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Basis and Background
Proposed
Treatment Requirements of Wastewaters
Discharged Into Surface Waters of the State

State of New Jersey
Department of Environmental Protection
February 1980

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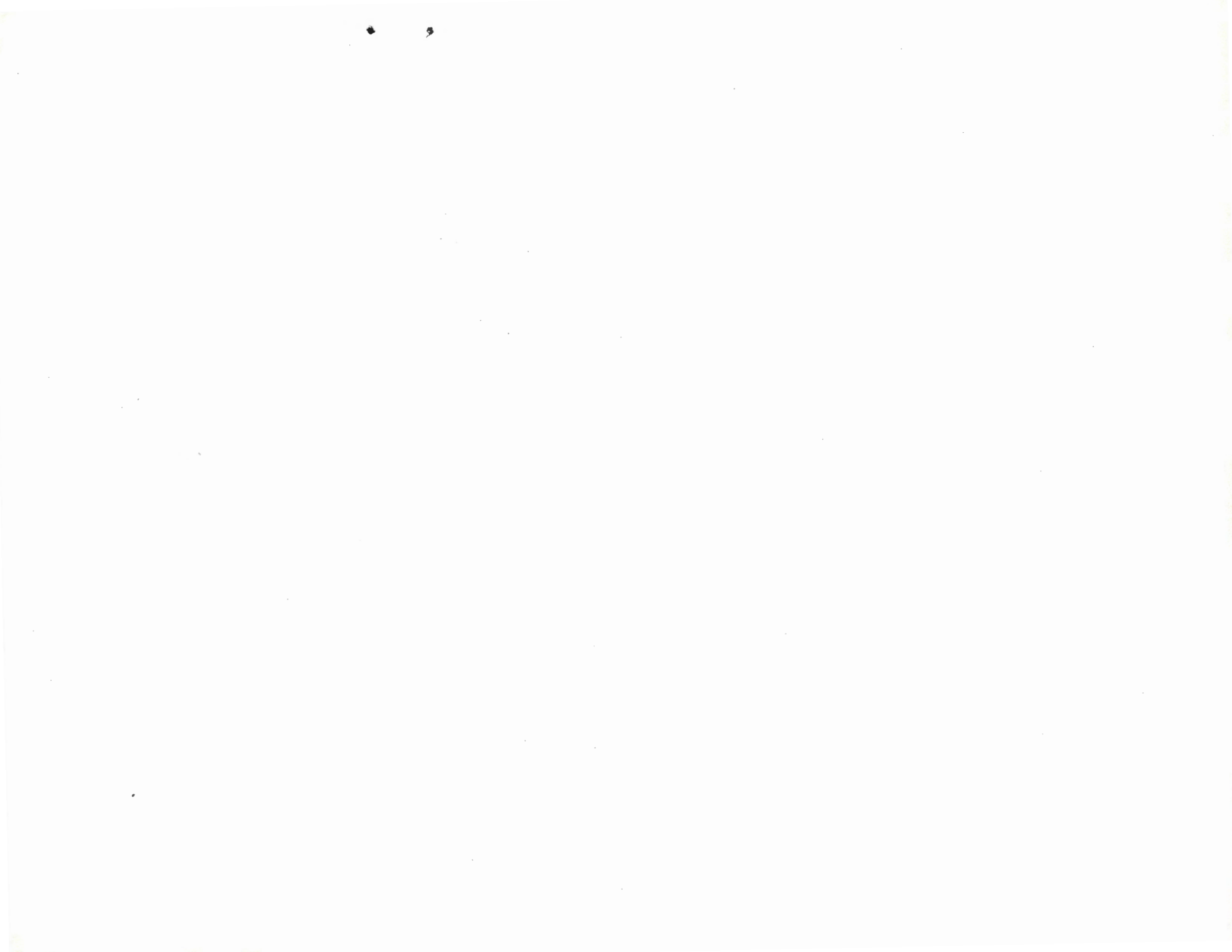
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Proposed
Treatment Requirements of Wastewaters
Discharged Into Surface Waters of the State

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I. Introduction

The Department is proposing to centralize all policy statements and procedures for the development of water quality based effluent limitations. The purpose of this proposal is to bring together these various Departmental policies and procedures so that the Division of Water Resources can more efficiently and effectively develop effluent limitations. Furthermore, such centralization should provide applicants for NPDES or State water pollution control permits with a clearer understanding of the Division's procedures for the development of effluent limitations.

Section 7:9-5.3 of this proposal contains the definitions, currently located in N.J.A.C. 7:9-11.1. This section will remain intact and be recodified into the new section, N.J.A.C. 7:9-5. The terms calculated changes, conservative substance, discharge, high quality waters, important species, measurable changed, LC50, nonconservative substance, nondegradation, pollutant, toxic substance, USEPA, and water quality management planning have been added to coincide with new words used in this subchapter. The term antidegradation has been deleted because it is a policy which is clearly described in Appendix A of the proposed new subchapter 5.

Subsection 7:9-5.4(a) of this proposal includes the Policy Statements number 2, 3, 4, and 11, from New Jersey's Surface Water Quality Standards (N.J.A.C. 7:9-4.4 et. seq.). These policy statements describe the regulatory methods available to ensure protection of the designated uses and water quality criteria in the State's surface waters. The revisions to these policy statements include:

1. Policy statement 2 remains unchanged as the new policy statement 1.
2. Policy statement 3 remains unchanged as the new policy statement 2.
3. Policy statement 4 and 11 were combined to become the new policy statement 3.

This new section also contains the following policy statements for the allocation of waste loads to point source dischargers and modifications from Water Quality Based Effluent Limitations; the latter two are currently found at N.J.A.C. 7:9-11.3 (a) and (b).

4. Waste Load Allocation Procedure.
5. Apportionment of waste loads to dischargers.
6. Modifications from Water Quality Based Effluent Limitations.

It should be noted that the apportionment of wasteloads to dischargers is one of the basis for water quality management planning, as required by sections 303(e) and 208 of the Clean Water Act and section 7 of the New Jersey Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq. All wasteload allocations will appear in areawide water quality management plans. Public hearings are conducted, to receive testimony regarding the contents of these plans, prior to their adoption by the Commissioner. In addition, the Department, on a case-by-case basis may develop water quality based effluent limitations for a single point-source discharge. Paragraph 14 of subsection (a) at section 6 of this subchapter was added to describe the public hearing procedures for wasteload allocations developed in accordance with subsection (a). Subsection (b) of section 6 and Appendix A of this subchapter was added to describe an alternative method of determining effluent limits for point-source discharges.

Policy statements for interstate waters are added to the general statements of policy 7:9-5.4(a). These policy statements reference wastewater treatment requirements adopted by the Delaware River Basin Commission and the Interstate Sanitation Commission.

Subsection 7:9-5.4(b) contains the disinfection policy which encourages the use of alternatives to chlorination. The original statement is currently found at N.J.A.C. 7:9-4.4(a)13. Policy statement 13, disinfection policy, is also revised to provide for seasonal disinfection. A detailed discussion of this revision follows this introductory section.

Sections 7:9-5.5 and 7:9-5.6, contain the objective, the wasteload allocation procedure, and the variations in discharge loadings currently found in N.J.A.C. 7:9-11.2, 4 and 5.

Section 7:9-5.7 is reserved.

Section 7:9-5.8 recodifies and reorganizes the current subchapter 8 of N.J.A.C. 7:9 which regulates the treatment of wastewaters discharged into waters of the State. As a result of proposed changes, all references to FW-3 are now revised to the classification of FW-2. Thus, FW-3 will no longer be referred to in this section. Furthermore, revisions to the minimum treatment requirements are being proposed for portions of the Hackensack River Basin, portions of the Passaic River Basin, and portions of the Raritan River Basin. The proposed revisions increase the minimum percent reduction of biochemical oxygen demand from 80% to 85% removal in wastewater discharges. Concomitantly, the objective of the maximum allowable concentrations of biochemical oxygen demand was decreased from 50 parts per million to 40 parts per million in wastewater discharges. These proposed revisions

sions make the State's minimum treatment requirements consistent with Federal requirements. In addition minimum treatment requirements are being proposed to be established for wastewater discharges to the Hudson River, Kill Van Kull and Arthur Kill Basins. The minimum treatment percent reduction of biochemical oxygen demand for wastewater discharges, to surface waters in these Basins, are consistent with minimum Federal requirements.

The Department will be considering a wasteload allocation method which may allow dischargers to distribute its wasteload among multiple outfalls. Such a distribution of the wasteload allocation will be allowed when the sum of the wasteloads is not greater than the total wasteload allocation. For example, dischargers A, B, C, and D discharge wastes to stream segment one. Dischargers A, B, and C have single outfalls. Discharger D has four outfalls. The State determines that the total maximum allowable daily wastewater load to stream segment one is 1000 pounds of BOD. The 1000 pounds is allocated as follows:

Discharger A	150 pounds
Discharger B	150 pounds
Discharger C	200 pounds
Discharger D	500 pounds (total allowable load from all four outfalls)

Discharger D may distribute the 500 pounds to each of the four outfalls in the most cost effective manner. The 500 pounds may be distributed equally, that is, each outfall may discharge 125 pounds, or the discharger may distribute the wasteload allocation unequally among the four outfalls. Discharger D will be restricted such that:

1. The sum of the wasteloads from the four outfalls does not exceed 500 pounds; and
2. The wasteload of any one of the four outfalls does not degrade the designated uses in the vicinity of the outfall.

This wasteload allocation process has been identified as the "bubble concept" in air pollution control plans. The Department is considering this process for wasteload allocations to surface waters. The Department invites comments regarding the use of this concept for developing wasteload allocations to dischargers.

Section 7:9-5.9 contains new variance procedures for modifying effluent limitations. The proposed modification procedures allow individual dischargers and affected communities to request modifications from water quality based effluent limitations. A more detailed explanation of these procedures will be found in section III of this Introduction.

Section 7:9-5.10 contains new procedures for reclassifying specific segments for less restrictive uses. The proposed reclassification procedures allow the department or a discharger to request, with appropriate information, a reclassification of a surface water segment to allow less restrictive uses than those contained in the water quality standards.

II. Disinfection Policy

A. Introduction

Disinfection is the reduction, destruction, or inactivation of pathogenic and indicator microorganisms in domestic wastewaters. Adequate disinfection of wastewater discharges to achieve an acceptable level of microorganisms can be accomplished primarily through the use of chemical or physical agents. New Jersey's Surface Water Quality Standards presently require year-round disinfection for all treated wastewater discharges containing pathogenic organisms. Section 17.3, of the Rules and Regulations for the Preparation and Submission of Plans for Sewer Systems and Wastewater Treatment Plants, presently limits disinfection to chlorination (N.J.A.C. 7:9-1.98). However, much concern has been expressed recently regarding the formulation of toxic and carcinogenic by-products during chlorination. To minimize this problem, the U.S. Environmental Protection Agency (USEPA) is encouraging States to amend their regulations to allow the use of disinfectants other than chlorine. As a result of these concerns, New Jersey is revising its water quality regulations such that disinfection by chlorination has minimum impact on attainment of beneficial water uses. The following is a discussion of the rationale for revisions to the disinfection policy.

B. Discussion

The Department recognizes that chlorinated organic compounds, resulting from the chlorination of wastewater effluents, may be deleterious to human health and the aquatic environment. These compounds, which are usually bioresistant, are formed from the reaction of free chlorine (provided during chlorination) with the organic materials contained in wastewater effluents. Recent research indicates that some of these chlorinated organic compounds may be carcinogenic to humans. Free chlorine and chloramines, the sum of both being the total residual chlorine (TRC), are toxic to aquatic life. The Department is proposing a TRC criterion of 3.0 micrograms per liter for freshwater classifications and 10.0 micrograms per liter for tidal and coastal

water classifications. Additional discussion of the TRC rationale is available in Proposed Revisions to New Jersey's Surface Water Quality Standards, February 1980, Quality Criteria for Water, July 1976 (U.S. Environmental Protection Agency, U.S. Government Printing Office, Washington, D.C.) and Effects of Wastewater and Cooling Water Chlorination on Aquatic Life (Ecological Research Series, U.S. Environmental Protection Agency--600/3-76-098, U.S. Environmental Protection Agency, Duluth, Minnesota).

The Department, in support of the TRC criteria, is revising its disinfection policy. The revised disinfection policy will encourage a more efficient use of chlorine by:

1. Encouraging the use of alternative disinfection methods provided that water quality standards will be met.
2. Encourage maximum disinfection with a minimum amount of chlorine.
3. Provide an opportunity for a discharger to demonstrate that seasonal disinfection will not impede attainment of water quality standards.

To achieve the TRC in-stream water quality criterion related regulations, Section 17.3 of the Rules and Regulations for the Preparation and Submission of Plans for Sewer systems and Wastewater Treatment Plants (N.J.A.C. 7:9-1.98), will be amended to allow alternative disinfection methods. However, before such methods are approved an applicant must demonstrate that the alternative method is as effective as chlorination relative to:

1. The removal of viable pathogens and indicators of pathogenic organisms.
2. The protection of human health.
3. The protection of the aquatic environment, including its biota, and shall not result in a contravention of prevailing surface water quality standards.

In facilities that continue to use chlorine for disinfection, substantial reduction (non-detectable levels) of TRC concentrations in the effluent at the point of discharge must occur if the TRC water quality criterion is to be met. This reduction of chlorine may be accomplished by reducing chlorine use. In the approval of disinfection apparatus employing chlorine, due consideration will be given to process efficiency. The

apparatus shall be designed to maximize disinfection and minimize chlorine consumption and residual. However, in no event shall the reduced use of chlorine, as a disinfectant, cause an increase in the risk of humans contracting pathogenic diseases. In addition, the process shall incorporate complete mixing of the disinfectant with the wastewater effluent throughout the contact period prior to discharge to ensure thorough and uniform disinfection.

A chlorination/dechlorination process may also be an effective method of ensuring compliance with prevailing in-stream TRC criterion. The dechlorination process may include physical and/or chemical methods. The dechlorination agents and their by-products shall have no deleterious effects on human health and the aquatic ecosystem. Dechlorination, or any process used for the removal of an alternative disinfectant, shall be installed in conformance with the Rules and Regulations for Preparation and Submission of Plans for Sewer System and Waste Treatment Plants (N.J.A.C. 7:9-1.1 et seq.), and shall result in compliance with prevailing surface water quality standards.

The disinfection policy is also being revised to include provisions for seasonal disinfection. Provision for seasonal disinfection is another mechanism to reduce the entry of toxic disinfectants into waters of the State. In no event, however, shall seasonal disinfection interfere with the attainment of water uses. The seasonal disinfection policy generally will be applicable between the months of April to October (inclusive). Seasonal disinfection may be allowed in areas where there is no actual public health need. A public health need includes surface waters used for drinking water supplies, shellfish harvesting and cultivation, bathing, and surface waters flowing through residential or recreational communities where there is a probable human exposure to the surface waters. The Department has determined that portions of the New Jersey - New York Harbor complex qualify as an area for seasonal disinfection. The Department will require seasonal disinfection from April 15 to October 15 in designated regions for the protection of the health and general welfare of the public. This time period is being proposed because boating season generally starts in mid-April and ends in mid-October (personal communication, Mr. Michael Redpath, Marine Trade Association of New Jersey).

In designating the area for seasonal disinfection, the Department considered:

1. Current water quality and relationship to water quality standards;

2. Attainability of water quality standards and related uses in the near future;
3. Impact of seasonal disinfection on contiguous water bodies; and
4. Costs of year-round disinfection and benefits derived from year-round disinfection.

Water quality data, which is available for review at the Division of Water Resources, demonstrates that bacterial quality is poor throughout the New Jersey - New York Harbor Complex, north of Raritan, Sandy Hook, and Lower Bays. Summer and winter fecal coliform levels, in Raritan, Sandy Hook, and Lower Bays, are generally near acceptable limits for primary contact recreation. Furthermore, shellfish harvesting classification, for Raritan Bay (Union Beach Area - 524 acres) is Special Restricted.

In contrast, summer and winter fecal coliform levels, in Newark Bay, Arthur Kill, Kill Van Kull, and Hudson River, are generally worse than water quality standards. These conditions occur with present year-round disinfection.

The Draft Final Report for the New York City Areawide Waste Treatment Management Planning Program (NYC Draft 208 Plan) and an article titled Contaminants in the New York Bight (Mueller et al, Journal Water Pollution Control Federation, Vol. 48, No. 10, October 1976) indicate that bacterial contamination is significantly related to the large volume of untreated wastewaters and combined sewer overflows entering the waterways north of Raritan and Lower New York Bays. The New York City Draft 208 Plan predicts that by 1985 bathing will be restored to the Hudson River, Upper New York Bay, and the upper Kill Van Kull. The control strategy outlined to reach the 1985 objective includes:

1. Treatment of raw sewage discharges.
2. Summer disinfection of major combined sewer overflows and storm outfalls.
3. Extension of outfalls away from beaches.

Thus it appears that the poor bacterial quality, described above, will not improve until the large volumes of raw wastewater and combined sewer overflow are properly controlled.

There are currently ten wastewater treatment facilities which discharge into the Kill Van Kull, Arthur Kill, Hudson River, or New York Bay. The cost of year-round disinfection for these facilities is approximately 1.2 million dollars. Thus, approximately \$600,000 per year (see Table 1) would be saved by these facilities if they were to disinfect for six months (April 15 to October 15). At least 3.0 million dollars could be saved by the ten facilities between 1980 and 1985.

In summary, the Department is proposing to establish a policy that will encourage the reduction of the use of toxic disinfectants at no additional public health risk. The policy describes a number of strategies to achieve this objective:

1. The use of disinfectants other than chlorine.
2. Chlorination/dechlorination facilities.
3. Designation of geographical areas for seasonal disinfection where year-round costs outweigh year-round benefits.

In the implementation of this policy, the Department:

1. Will require wastewater treatment facilities (that will be disinfecting seasonally) to establish, with the Department, a cooperative ambient monitoring program to ensure that contiguous water bodies are not adversely impacted by implementation of the seasonal disinfection policy.
2. Will annually review the ambient water quality monitoring data and the status of water quality control strategies to determine the impact and necessity of the seasonal disinfection policy.
3. Will initiate discussions with the U.S. Environmental Protection Agency, and other regional water quality control agencies, so as to develop a consistent disinfection policy that will not delay the restoration of these interstate waters to water quality levels that are acceptable for swimming and shellfishing (provided that year-round shellfishing is not precluded by other pollutants such as heavy metals, PCB's etc.).

Table 1. Summary of Chlorine Loads and Costs for Various New Jersey Wastewater Treatment Facilities

Plant Name	Receiving Stream Classification	Treatment	Average Daily Flow MGD	Chlorine Load Tons/Year	Chlorine Cost \$/Ton '79	Cost Chlorination \$/Year
Bayonne S.T.P. 0025836	Kill Van Kull TW-3	Primary	13.3	144	234	33,696
Carteret S.T.P. 0024571	Arthur Kill TW-3	Primary	3.3	77	167	12,859
Borough of Edgewater S.T.P. 0020591	Hudson River TW-2	Primary	2.71	30	274	8,220
Hoboken S.T.P. 0026085	Hudson River TW-2	Primary	14	146	332	48,600
Jersey City East-Side 0027014	Hudson River TW-2	Primary	35	420	166	69,720
Jersey City West-Side	Hackensack River Newark Bay	Primary	24	329	166	54,614
Joint Meeting of Essex and Union Counties 0024741	Arthur Kill TW-3	Secondary	58.4	600	145	87,000
North Bergen Woodcliff S.T.P. 0029084	Hudson River TW-2	Primary	2.0	20.25	296	6,000

Table 1. Summary of Chlorine Loads and Costs for Various New Jersey Wastewater Treatment Facilities

Plant Name	Receiving Stream Classification	Treatment	Average Daily Flow MGD	Chlorine Load Tons/Year	Chlorine Cost \$/Ton '79	Cost Chlorination \$/Year
Passaic Valley Sew. Commission 0021016	New York Bay TW-2	Primary	250	9125	103	939,875
WPST New York S.T.P. 0025321	Hudson River TW-2	Primary	8	273	29	8,055
Woodbridge S. Warren S.T.P. 0020397	Arthur Kill TW-3	Primary	3.5	68	170	11,560
Total Annual Cost of Chlorination						1,280,199
Total Semi-Annual Savings of Seasonal Disinfection (Cost of Chlorination)						640,099

Therefore, the Department proposes the following revision to the disinfection policy:

From: Effective year-round disinfection shall be required for all treated wastewater discharges containing pathogenic organisms.

To: The following are statements of policy concerning disinfection of wastewater:

1. The department recognizes that chlorinated organic compounds resulting from the chlorination of wastewater effluents may be deleterious to human health and the aquatic environment.
2. To reduce the exposure of humans to possible carcinogens and aquatic life to toxicants, the department encourages the efficient use of chlorine if used as a disinfectant. However, in no event shall the reduced use of chlorine as a disinfectant, cause an increase in the risk of humans contracting pathogenic diseases.
3. The department encourages the use of alternatives to chlorination providing that the following can be demonstrated:
 - i. The alternative method is effective in the removal of viable pathogens and indicators of pathogenic organisms; and
 - ii. The alternative method is safe and has no deleterious effects on the health of humans who may ingest or come into contact with waters receiving these discharges; and
 - iii. The alternative method shall have no deleterious effects on the aquatic environment, including its biota, and shall not result in a contravention of prevailing surface water quality standards; and
 - iv. The alternative method will not produce levels of residual disinfectants and disinfection by-products that are conservative.

4. Unless it can be demonstrated that a disinfectant and its by-products are non-conservative, then the disinfectant and its by-products shall be considered to be conservative for purposes of determining water quality based effluent limitations.
5. The department shall require continuous year-round disinfection of all wastewaters discharged into surface waters of the State, except in regions designated for seasonal disinfection, such that compliance with prevailing water quality standards is achieved.
6. The department will require seasonal disinfection from April 15 to October 15 in designated regions for the protection of the health and general welfare of the public.
 - i. Areas for seasonal disinfection are restricted to the State's surface waters where the waters can not be restored or used for primary contact recreation, shellfishing, or potable water supply in the foreseeable future and where contiguous waters with these designated uses are not degraded by seasonal disinfection.
 - ii. The designated areas eligible for seasonal disinfection are as follows:
 - (1) Hudson River between the George Washington Bridge and the confluence with Upper New York Bay.
 - (2) Upper New York Bay
 - (3) Kill Van Kull, entire length
 - (4) Arthur Kill, entire length.
 - (5) Newark Bay

III. Procedures for Modifying Water Quality Based Effluent Limitations

A. General

When a discharger applies for approval of new or modified treatment facilities the appropriate water quality based effluent limitations will be issued. A copy of the draft effluent limitations will also be sent to affected local jurisdictions. The Procedures for Modifying Water Quality Based Effluent Limitations shall then be followed if a modification is to be requested. Additionally, the applicant may request an adjudicatory hearing at the final permitting stage to contest the technical justification for the effluent limitation.

B. Criteria for Modifying Water Quality Based Effluent Limitations for Individual Dischargers

1. Where existing water quality is currently better than applicable water quality standards, a draft effluent limitation will be issued which reflects the Department's Antidegradation Policy to maintain high quality waters. The Department proposes to allow the discharger the opportunity to request a modification of this draft effluent limitation. The burden of proving, at a public hearing, that a modification should be issued, according to the listed criteria, will fall on the person requesting the modification.

The Department also reserves the right to determine, on its own initiative, that some degradation of high quality waters should be allowed. In this case the Department will provide notice and the opportunity for a public hearing, at which the Department shall, if required, set forth the reasons for its determinations.

2. Where existing water quality is equal to or worse than applicable water quality standards, it is the objective of the Department to improve water quality and attain the goals of fishable and swimmable waters. Draft water quality based effluent limitations will be issued to achieve these goals. However, the Department proposes to allow a person affected by such limitations to demonstrate, at a public hearing, that a modification should be granted based on the criteria set forth in the Procedures.
3. In no case will modifications from water quality based effluent limitations be granted which are less stringent than the technology based effluent limitations required by Sections 301, 306 and 307 of the Federal Clean Water Act.

IV. RECOMMENDATION

The New Jersey Department of Environmental Protection recommends the adoption of the following new section titled "Treatment Requirements of Wastewaters Discharged Into waters of the State".

SUBCHAPTER 5. TREATMENT OF WASTEWATER DISCHARGED INTO WATERS OF THE STATE

7:9-5.1 Scope of Rules

- (a) Unless otherwise provided by rule or statute, the following shall constitute the rules of the Department of Environmental Protection concerning matters of policy with respect to the protection and enhancement of surface waters of the State, disinfection, wasteload allocations, seasonal variations in discharge loadings, minimum treatment standards, procedures for establishing water quality based effluent limitations, modification of water quality based effluent limitations, and procedures for reclassifying specific segments for less restrictive uses pursuant to the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq. and the Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq.
- (b) This subchapter shall apply to the establishment of effluent limitations and other requirements applicable to discharge into the surface waters of the State.

7:9-5.2 Construction

These rules shall be liberally construed to permit the department and its various divisions to discharge its statutory functions.

7:9-5.3 Definitions

The following words and terms, when used in this subchapter, shall have the following meanings unless the context clearly indicates otherwise.

"Acceptable arrangement" means any combination of alternative configurations and levels of treatment under which water quality standards will be maintained.

"Alternative configuration" means the alternative juxtaposition of the number of point-source dischargers and discharger locations within a segment of study area.

"Alternative arrangement" means any combination of alternative configurations and levels of treatment.

"Calculated Changes" means changes to representative (as determined by the Department) water quality data which may be demonstrated by any acceptable mathematical predictive tool.

"Commissioner" means the Commissioner of Environmental Protection.

"Conservative Substance" means a substance that is relatively persistent and resistant to degradation having a one-half life of 96 hours or more.

"Department" means the New Jersey Department of Environmental Protection.

"Design conditions" means those hydrological and flow characteristics of a water body which are used as a basis for determining water quality standards.

"Discharge" means the releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of a pollutant into the waters of the State or onto land or into wells from which it might flow or drain into said waters.

"Discharger" means any person, corporation, municipality, sewerage authority or other legal entity, who causes, suffers, or allows any discharge.

"High Quality Waters" means those surface waters having biological chemical, or physical characteristics which are better than water quality standards and the aquatic biological community or other uses are sensitive to changes in water quality.

"Important Species" means species which are commercially or recreationally valuable (e.g., within the top ten species lauded--by dollar value); threatened or endangered; critical to the organization and maintenance of the ecological system; or necessary in the food web for the well-being of species identified in this definition.

"LC50" means the concentration of a toxicant which is lethal to fifty percent of the organisms of a particular species under a given set of conditions in a specified length of time (i.e., 24, 48, 96 hours).

"Levels of treatment" means the degree of waste removal and concomitant residual wastewater effluent to be attained by any discharger.

"Measurable Changes" means changes determined by any biological, chemical, or physical analytical method conducted in accordance with USEPA approved methods as identified in 40 C.F.R. 136 or other analytical methods (e.g., ecological indices) approved by the Department.

"Nonconservative Substance" means a substance that degrades relatively quickly having a one-half life of less than 96 hours.

"Nondegradation Waters" means those surface of the State whose water quality and water uses shall be preserved because of their outstanding State or National resource value. This definition shall not apply to those surface waters that have special water quality standards (e.g., FW-Central Pine Barrens and FW-Lower Mullica and Wading Rivers-Central Pine Barrens).

"Point source" means any discernable, discrete discharge source which may be attributable to a given discharger.

"Pollutant" means any dredged spoil, solid waste, incinerator residue, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, radioactive substance, thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, or agricultural waste or other residue discharged or entering into the waters of the State.

"Reserve" means the hydrological, chemical or biological ability of a water body to accept additional waste loads beyond those allocated.

"Segment" means a portion of a study area, the surface waters of which have common hydrological characteristics (or flow regulation patterns), common natural physical, chemical, and biological processes and which have common reactions to external stresses, for example, the discharge of pollutants.

"Toxic Substance" means those substances, or combination of substances, which upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly through food chains, will, on the basis of information available to the department, cause death, disease, behavior abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformation, in such organisms or their offspring.

"USEPA" means the United States Environmental Protection Agency.

"Study area" means the geographical area which includes all water bodies for which waste load allocations are to be done as a unit.

"Waste load" means the amount of chemical, physical or biological matter contained within a waste discharge.

"Waste load allocation" means the assignment of maximum waste loads to point-source discharges so as to maintain water quality standards.

"Water quality management planning" (water quality management plan)" means the activities defined in, and referred to, in sections 208 and 303 of the Federal Clean Water Act.

"Water quality model" means any mathematical or analytical tool used to predict the hydrological, flow, chemical or biological characteristics of a water body.

"Water quality standards" means the physical, chemical, biological and esthetic characteristics of a water body as described by State water quality criteria (subchapter 4 of this chapter) or the water quality which would result from existing discharges under design conditions, whichever is more stringent as determined by the department.

7:9-5.4 Statements of Policy

(a) The following are general statements of policy:

1. It shall be unlawful for any person to discharge any pollutant into waters of the State, except in conformity with a valid permit issued by the commissioner or by the Administrator of the United States Environmental Protection Agency, and that it shall be unlawful for any person to build, install, modify or operate any facility for the collection, treatment or discharge of any pollutant, except after approval by the department pursuant to regulations adopted by the commissioner.
2. The protection and enhancement of the quality and function of the waters of this State into which effluents are discharged is a principal objective of the Department of Environmental Protection when considering the approval of permits to discharge or the designs for proposed facilities for the collection, treatment or discharge of pollutants.
3. The minimum level of treatment required for any wastewater must be such that discharges shall meet effluent limits as established under the New Jersey Water Pollution Control Act or Section 402 of the Federal Clean Water Act and shall not cause the surface water quality criteria contained in subchapter 4 of this chapter to be contravened. Furthermore no discharger shall have the privilege of utilizing the entire theoretical capacity of a surface water to receive waste discharges.

4. Water quality based effluent limitations shall be developed in accordance with the procedures described in Waste Load Allocation Procedure (section 6 or Appendix A of this subchapter) so that the provisions of the antidegradation policy and other provisions of the prevailing water quality standards (subchapter 4 of this chapter) are met.
5. In the apportioning of waste loads to dischargers, the general objective is to minimize total public expenditures, subject to social and environmental constraints, so that provisions of the antidegradation policy and other provisions of the prevailing water quality standards (subchapter 4 of this chapter) are met. To achieve this end, the State's policy does not preclude the assignment of different levels of treatment to different dischargers, if this will prove more beneficial over the study area. Levels of treatment assigned under section 6 of this subchapter, which are higher than those specified in section 8 of this subchapter, shall take precedence.
6. The policies for interstate waters are:
 - i. The minimum level of treatment for wastewater treatment facilities that discharge treated wastewater to the Delaware River, including the fresh and saline tidal tributaries to the Delaware River and Delaware Bay, shall be as established at subsections (g) through (l) of section 8 of this subchapter or in accordance with the current "Basin Regulations - Water Quality" (and subsequent revisions) adopted by the Delaware River Basin Commission as part of its Comprehensive Plan, whichever are more stringent.
 - ii. The minimum level of treatment for wastewater treatment facilities that discharge treated wastewaters to waters of the Interstate Sanitation District under the jurisdiction of the Interstate Sanitation Commission in the New Jersey - New York metropolitan area, shall be as established at subsections (y) through (dd) and (ii) through (ll) of section 8 of this subchapter, or in accordance with the current Interstate Sanitation Commission's Water Quality Regulations (and subsequent revisions), whichever are more stringent.

7. The State's policy of antidegradation, as specified in subchapter 4 of this chapter, shall remain in effect for all water bodies in the State unless it can be substantiated that severe social and economic consequences will result in a specifically affected area. In such a case, application for modification with proper documentation, following any procedural rules from the department as may exist, shall be filed by the discharger. In cases where modifications may be granted, water quality will not be permitted to fall below any other provisions of the prevailing water quality standards (subchapter 4 of this chapter).
- b. The following are statements of policy concerning disinfection of wastewater:
1. The department recognizes that chlorinated organic compounds resulting from the chlorination of wastewater effluents may be deleterious to human health and the aquatic environment.
 2. To reduce the exposure of humans to possible carcinogens and aquatic life to toxicants, the department encourages the efficient use of chlorine if used as a disinfectant. However, in no event shall the reduced use of chlorine as a disinfectant, cause an increase in the risk of human's contracting pathogenic diseases.
 3. The department encourages the use of alternatives to chlorination providing that the following can be demonstrated:
 - i. The alternative method is effective in the removal of viable pathogens and indicators of pathogenic organisms; and
 - ii. The alternative method is safe and has no deleterious effects on the health of humans who may ingest or come into contact with waters receiving these discharges; and
 - iii. The alternative method shall have no deleterious effects on the aquatic environment, including its biota, and shall not result in a contravention of prevailing surface water quality standards; and
 - iv. The alternative method will not produce levels of residual disinfectants and disinfection by-products that are conservative.

4. Unless it can be demonstrated that a disinfectant and its by-products are non-conservative, then the disinfectant and its by-products shall be considered to be conservative for purposes of determining water quality based effluent limitations.
5. The department shall require continuous year-round disinfection of all wastewaters discharged into surface waters of the State, except in regions designated for seasonal disinfection, such that compliance with prevailing water quality standards is achieved.
6. The department will require seasonal disinfection from April 15 to October 15 in designated regions for the protection of the health and general welfare of the public.
 - i. Areas for seasonal disinfection are restricted to the State's surface waters where the waters can not be restored or used for primary contact recreation, shellfishing, or potable water supply in the foreseeable future and where contiguous waters with these designated uses are not degraded by seasonal disinfection.
 - ii. The designated areas eligible for seasonal disinfection are as follows:
 - (1) Hudson River between the George Washington Bridge and the confluence with Upper New York Bay;
 - (2) Upper New York Bay;
 - (3) Kill Van Kull, entire length;
 - (4) Arthur Kill, entire length;
 - (5) Newark Bay.

7:9-5.5 Objective of Waste Load Allocation

- (a) The allocation of waste loads to point-source dischargers forms the basis for water quality management planning, as required by sections 303(e) and 208 of the Federal Clean Water Act of 1977, and section 7 of the New Jersey Water Quality Planning Act, N.J.S.A. 58:11A-1 et seq.

- (b) The objective of waste load allocations is to apportion the after-treatment, residual wastewater discharges in such a way that the antidegradation policy and any other provisions of the water quality standards (subchapter 4 of this chapter) are maintained under design conditions.

7:9-5.6 Wasteload Allocation Procedure

- (a) The procedure to be followed by the department in allocating waste loads to point-source dischargers shall be as follows:
1. Delineate the study area;
 2. Assemble all necessary water quality and hydrologic data for the water bodies in the study area for which waste load allocations are to be done;
 3. Develop water quality models, or other predictive water quality estimators, for the water bodies in the study area, which shall then be used to evaluate alternative arrangements of point-source discharge configurations and treatment levels under design conditions;
 - i. Seasonal variations in discharge loadings may be approved by the department when it can be substantiated that treatment performance is limited by ambient conditions. Projected variations are subject to technical review by the department, and where great variability exists, the department may require the discharger to utilize alternate treatment processes.
 - ii. When components of treatment processes have a disproportionately high ratio of operation-and-maintenance costs to capital costs, and when conditions of the receiving water body are such that reductions in performance of said treatment components will have no measurable impact on receiving water quality, permission may be granted by the department for such reductions during specified periods.
 4. Delineate the segments within the study area;
 5. Determine alternative arrangements of point-source discharge configurations and levels of treatment for each segment;

6. Analyze the alternative arrangements for each segment independently and eliminate from further consideration those which are unacceptable within the individual segments themselves;
7. Combine the acceptable arrangements for the segments into a set of alternative arrangements for the study area;
8. Analyze the alternative arrangements for the study area and eliminate those which are unacceptable;
9. Determine reserve for all acceptable arrangements for the waste load parameters being allocated;
10. Enumerate all acceptable arrangements for the study area, which shall be described by:
 - i. A configuration of point source dischargers;
 - ii. A level of treatment required for each of said dischargers;
 - iii. A specified reserve for each segment and parameter.
11. Evaluate all acceptable arrangements for the study area;
12. Select the best arrangement for the study area and thus for each segment contained therein, in conformity with this subchapter and other subchapters of this chapter;
13. Allocate waste loads to the point-source dischargers within the study area, in accordance with paragraph 12, of this subsection.
14. Where the department allocates waste loads to point-source dischargers as provided in paragraphs 1 through 13 of this subsection, the State will provide each affected point-source discharger in the study area with notice and the opportunity to be heard and comment upon such waste load allocations. The selected arrangement and waste load allocation shall be formally adopted under the Water Quality Management Planning procedures, as a revision to the existing areawide Water Quality Management Plan, and will be binding upon all affected dischargers. Procedures for modifying surface water quality based effluent limitations found at section 9 of this subchapter are not applicable in this instance. However, the criteria for modification will be considered in setting allocations and in

review of the comments upon such allocations before final adoption.

- (b) The department may also allocate a water quality based effluent limitation to a single point-source discharger with notice and the opportunity to request a modification of such water quality based effluent limitations in accordance with section 9 of this subchapter. Procedures for establishing water quality based effluent limitations are found at Appendix A of this subchapter.

7:4.5.7 (Reserved)

7:9-5.8 Treatment of Wastewaters Discharged Into Waters of the State.

- (a) Domestic wastes discharged into waters of the Atlantic Coastal Plain classified as FW-2 and TW-1 shall be treated as follows:

Domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Atlantic Coastal Plain classified as FW-2 or TW-1, shall be treated to a degree providing, as a minimum, 95 percent of reduction of biochemical oxygen demand at all times including any four-hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 15 parts per million.

- (b) Industrial wastes discharged into waters of the Atlantic Coastal Plain classified as FW-2 or TW-1 shall be treated as follows:

Industrial wastes, prior to discharge into waters of the Atlantic Coastal Plain, classified as FW-2 or TW-1, shall be treated to a degree providing, as a minimum, 95 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable effluent dispersion, as specified in subchapter 4 of this chapter; it is the objective of this section that the biochemical oxygen demand of effluents discharged shall not exceed 15 parts per million.

- (c) Domestic wastes discharged into waters of the Atlantic Coastal Plain classified as CW-1 or CW-2 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Atlantic Coastal Plain classified as CW-1 or CW-2, shall be treated providing, as a minimum, 85 per cent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 40 parts per million.

- (d) Industrial wastes discharged into waters of the Atlantic Coastal Plain classified as CW-1 or CW-2 shall be treated as follows:

Henceforth, industrial wastes prior to discharge into waters of the Atlantic Coastal Plain, classified as CW-1 or CW-2, shall be treated to a degree providing, as a minimum, 85 percent of reduction of biochemical oxygen demand at all times and such further reduction of biochemical oxygen demand as may be necessary to maintain water quality specified in subchapter 4 of this chapter.

- (e) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Plain cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Plain.
- (f) Treatment standards set forth in subsections (a) through (e) of this section are the minimum acceptable for the Atlantic Coastal Plain. Treatment more intensive than those set forth in subsections (a) through (e) of this section shall be provided whenever it is determined by the department that such treatment is necessary.
- (g) Domestic wastes discharged into waters of the Delaware River Basin classified as FW-2, TW-1, or TW-2 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Delaware River Basin classified as FW-2, TW-1 and TW-2, shall be treated to a degree providing, as a minimum, 90 per cent of reduction of biochemical oxygen demand at all times including any four-hour period of a

day when the strength of the wastes to be treated might be expected to exceed average conditions; it is an objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 25 parts per million.

- (h) Industrial wastes discharged into waters of the Delaware River Basin classified as FW-2, TW-1, or TW-2 shall be treated as follows:

Henceforth, industrial wastes prior to discharge into waters of the Delaware River Basin, classified as FW-2, TW-1 and TW-2, shall be treated to a degree providing, as a minimum, 90 per cent of reduction of biochemical oxygen demand at all times and such further reduction of biochemical oxygen demand as may be necessary to maintain water quality, after reasonable effluent dispersion, as specified in subchapter 4 of this chapter; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 25 parts per million.

- (i) Domestic wastes discharged into waters of the main stem Delaware River shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into the waters of the "main stem" of the Delaware River shall be treated to a degree providing for conformity with "Water Quality Standards for the Delaware River Basin" as adopted by the Delaware River Basin Commission on April 26, 1967 by its Resolution No. 67-7 and subsequent revisions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall conform to all regulations of the Delaware River Basin Commission.

- (j) Industrial wastes discharged into waters of the main stem of the Delaware River shall be treated as follows:

Henceforth, industrial wastes prior to discharge into waters of the "main stem" of the Delaware River Basin shall be treated to a degree providing for conformity with "Water Quality Standards for the Delaware River Basin" as adopted by the Delaware River Basin Commission on April 26, 1967 by its Resolution No. 67-7 and subsequent revisions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall conform to all regulations of the Delaware River Basin Commission.

- (k) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Basin cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Standards established for the various classifications of waters in the Basin.
- (l) Treatment standards set forth in subsections (g) through (k) of this section are the minimum acceptable for the Delaware River Basin. Treatment more intensive than that set forth in subsections (g) through (k) of this section shall be provided whenever it is determined by the department that such treatment is necessary.
- (m) Domestic wastes discharged into waters of the Hackensack River Basin classified as FW-2 or TW-1 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Hackensack River Basin classified as FW-2 or TW-1 shall be treated to a degree providing, as a minimum, 90 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 25 parts per million.

- (n) Industrial wastes discharged into waters of the Hackensack River Basin classified as FW-2 or TW-1 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Hackensack River Basin, classified as FW-2 or TW-1 shall be treated to a degree providing, as a minimum, 90 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable effluent dispersion, as specified in subchapter 4 of this chapter; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 25 parts per million.

- (o) Domestic wastes discharged into waters of the Hackensack River Basin classified as TW-2 or TW-3 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Hackensack River Basin classified as TW-2 or TW-3 shall be treated to a degree providing, as a minimum, 85 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 40 parts per million.

- (p) Industrial wastes discharged into waters of the Hackensack River Basin classified as TW-2 or TW-3 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Hackensack River Basin, classified as TW-2 or TW-3 shall be treated to a degree providing, as a minimum, 85 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable effluent dispersion, as specified in subchapter 4 of this chapter; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 40 parts per million.

- (q) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Basin cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Basin.
- (r) Treatment standards set forth in subsections (m) through (q) of this section are the minimum acceptable for the Hackensack River Basin. Treatment more intensive than that set forth in subsections (m) through (q) of this section shall be provided whenever it is determined by the department in a particular situation that such treatment is necessary.
- (s) Domestic wastes discharged into waters of the Passaic River Basin, including Newark Bay, classified as FW-2 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Passaic River Basin classified as FW-2, shall be treated to a degree providing, as a minimum, 90 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 25 parts per million.

- (t) Industrial wastes discharged into waters of the Passaic River, including Newark Bay, classified as FW-2 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Passaic River Basin, classified as FW-2 shall be treated to a degree providing, as a minimum, 90 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable dispersion, as specified in subchapter 4 of this chapter; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 25 parts per million.

- (u) Domestic wastes discharged into waters of the Passaic River Basin, including Newark Bay, classified as TW-2 or TW-3 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Passaic River Basin classified as TW-2 or TW-3 shall be treated to a degree providing, as a minimum, 85 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 40 parts per million.

- (v) Industrial wastes discharged into waters of the Passaic River Basin, including Newark Bay, classified as TW-2 or TW-3 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Passaic River Basin, classified as TW-2 or TW-3 shall be treated to a degree providing, as a minimum, 85 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable dispersion, as specified

in subchapter 4 of this chapter; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 40 parts per million.

- (w) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Basin cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Basin.
- (x) Treatment standards set forth in subsections (s) through (w) of this section are the minimum acceptable for the Passaic River Basin. Treatment more intensive than that set forth in subsections (s) through (w) of this section shall be provided whenever it is determined by the department in a particular situation that such treatment is necessary.
- (y) Domestic wastes discharged into waters of the Raritan River Basin, including Raritan Bay and Sandy Hook Bay, classified as FW-2 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Raritan River Basin classified as FW-2, shall be treated to a degree providing, as a minimum, 90 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions.

- (z) Industrial wastes discharged into waters of the Raritan River Basin, including Raritan Bay and Sandy Hook Bay, classified as FW-2 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Raritan River Basin, classified as FW-2 shall be treated to a degree providing, as a minimum, 90 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable dispersion, as specified in subchapter 4 of this chapter.

- (aa) Domestic wastes discharged into waters of the Raritan River Basin, including Raritan Bay and Sandy Hook Bay, classified as TW-1 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Raritan River Basin classified as TW-1, shall be treated to a degree providing, as a minimum, 85 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions.

- (bb) Industrial wastes discharged into waters of the Raritan River Basin, including Raritan Bay and Sandy Hook Bay, classified as TW-1 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Raritan River Basin, classified as TW-1 shall be treated to a degree providing, as a minimum, 85 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable dispersion, as specified in subchapter 4 of this chapter.

- (cc) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Basin cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Basin.
- (dd) Treatment standards set forth in subsections (y) through (cc) of this section are the minimum acceptable for the Raritan River Basin. Treatment more intensive than that set forth in subsections (y) through (cc) of this section shall be provided whenever it is determined by the department in a particular situation that such treatment is necessary.
- (ee) Domestic wastes discharged into waters of the Wallkill River Basin classified as FW-2 shall be treated as follows:

Henceforth, domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Wallkill River Basin classified as FW-2, shall be treated to a degree providing, as a minimum, 95 percent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 15 parts per million.

- (ff) Industrial wastes discharged into waters of the Wallkill River Basin classified as FW-2 shall be treated as follows:

Henceforth, industrial wastes, prior to discharge into waters of the Wallkill River Basin, classified as FW-2 shall be treated to a degree providing, as a minimum, 95 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable dispersion, as specified in subchapter 4 of this chapter; it is the objective of this subsection that the biochemical oxygen demand of effluents discharged shall not exceed 15 parts per million.

- (gg) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Wallkill River Basin cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Wallkill River Basin.
- (hh) Treatment standards set forth in subsections (ee) through (gg) of this section are the minimum acceptable for the Wallkill River Basin. Treatment more intensive than that set forth in subsections (ee) through (gg) of this section shall be provided whenever it is determined by the department in a particular situation that such treatment is necessary.
- (ii) Domestic wastes discharged into waters of the Hudson River, Kill Van Kull, and Arthur Kill Basins classified as FW-2, and TW-2 or TW-3 shall be treated as follows:

Domestic wastes, separately or in combination with industrial wastes, prior to discharge into waters of the Hudson River, Kill Van Kull, and Arthur Kill Basins classified as FW-2, TW-2, or TW-3 shall be treated to a degree providing, as a minimum, 85 per cent of reduction of biochemical oxygen demand at all times, including any four hour period of a day when the strength of the wastes to be treated might be expected to exceed average conditions.

- (jj) Industrial wastes discharged into waters of the Hudson River, Kill Van Kull, and Arthur Kill Basins classified as FW-2, TW-2, or TW-3 shall be treated as follows:

Industrial wastes, prior to discharge into waters of the Hudson River, Kill Van Kull and Arthur Kill Basins classified as FW-2, TW-2, or TW-3 shall be treated to a degree providing, as a minimum, 85 per cent of reduction of biochemical oxygen demand at all times and such further reduction in biochemical oxygen demand as may be necessary to maintain water quality, after reasonable dispersion, as specified in subchapter 4 of this chapter.

- (kk) It is recognized, especially in connection with some industrial wastes, that the pollution load imposed upon the waters of the Hudson River, Kill Van Kull, and Arthur Kill Basins cannot be evaluated fully exclusively by the biochemical oxygen demand test; therefore, each industrial waste problem shall be considered individually and treatment shall be required as needed to effect compliance with the Water Quality Criteria established for the various classifications of waters in the Hudson River, Kill Van Kull, and Arthur Kill Basins.
- (ll) Treatment standards set forth in subsections (ii) through (kk) of this section are the minimum acceptable for the Hudson River, Kill Van Kull, and Arthur Kill Basins. Treatment more intensive than that specified in subsections (ii) through (kk) of this section shall be provided whenever it is determined by the department in a particular situation that such treatment is necessary.

7:9-5.9 Procedures for Modifying Water Quality Based Effluent Limitations for Individual Dischargers

- (a) The criteria for modifying water quality based effluent limitations where existing water quality is currently better than applicable water quality standards are as follows:
1. Whenever the department determines that existing water quality within a segment is consistently better in quality than established water quality criteria, the department shall establish water quality based effluent limitations for new dischargers or those existing dischargers who propose to modify their discharge, which can reasonably be expected to protect the high quality waters from degradation. However, in those cases in which the department has established water quality based effluent limitations on a case-by-case basis, as provided for in section 6 of this subchapter, the applicant may request a modification of such

effluent limitations. Such a request shall be made, in writing, within 30 days of receipt of the draft effluent limitations. If the department does not receive such a request for modification, the draft water quality based effluent limitations shall become final. In no case shall the department establish a water quality based effluent limitation lower than that necessary to maintain the existing high water quality unless:

- i. The applicant for such effluent limitation modification demonstrates to the satisfaction of the department, after public notice, including notice to affected municipalities, and a public hearing, that:
 - (1) There is no reasonable relationship between the economic and social costs of achieving the original antidegradation effluent limitations and the benefits to be obtained in maintaining existing water quality. Economic and social costs shall include social and economic dislocation in the affected community or communities; and
 - (2) Some degradation of high quality waters should be allowed because of necessary and justifiable economic or social development; and
 - (3) Alternative effluent limitations, at least as stringent as the technically based effluent limitations required by sections 301, 306, and 307 of the Federal Clean Water Act or State law will not interfere with or be injurious to instream water uses; or
- ii. The department determines, after public notice, including notice to affected municipalities, of the opportunity for a public hearing that:
 - (1) Some degradation of high quality waters should be allowed because of necessary and justifiable economic and social development; and
 - (2) Alternative effluent limitations, at least as stringent as the technically based effluent limitations required by

sections 301, 306, and 307 of the Federal Clean Water Act or State law will not interfere with or be injurious to instream water uses.

2. In no case shall degradation be allowed in high quality waters which constitute an outstanding national resource such as waters of National and State parks and Wildlife refuges and waters of exceptional recreational or ecological significance.
 3. A surface water quality based effluent limitation modification shall be granted for a time period not to exceed that of the pollution control permit in which the limitations appear. On review of the permit, the modified effluent limitations will be renewed if, in the opinion of the department, there has been no adverse effect on water quality and designated uses.
- (b) The criteria for modifying surface water quality based effluent limitations where existing water quality is equal to or worse than applicable water quality standards are as follows:
1. Whenever the department determines that surface water quality is consistently worse than or equal to applicable water quality standards, and that discharges of pollutants from a point source or group of point sources with the application of technically based effluent limitations at least as stringent as those required under sections 301, 306, and 307 of the Federal Clean Water Act or State law would interfere with the attainment and maintenance of applicable water quality standards, the department may establish more stringent effluent limitations which can reasonably be expected to attain and maintain water quality standards. However, in those cases in which the department has established water quality based effluent limitations on a case-by-case basis, as provided for in section 6 of this subchapter, the applicant may request a modification of such effluent limitations. Such a request shall be made, in writing, within 30 days of receipt of the draft effluent limitations. If the department does not receive such a request for modification, the draft water quality based effluent limitations shall become final. In no case shall the department establish a water quality based effluent limitation less stringent than that necessary to attain or maintain water quality standards unless the applicant for such effluent limitation modification demonstrates to the satisfaction of the department, after public notice, including notice to affected municipalities, and a public hearing, that:

- i. The existing designated use is not attainable because of natural background; or
 - ii. The existing designated use is not attainable because of irretrievable man-induced conditions; and
 - iii. There is no reasonable relationship between the economic and social costs of achieving the draft effluent limitations and the benefits to be obtained in maintaining or attaining water quality standards. Economic and social costs shall include social and economic dislocation in the affected community or communities.
2. In no case shall the department establish effluent limitations less stringent than those required by Sections 301, 306, and 307 of the Federal Clean Water Act or those required to protect existing instream water uses.
 3. A surface water quality based effluent limitation modification shall be granted for a time period not to exceed that of the pollution control permit in which the limitations appear. On review of the permit, the modified effluent limitations will not be renewed unless the criteria of this subsection are fully met.
- (d) In no case shall the department grant a modification, establishing an effluent limitation less stringent than currently permitted, to existing dischargers who propose to modify their discharge where water quality standards are not presently being met.

7:9-5.10 Procedures for Reclassifying Specific Segments for less Restrictive Uses

- (a) The department shall maintain those water quality standards which are designated in subchapter 4 of this chapter. From time to time (but at least once each three year period beginning with the date of adoption of these rules), the department shall hold public hearings in accordance with section 303(c) of the Federal Clean Water Act and the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq. for the purpose of reviewing and, as appropriate, revising and adopting standards. Should the department decide at that time to reclassify a segment to allow less restrictive uses than those contained in subchapter 4 of this chapter, it shall follow the procedure set forth in subsections (d) and (c) of this section.

- (b) In addition to the regularly scheduled review of water quality standards, the department will entertain petitions for segments for less restrictive uses at any time. The petition must be fully documented as outlined in subsection (d) of this section. Upon receipt of a petition for reclassification, the department shall review the documents submitted and, based upon such review, determine whether to conduct a public hearing to consider the reclassification.
- (c) For the purpose of this subchapter, a "petitioner" for a reclassification means the department and any existing discharger to the segment.
- (d) The petitioner shall include in the petition for reclassification, appropriate water quality studies and analyses as well as environmental, economic, and social impact statements demonstrating satisfaction of the criterion, listed in paragraph one, two or three of subsection (e) of this section, upon which the petition for reclassification is based.
- (e) The department may establish less restrictive uses than those contained in subchapter 4 of this chapter only when a petitioner for a reclassification demonstrates to the satisfaction of the department, after public notice, including notice to affected persons, and a public hearing, that:
 - 1. The existing designated use is not attainable because of natural background;
 - 2. The existing designated use is not attainable because of irretrievable man-induced conditions;
or
 - 3. Application of effluent limitations for existing sources more stringent than those required pursuant to section 301(b)(2)(A) and (B) of the Federal Clean Water Act would be required and would result in substantial and widespread adverse economic and social impact.
- (f) Any reclassification for less restrictive uses, established pursuant to this section, shall be reviewed by the department at least once each three year period beginning with the date of adoption of such standard.
- (g) In those cases in which a thermal discharge is involved, the procedures for reclassifying segments for less restrictive uses shall be consistent with section 316 of the Federal Clean Water Act.

APPENDIX A

Procedures for Establishing Water Quality Based Effluent Limitations

I. Scope and Purpose

The purpose of this document is to set forth the department's policy and procedures for developing water quality based effluent limitations for waste treatment facilities treating domestic and/or industrial wastes which are discharged directly to the surface waters of the State. These procedures are intended to clarify the methodology presented at section 6 of this subchapter.

II. Authority

The authority for the department to establish these procedures is contained in N.J.S.A. 13:1D-1 et seq., N.J.S.A. 58:10A-1 et seq., and N.J.S.A. 58:11A-1 et seq., The State is required by Section 303(e) of the Clean Water Act, P.L. 92-500, to develop waste load allocations for point-source discharges and to develop programs and procedures to implement the State's antidegradation policy as required by Federal Regulation (40 CFR 35.1550). These procedures have been developed to implement those requirements.

III. Procedure

A. Background

A waste load allocation is the basic regulatory tool of the department for controlling water pollution. It is an integral part of the issuance of National Pollutant Discharge Elimination System permits (NPDES) and the development of 201 facilities plans. With the passage of the New Jersey Water Pollution Control Act of 1977 which establishes the pollution control permits there is a need for a process for developing effluent limitations. Though many factors and policies will determine effluent limits and each stream segment has specific characteristics which make it different, it is necessary that this process be uniform throughout the State.

B. Procedures

1. Establishment of Categories of Streams

The water quality based effluent limitation process can be distinguished according to three different water quality conditions. The first category is for those water bodies that have water quality characteristics that are better than the State's water quality standards, and where it is presumed that any measurable or calculated changes to the instream characteristics will lead to eventual change or harm to the uses in these surface waters.

Affected persons may request a modification from the effluent limitations established for these high quality waters which are designated as High Quality Waters-Category One. The procedures for granting modifications are found at section nine of this subchapter.

If the result of the request for a modification is to allow some degradation of stream water quality, the stream segment would fall under High Quality Waters-Category Two for developing effluent limitations. Through the modification process, the water quality parameters which will be allowed to be degraded and the level of degradation will be determined. Any effluent limitation developed under this category would still be limited by the State's water quality standards. The department also reserves the right to decide, in the first instance, that a stream should be considered as High Quality Waters-Category Two according to criteria further explained below. This determination is also subject to modification after a public hearing held at the request of the discharger or an affected local jurisdiction (see section nine of this subchapter).

The third category are those stream segments which have water quality characteristics which are equal to or worse than surface water quality standards. It is the department's goal to attain or maintain water quality standards unless it can be demonstrated that the standards are not attainable due to natural background, or because of irretrievable man-induced conditions, or where high levels of treatment would result in an adverse economic and social impact. EPA regulations on upgrading water quality can be found in "Policies and Procedures for the Continuing Planning Process" (40 CFR Part 135).

In addition to these categories, a separate discussion for existing facilities is presented. The process for developing effluent limits for existing facilities will depend on both the water quality characteristics of the stream segment and the status of that facility.

The general process for developing water based effluent limitations for each of these categories is presented below.

2. Data Requirements for Developing Effluent Limitations

The requirements outlined below will serve to clarify the information to be submitted by an applicant in order for the department to develop a water quality based effluent limitation for purposes of a NPDES or State water pollution control permit or conceptual approval of treatment works pursuant to the requirements of the New Jersey Water Pollution Control Act Regulations, N.J.A.C. 7:14-1 et. seq., subsection 7:14-2.17.a.2.

- a. Type of waste (domestic-industrial) to be treated with an analysis of the effluent characteristics.
 - b. Type of treatment process and level of treatment being considered, if known.
 - c. U.S. Geological Survey maps showing treatment facility location, discharge point and the location of other treatment facilities on the receiving stream within a reasonable distance of the proposed discharge.
 - d. Name and classification of receiving stream including a description of the stream's beneficial uses.
 - e. Stream analysis which will include both a flow analysis to determine the seven (7) consecutive day - ten (10) year recurrence interval low flow and a water quality analysis program which will be developed in coordination with the department. The 7 day, 10 year low flow will be used to calculate effluent limits.
3. Effluent Limitation Methodology for New Wastewater Treatment Facilities.

Upon review of the above material, the department will determine a water quality based effluent limitation following the procedures outlined for each category below:

- a. High Quality Waters-Category One are waters having biological, chemical, or physical characteristics which are better than water quality standards. The uses of these high quality waters are so sensitive to any change in chemical or physical characteristics that it is presumed that any measurable or calculated changes to the instream characteristics will lead to eventual change or harm to the uses in these surface waters. The existing biological, chemical, or physical characteristics of High Quality Waters-Category One will be protected from any measurable or calculated changes. Surface waters identified as High Quality Waters-Category One are:

- i. FW-2 Trout Production and their tributaries;
- ii. Surface waters classified as FW-2 Trout Maintenance or FW-2 Nontrout which are upstream of surface waters classified as FW-2 Trout Production;
- iii. Shellfish waters classified as approved in chapter 12 of this title; or
- iv. Other high quality surface waters and their tributaries which flow through State and National Parks, Forests and Fish and Wildlife lands.

The effluent limitations will be developed such that there is no calculated or measurable changes to the existing biological, chemical or physical characteristics of surface waters designated as High Quality Waters-Category One. The parameters to be considered are those contained in the water quality standards and any other parameters that the department determines may have a detrimental effect on the instream uses or to important species. An applicant for a new wastewater treatment facility may request a modification from effluent limits established for discharges to surface waters designated as High Quality Waters-Category One, in accordance with the procedures contained in section nine of this subchapter.

- b. High Quality Waters-Category Two are waters having biological, chemical, or physical characteristics which are better than water quality standards. The uses of these high quality waters are sensitive to changes in chemical or physical characteristics. However, these uses may be capable of being maintained within some range of instream chemical or physical characteristics, as may be demonstrated by studies relating biological and other use characteristics to chemical and physical characteristics of aquatic ecosystems. The High Quality Waters-Category Two are those waters having biological, chemical, or physical characteristics better than water quality standards and not designated as Nondegradation Waters (see subchapter 4 of this chapter) or High Quality Waters-Category One.
 - i. Provisions for Classifying Streams as High Quality Waters-Category Two

In determining an effluent limitation for streams falling in High Quality Waters-Category One, the department will reserve the right to make a determination that some degradation of existing water quality for some parameters is allowable provided that existing uses will be protected. After determining whether to classify a stream as High Quality Waters-Category One or High Quality Waters-Category Two, the department will document its decision on which category will be applied and present such documentation with any draft effluent limitations of a waste discharge pursuant to this decision.

After making a decision to allow some degradation of stream quality, the department will develop a draft effluent limitation which shall establish the permissible concentration of pollutants in a discharge that will not interfere with or become injurious to the use of the stream. The department will issue draft effluent limits.

A copy of the draft effluent limitation (as well as the documentation of the decision to allow some changes in stream quality, where applicable) for any discharge to a stream where water quality is better than water quality standards, will be sent to the governing bodies of affected local jurisdictions. The discharger and the affected local jurisdictions have the right to request a modification from the effluent limitations contained in the draft effluent limitation according to the procedures contained at section nine of this subchapter.

ii. Methodology

The effluent limitations developed under this category must take into consideration some reserve capacity in the stream segment. The resultant water quality to be allowed will therefore be at a level better than water quality standards.

The parameters to be considered in determining water quality based effluent limitations can vary depending on type of discharge, the stream segments, its existing and potential use, and instream water quality. The parameters can be divided into two groups, non-toxic and toxic. For each group a number of technical analyses including water quality mathematical modeling, simple mass balances combined with water quality surveys, and bioassays, can be used to determine an effluent limitation. The following discussion outlines the procedures the department will use for each group of parameters.

1. Non-toxic - In the past, the main thrust of developing water quality based effluent limitations has been to meet dissolved oxygen (D.O.) standards which involves establishing limitations for carbonaceous biochemical oxygen demand (CBOD) and nitrogenous biochemical oxygen demand (NBOD). These limitations will be determined using a calibrated and verified water quality mathematical model developed for a particular stream or a simplified modeling approach as outlined in the 1977 USEPA document entitled "Water Quality Assessment" (EPA-600/9-77-023). In those streams where these methods can be used, the CBOD and NBOD limits will be based on those developed for modeled downstream river segments unless the need for more stringent requirements can be shown.

In the use of a mathematical model for determining effluent limitations, it should be understood that the model is a simplification of the actual complex river system and therefore, the values produced should not be interpreted as an exact answer by the decision maker but should guide the development of final effluent limits.

For other non-toxic parameters, a mass balance will be determined using the State's water quality standards as the base including some reserve capacity. The following formula will be applied where applicable:**

** For example, not applicable for D.O.

$$V_1 C_1 + V_2 C_2 = (V_1 + V_2) [P(C_1 - C_s) + C_s]$$

Where:

V_1 = Upstream Low Flow

V_2 = Effluent Design Flow

C_1 = Upstream Concentration

C_2 = Effluent Concentration
Limitation (unknown)

C_s = Water Quality Standard

P = Percent Reserve

2. Toxics - The 1977 Amendments to the Clean Water Act increase the emphasis of controlling toxic pollutants. In accordance with these Amendments, 65 toxic pollutants have been initially identified which will require BAT effluent guidelines to be met by July 1, 1984. In developing effluent limitations for toxic pollutants, the department is not limited to the list of toxics presented by USEPA or any Federal minimum effluent limits being developed for those pollutants. Where the State's water quality standards or a particular stream use warrants more stringent requirements, effluent limitations reflecting that need will be established. The Federal minimum levels of treatment will be applied where they are more stringent than those developed by these procedures.

As with non-toxic parameters, the methodology for determining toxic effluent limitations will also be a mass balance using the State's water quality standards as the base. The standards for most toxics do not present specific limits for each toxic material, but rather present limits for each toxic material, but rather present limits based on the results of bioassays. In applying the standards the following basic policies will be followed:

(1) Statewide Effluent Limitations for Toxics

Any discharge of an effluent shall not be more toxic than a 96 hour LC50 of 50% concentration. The lethal concentration (LC) is that concentration of a toxicant which will cause death in a specified percentage of organisms within a specified time period.

(2) Effluent Constituent Limitations

Where the toxic substance(s) in an effluent is known, the level of the substance(s) in the effluent shall be limited so that the concentration in the receiving stream shall not exceed either 1/20 (non-conservative toxic substances) or 1/100 (conservative toxic substances) of the 96 hour LC50 concentration.

(3) Effluent Flow Limitations

Where the toxic substance(s) are known, the effluent flow shall be limited so that the concentration of the effluent in the receiving stream shall not exceed 1/20 (where non-conservative toxic substances are suspected) or 1/100 (where conservative toxic substances are suspected) of the 96 hour LC50 concentration.

The procedure to be followed for determining toxic effluent limitations is as follows:

The applicant shall submit a report of the test results of an acute toxicity static bioassay and a laboratory chemistry analysis on the proposed effluent discharge(s). The methodology to be utilized in the conduct of the tests shall be approved by the Department.

The State will review each application and supporting data. If the effluent discharge(s) is determined not to be toxic to aquatic life, the State will insert the minimum toxicity effluent limitation into the State's water pollution control permit as a permanent condition in the event that some characteristics of the discharge may change.

If the effluent discharge(s) is determined to be toxic, based on the initial static bioassay test results, the State may, on a case-by-case basis, require more detailed bioassays (e.g., modified static or flow-through) to be performed as part of the application procedure to provide further data for evaluation.

The basic calculations that will be utilized by the State to determine the effluent limitations for toxic substances are:

Effluent Constituent Limitation
Formula

Utilized for toxic substances

$$V_1 C_1 + V_2 C_2 = (V_1 + V_2) F C_E D + (1-D)C_1$$

Where:

V_1 = Upstream Low Flow

V_2 = Effluent Design Flow

C_1 = Upstream Concentration

C_2 = Effluent Concentration
Limitation (unknown)

D = Dilution (96 hour LC50
Concentration)

F = Application Factor*

C_E = Pure Effluent Concentration
Used in Bioassay

*1/20 for Non-conservative Toxic
Substances.

1/100 for Conservative Toxic
Substances.

Effluent Flow Limitation Formula

Utilized for flow limitations where the toxic substances are unknown

$$V_2 = \frac{V_1 (F X D)}{1 - (F X D)}$$

Where:

V_1 = Upstream Low Flow

V_2 = Effluent Flow Limitation
(unknown)

F = Application Factor*

D = Dilution (96 hour LC50)

*1/20 where non-conservative toxic substances are suspected

1/100 where conservative toxic substances are suspected.

For new discharges where a bioassay is impossible the department may use as a reference the USEPA 1976 publication, "Quality Criteria for Water" (Red Book) or other reliable sources, or the results of other bioassays for particular substances to determine effluent limitations.

Category Three - Definition - Stream segments where the water quality characteristics are equal to or worse than State surface water quality standards.

The goal of the department of this category is to improve water quality to meet the standards and designated uses of the stream segment. The methodologies discussed in High Quality Waters-Category Two will be applied to this category to determine effluent limitations for both existing and future discharges.

In those segments where the standards are not attainable, as discussed previously, effluent limitations would be developed to reflect the highest attainable water quality.

4. Effluent Limitation Methodology for Existing Wastewater Treatment Facilities - Definition - An existing facility is a waste treatment facility that is presently in operation and has received construction and operation permits from the department.

a. Methodology

The process for developing effluent limits for existing facilities can be divided into two classifications, those for which no expansion is proposed and those for which an expansion is being proposed.

i. Expansion not being proposed

For those existing facilities that discharge to a stream segment which are worse than or equal to water quality standards, the effluent limits will be formulated as discussed in Category Three.

For those existing facilities that discharge to a stream segment which are better than water quality standards and are meeting their designated use, the effluent limitations will be based on the limits the department developed for their present design capacity when the permits to construct and operate were approved or the minimum USEPA requirements whichever is more stringent. In addition, the department may require more stringent requirements for specific pollutants that have been shown to be a detriment to water quality or a potential health hazard. An example of this would be the possible implementation of more stringent requirements of chlorine residual being discharged.

ii. Expansion being proposed

The process for determining the effluent limit for these facilities will be those outlined in subparagraph three of this subsection. The data requirements outlined in subparagraph two of this subsection will be required and a determination of the stream category will be made. If the resultant effluent from the expanded facility will improve overall stream water quality and upgrade stream use as determined by the department, the procedures contained in subparagraph three of this subsection will not be used.

In no case will a modification be granted for an effluent limitation less stringent than currently required, to existing dischargers who propose to increase their level of discharge and who are not presently meeting water quality standards.

In developing all effluent limitations, the department reserves the right to apply more stringent effluent limitations than those derived by using the procedures outlined in subparagraph three of this subsection if it finds that more stringent limitations are necessary to aid in the restoration, enhancement and maintenance of the surface water quality.

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