of one million gallons per day (mgd) or less. This provision was included because the Agency believes that the supplemental treatment methods, which are often needed to achieve the suspended solids limitations of § 103.102(b) with wastewater treatment ponds, unavoidably add to the complexity of designs and may strain the operational capabilities of small communities where the vast majority of wastewater treatment ponds are used. The one million gallons per day maximum facility design capacity was based on a population of 10,000 and an average wastewater flow of 100 gallons per capita per day. A number of comments were received which indicated specific instances where wastewater flows to wastewater treatment ponds in communities of 10,000 population or less exceed one mgd. In recognition of the fact that there may be valid reasons for wastewater flows to exceed 100 gallons per capita per day, the final rule has been changed to indicate that the suspended limitations may be adjusted for wastewater treatment ponds with a maximum facility design capacity of two mgd or less.

A number of comments were also received which requested a clarification of the term "maximum facilities design capacity." As the term implies, it is the flow rate which is used as the design basis for sizing wastewater treatment facilities. In most instances design capacities are expressed in terms of annual average flows, even though there may be seasonal variations in flow rates which obviously must be accounted for in the sizing of treatment facilities.

APPLICABILITY OF THE REGULATION

A number of comments questioned whether the suspended solids requirements for privately or Federally owned ponds treating sanitary wastewater could be adjusted as a result of the change to 40 CFR 133. It is clear that section 304(d) (1) of the FWPCA requires promulgation of standards directly applicable to publicly owned treatment works only and therefore 40 CFR 133 is not directly applicable to private or Federal wastewater treatment ponds. However, EPA has authority under section 402 of the Act to issue permits where no effluent limitation standards have been promulgated and to fashion conditions on a case-by-case basis premised on EPA's best technical judgment. In fashioning such conditions, EPA may consider any available information. Accordingly, the provisions of § 133.103(c) may be considered as guidance in conjunction with other information in determining individual NPDES permit requirements for privately and Federally owned sewage treatment plants which are not subject to effluent limitation guidelines proposed or promulgated under sections 301, 304, and 306 of the FWPCA.

COMMENTS WHICH DID NOT SUPPORT THE RULE CHANGE

One commenter stated that the amendment is not consistent with the FWPCA because section 304(d) contemplates secondary treatment limitations that do not vary for different treatment processes. Two of the comments which objected to the rule change indicated that the amendment is not needed because technology is available to enable small communities to comply with the existing requirements of 40 CFR 133. Two comments also stated an objection to the amendment on the grounds that some small communities already comply or are in the process of complying with the original requirements.

The legislative history of the FWPCA indicates that secondary treatment may be considered to represent a range of removals (H. Rep. 92-911, p. 101, Leg. Hist. p. 788). Based on this concept of range, there are different subcategories of treatment technologies within the broad category of secondary treatment. In this instance which is clearly supported by historical, technical and economic data, EPA is exercising its authority to define secondary treatment through categorization. Wastewater treatment ponds, without supplementary suspended solids removal processes, have traditionally been considered a form of secondary treatment for small communities. Moreover, wastewater treatment ponds have been extensively used by small communities in such applications primarily because of their low cost and operational simplicity.

As stated in the preamble to the proposed rulemaking, methods for removing excessive suspended solids (algae) from wastewater treatment pond effluents have been developed but have not been widely demonstrated in all climatic regions of the country. The Agency was faced with the fact that there was a lack of confidence both in the capabilities of conventional pond systems and in the use of supplementary devices which would effectively rule out the continued use of wastewater treatment ponds to achieve the secondary treatment requirements in many sections of the country. The Environmental Protection Agency believes that wastewater treatment ponds play a vital role in the Nation's water pollution control strategy and that, because of their advantages of simplicity, low cost and minimal energy requirements, ponds should be retained as an option for smaller communities. The Agency also recognizes that suspended solids due to live algae in pond effluents have fundamentally and substantially different characteristics than sewage solids or solids from other treatment processes. It is for these reasons the final rulemaking is being adopted substantially as proposed. Viewed in other terms, adoption of the amendment for ponds will result in significant economic benefits, particularly for small communities. It is estimated that the projected savings in capital construction costs alone will be in excess of one billion dollars nationwide.

In promulgating this amendment to 40 CFR 133 for small wastewater treatment ponds, however, the Environmental Protection Agency does not intend to imply that supplemental treatment devices such as rock filters or intermittent sand filters are not acceptable methods for upgrading pond performance. In many instances where ponds presently do not meet discharge requirements pursuant to specific quality standards, upgrading can be economically accomplished while generally preserving the basic concept of simplified operation. The Agency strongly believes that any large scale approach to replace ponds with mechanical plants would be ill-advised because the previously mentioned advantages of ponds for small communities must be sacrificed.

RELATIONSHIP TO INDUSTRIAL EFFLUENT LIMITATIONS

Comments were received which supported the position that less stringent suspended solids limitations should also be applied to industrial wastewater treatment ponds. Section 304(d)(1) of the FWPCA requires that EPA "publish information * * * on the degree of effluent reduction attainable through application of secondary treatment." The factors to be considered in setting effluent limitations for industrial discharges pursuant to section 304(b) of the FWPCA are distinct from the section 304(d)(1) criteria. In consideration of these statutory differences, EPA clearly has authority to establish different effluent limitations for municipal and industrial discharges with regard to the control of one or more pollutant parameters.

ADJUSTMENT OF THE BIOCHEMICAL OXYGEN DEMAND (BOD) LIMITATIONS FOR PONDS

A number of comments suggested that an adjustment of the BOD limitations of 40 CFR 133 should also be allowed for wastewater treatment ponds. An equal number of commenters supported the position that the suspended solids limitation of 40 CFR 133 is the only parameter that properly designed and operated ponds cannot meet.

While there is not an extensive amount of routine monitoring data available to precisely define wastewater treatment pond performance, the majority of the State Agencies with responsibilities in this area expressed the belief during the development of the amendment that wastewater treatment ponds are generally capable of meeting the BOD requirements of 40 CFR 133.102. The Agency believes that adoption of the amendment, as proposed, will effectively ensure the continued acceptability of wastewater treatment as a secondary treatment process. It is important to recognize, however, that many of these facilities will still have to be upgraded to meet the BOD limitations of 40 CFR 133, which remain unchanged.

THE USE OF SUSPENDED SOLIDS AS A REGULATORY PARAMETER FOR WASTEWATER TREATMENT PONDS

Comments received from four State Agencies indicated that suspended solids limitations should be eliminated entirely as a regulatory parameter for wastewater treatment ponds. The Environmental Protection Agency recognizes that, because suspended solids limitations set in accordance with § 133.103(c) are to be based on a sampling of ponds which meet the BOD requirements of 40 CFR 133, BOD removal capability will be the major factor used in determining the adequacy of wastewater treatment pond designs. However, the statutory history of the FWPCA has been interpreted to require that standards for publicly owned treatment works include limitations on both BOD and suspended solids. Furthermore, EPA considers suspended solids to be a pollutant parameter for which regulatory control is important.

AVAILABILITY OF SUSPENDED SOLIDS MONITORING DATA

Several comments were received which supported the view that there is insufficient suspended solids monitoring data available to reliably establish alternative limitations for ponds in accordance with § 133.103(c). A number of other commenters provided actual monitoring data or indicated that such data is currently available. During the period of time since the amendment was proposed, the EPA Regional Offices have been requested to begin compiling data which could be used to establish suspended solids limitations for ponds in accordance with § 133.103(c). Efforts to date have indicated that sufficient data is available. Furthermore, preliminary determinations have demonstrated a reasonable degree of consistency nationwide.

REQUESTS FOR CLARIFICATION

Comments were received which requested clarification of the following aspects of the rule change:

(1) What types of wastewater treatment ponds are covered by § 133.102(c)? As indicated in § 133.102(c), adjustment of the suspended solids limitations may be made in cases where waste stabilization ponds are the sole process used for secondary treatment. Determination of the types of facilities to which § 133.103(c) can be applied will be in accordance with the terminology section of the EPA technical bulletin, "Wastewater Treatment Ponds" (EPA 430/9-74-011). Specifically included are photosynthetic and aerated ponds. The amendment is not applicable to polishing or holding ponds which are preceded by other biological or physical/chemical treatment processes capable of secondary treatment.

(2) Do the provisions of § 133.103(c) apply to new facilities? Yes, the suspended solids limitations for new wastewater treatment ponds can be set in accordance with the provisions of § 133.103(c). It must be recognized, however, design standards for new wastewater treatment ponds may be more stringent than those used in the determination of "best waste stabilization pond technology" in cases where the States or the EPA Regional Offices determine that such design standards are important for the overall reliability of new pond systems in that area.

(3) Does the amendment apply to the criteria for best practicable waste treatment technology? Yes, the criteria for best practicable waste treatment technology contained in Alternative Waste Management Techniques for Best Practicable Waste Treatment (EPA 430/9-75-013, October 1975), states that "publicly owned treatment works employing treatment and discharge into navigable waters shall, as a minimum, achieve the degree of treatment attainable by the application of secondary treatment as defined in 40 CFR 133." Unless specific revisions to the best practicable waste treatment criteria are published, or other applicable regulations are promulgated, the standards contained in 40 CFR 133, including the provisions of this amendment, will continue as the minimum requirements for treatment and discharge alternatives.

(4) Will specific guidance on implementation of the rule change be issued? As indicated previously, the EPA Regional Offices have been working on preliminary determinations for establishment of suspended solids limitations for wastewater treatment ponds in accordance with the proposed provisions of § 133.103(c). In most cases these efforts have been coordinated with the appropriate State Agencies. Draft guidance on procedures for actual implementation of the rule change has been circulated to the Regional Offices and will be finalized upon adoption of the amendment.

In consideration of the foregoing, Part 133 of Chapter I of Title 40 of the Code of Federal Regulations is amended as set forth below (section 304(d)(1) and 301(b)(1)(B) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1342, 1345 and 1361)).

Dated: September 28, 1977.

DOUGLAS M. COSTLE,
Administrator.

1. Section 133.103 is amended by adding paragraph (c) as follows:

§ 133.103 Special considerations.

(c) The Regional Administrator (or, if appropriate, the State subject to EPA approval) is authorized to adjust the minimum levels of effluent quality set forth in paragraphs (b)(1), (b)(2), and (b)(3) of § 133.102 for treatment works subject to this part, to conform to the suspended solids concentrations achievable with best waste stabilization pond technology, provided that: (1) waste stabilization ponds are the sole process used for secondary treatment; (2) the maximum facility design capacity is two million gallons per day or less; and (3) operation and maintenance data indicate that the requirements of paragraphs (b) (1), (b) (2), and (b) (3) of § 133.102 cannot be achieved. The term "best waste stabilization pond technology" means a suspended solids value, determined by the Regional Administrator (or, if appropriate, the State Director subject to EPA approval), which is equal to the effluent concentration achieved 90 percent of the time within a State or appropriate contiguous geographical area by waste stabilization ponds that are achieving the levels of effluent quality established for biochemical oxygen demand in § 133.102(a).

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