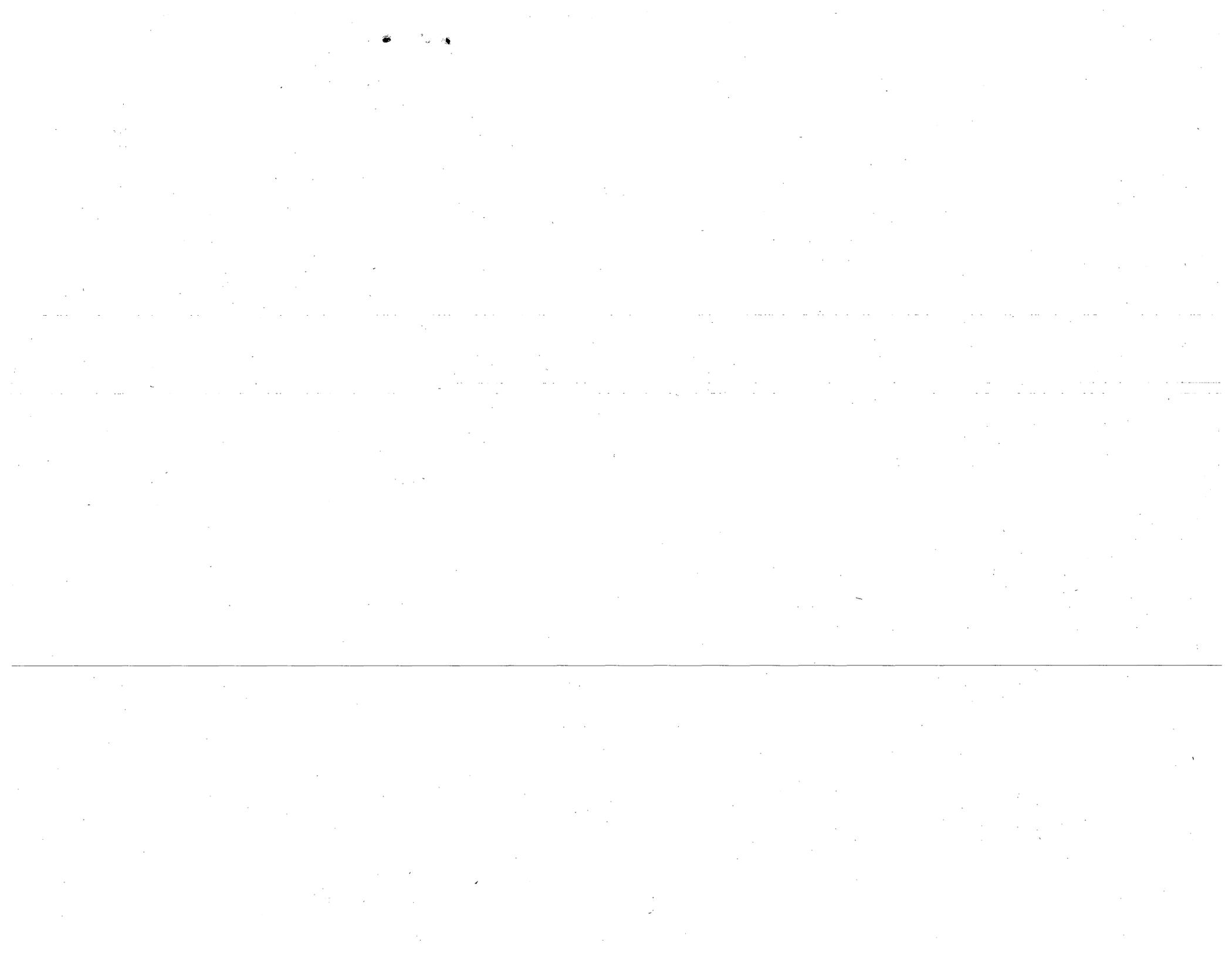


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BASIS AND BACKGROUND
PROPOSED GROUND-WATER QUALITY STANDARDS

State of New Jersey
Department of Environmental Protection
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Introduction

A. Purpose and Statutory Authority

Water quality standards are key elements in the State's program to develop sound and adequate water quality management plans. The objectives of water quality management plans are twofold; to maintain and protect water quality for consumption by the present and future citizens of the State and, to protect water quality as it relates to a variety of present and potential uses, including but not limited to potable, agricultural, aesthetic, recreational, fisheries, and industrial.

The New Jersey Department of Environmental Protection adopted Ground-Water Quality Standards for the Central Pine Barrens on January 23, 1978. The purpose of those Standards was to protect the ground-water resources in portions of Atlantic, Burlington, Camden and Ocean Counties. On October 23, 1978 amendments to the Central Pine Barrens description were proposed. The amendments were adopted on July 19, 1979. The standards proposed herein will modify a portion of the Pine Barrens criteria and will establish standards that shall apply to the remainder of the state. For the sake of clarity and continuity the July 19, 1979 amendments are incorporated herein. All Ground-Water Quality Standards will be integrated and recodified as Title 7, Chapter 9, Subchapter 6, of N.J.A.C. The proposed standards were developed by the Division of Water Resources, New Jersey Department of Environmental Protection pursuant to the New Jersey Water Quality Planning Act (N.J.S.A. 58:11A-1 et seq.), the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and N.J.S.A. 13:1D-1 et seq.

B. Nature and Extent of Water Quality Standards

Water quality standards represent levels of purity and thereby provide a basis for determining the need for and effectiveness of pollution control programs.

Although this document prescribes water purity levels, these levels are not necessarily being attained in all areas at present. Where waters do not presently meet the numerical criteria, the criteria provide a goal to be achieved. For waters of better quality than the standards prescribe, the higher quality is to be maintained unless change is allowed by State permit and is justifiable as a result of necessary economic or social development determined pursuant to appropriate modification procedures as provided in the regulations.

The State's Ground-Water Quality Standards are comprised of the following elements:

1. Statements of Policy

These statements set forth the conditions under which standards apply, the relationship of the standards to other requirements, and any special requirements or conditions not explicit in the body of the standards.

2. Designated Uses

Designated uses indicate the present and potential, desired uses of the waters of the State. For ground waters, the uses are based on the natural concentrations of total dissolved solids. For example, ground water having a natural total dissolved solids (TDS) concentration of 500 mg/l or less shall be suitable for potable water supply; industrial water supply; agricultural water supply; continual replenishment of surface water to maintain the quantity and quality of the surface waters of the State; and other reasonable uses. Therefore, the waters in this class should be suitable for drinking, with treatment, if necessary. Further, if they replenish surface waters, they shall not cause the surface water standards to be violated.

3. Criteria

Water quality criteria are characteristics of water that can be measured or physically perceived. The criteria chosen herein are intended to allow the designated uses to be maintained or achieved.

Criteria may be expressed as a number, narrative or both. An example of a numerical criterion is the concentration of 10 mg/l for nitrate-nitrogen. An example of narrative criterion is the "none noticeable" statement for color and odor.

4. Designated Area

Designated area specifies the geographic extent of waters where designated uses and criteria described above are to be met or protected. For ground water, the areas are a function of the natural concentration of total dissolved solids, unless specifically described on a geographic basis, like the Central Pine Barrens area.

5. Effluent Limitations

Effluent limitations provide for regulation of those activities that could cause contravention of ground-water standards. Limitations for the discharge of

specific substances or effluent standards, will be developed on a case by case basis with the objective of protecting the designated uses until such time as Statewide effluent limits are developed. In no case will activities be allowed that contravene the designated uses.

PROPOSED REVISIONS

Proposed Revisions to Ground-Water Quality Standards (N.J.A.C. 7:9-14.1 et seq. and amendments as adopted July 19, 1978).

Background

In September of 1977 the Division of Water Resources, New Jersey Department of Environmental Protection established a committee to recommend revisions to the State's Water Quality Standards. The committee consisted of representatives of:

United States Environmental Protection Agency and the
New Jersey Department of Environmental Protection,
Office of the Commissioner, Program on Environmental Cancer
and Toxic Substances,
Division of Fish, Game and Shellfisheries,
Bureau of Fisheries,
Division of Water Resources,
Bureau of Water Quality Planning and Management,
Office of Regulatory Affairs,
Bureau of Potable Water,
Monitoring, Surveillance and Enforcement Element,
Office of Areawide Planning,
Office of Environmental Assessment,
Office of Program Development and
Public Wastewater Facilities Element.

This committee considered the adequacy of the following components in recommending revisions to the Water Quality Standards.

Statements of Policy
Definitions
Designated Uses
Water Quality Criteria
Treatment Requirements

As a result of this committee review it was determined that revisions to the Water Quality Standards were necessary to ensure that ground-water quality standards meet the intent of State and Federal Law and protect existing and potential water uses.

REVISIONS AND ADDITIONS

The proposed revisions include the following components.

A. REVISIONS TO STATEMENTS OF POLICY

1. Addition of five policy statements in conformity with those added to the Surface Water Quality Standards.

1. Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the State's population or its economy. It is the policy of the State to restore, enhance and maintain the chemical, physical and biological integrity of its waters, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water.

2. It is the policy of the Department not to permit the introduction of pollutants into the ground-waters of the State which are known or suspected to be toxic, carcinogenic, mutagenic, or teratogenic. The Department, to the maximum extent possible, will direct its control efforts to require the removal of such substances from discharges where such discharges are shown to already occur into the waters of the State.

3. Existing and potential uses of ground waters shall be maintained and protected. Where existing criteria are inadequate to support existing uses, such quality shall be upgraded.

4. The Department shall define the designated uses which are to be protected and maintained, identify those waters to which each designated use applies, and establish numerical or descriptive criteria for water quality substances in a manner that is consistent with the designated uses and policies described herein.

5. When existing water quality does not conform with the established minimum criteria solely as a result of natural causes, natural water quality characteristics shall prevail.

2. Retention of Policy Statements

The following policy statements have been included here exactly as they appear in N.J.A.C. 7:9-14.4(a) 2 and 3, respectively.

1) The Central Pine Barrens constitutes a unique and particularly fragile ecosystem compared with other coastal pine areas. Furthermore, the ground

waters in the Central Pine Barrens have major impact on the quantity and quality of the surface waters in the Central Pine Barrens. The vast high quality ground-water reservoir in the area necessitates a special State ground-water quality policy. In light of the vulnerable character of the area, the Department of Environmental Protection shall not, in the performance of its statutory duties, approve any activity which, alone or in combination with other activities, will cause degradation in the existing ground-water quality characteristics of the Central Pine Barrens.

- 2) The State's Central Pine Barrens water quality policy is not intended to interfere with water use for the operation of cranberry bogs or blueberry production.

3. Deletion of Policy Statements

The following policy statement was deleted, because the Class GW has been eliminated and the Central Pine Barrens Criteria apply to all of the designated area. The description of the Central Pine Barrens Area appears in N.J.A.C. 7:9-6.7(c) as proposed herein and conforms to the area currently described in 7:9-14.7 as amended July 19, 1979.

Deleted:

"4. The Class GW-Central Pine Barrens Quality Criteria shall apply to ground waters that underlie surface water drainages in State and Federal Parks, Forests, Fish and Wildlife lands in the Central Pine Barrens. The boundary of the Central Pine Barrens is further clarified by the Official Map which is available for review at the New Jersey Department of Environmental Protection, Division of Water Resources or the appropriate county planning board, board of health or municipality." (N.J.A.C. 7:9-14.4(a) 4).

The GW-Central Pine Barrens Class has been deleted because it is replaced by Class GW-1 to conform with the other Ground-Water Designated Uses as they appear in N.J.A.C. 7:9-6.6(a) herein. The boundary of the Central Pine Barrens Area given in N.J.A.C. 7:9-14.7 (as amended July 19, 1979) is incorporated into N.J.A.C. 7:9-6.7(c) herein unchanged.

4. The following policy statement was expanded and reorganized for clarity:

FROM:

"The purpose of these rules is to protect the ground waters for domestic, agricultural, and industrial uses and as a source of surface water suitable for recreation, wildlife, fish and other aquatic life, except where such uses are precluded by natural conditions." (N.J.A.C. 7:9-14.4 (a) 1.)

TO:

"The purpose of these rules is to protect the ground waters of the state for use as agricultural, industrial, and potable water supplies and other reasonable uses, and as a supplement to surface waters for recreation, wildlife, fish and other aquatic life, agricultural, industrial, and potable water supply."

5. The following policy statements were added to ensure the regulations meet the intent of the law on those issues that can not be adequately addressed in the body of the regulations, or that need further reinforcement because of their importance.

1. "Discharges to ground water which subsequently discharge into surface waters and which would cause a contravention of those surface water quality standards shall not be permitted."

2. Existing ground-water quality which exceed those levels necessary to support designated uses shall be maintained and protected unless the State chooses to allow lower water quality as a result of necessary and justifiable economic or social development. In no event, however may degradation of water quality interfere with or become injurious to existing designated uses. Additionally no degradation shall be allowed in ground waters which constitute an outstanding National resource such as waters of National and State Parks and Wildlife refuges and waters of exceptional ecological significance.

3. Where existing ground-water quality does not meet the criteria listed herein, due primarily to man's activities, it is the policy and objective of the Department that the quality be restored and upgraded to the minimum levels of quality stated herein.

B. REVISIONS TO DEFINITIONS

1. The following definitions were deleted from N.J.A.C. 7:9-14.5 because the words are not used in the ground-water standards:
 - Ambient Temperature
 - Aquatic Substrata
 - Biota
 - Surface Water Classifications
 - Toxic Substances
 - Water Table
 - Zone of Aeration
2. Definitions were added for the following words:
 - Discharger
 - Pollutant
 - Toxic Pollutants
 - Treatment Works
 - Water Quality Criteria
 - Individual household waste
 - Natural background
 - Best management Practices
 - Discharge Allocation Certification
 - Discharge
 - Farming
3. The definitions of ground water and point of discharge have been revised.

C. REVISIONS TO DESIGNATED USES

This section has been extensively revised to include designated uses for all the ground water of the State and to include quality criteria to protect these uses.

1. Class GW formerly found at N.J.A.C. 7:9-14.6 has been eliminated.
2. Uses have been established for 4 different classes of ground water, as follows:
 - GW1. Ground water underlying the Central Pine Barrens area (replaces N.J.A.C. 7:9-14.6).
 - GW2. Ground water having a natural total dissolved solids concentration of 500 mg/l or less.
 - GW3. Ground water having a natural total dissolved solids concentration between 500 to 10,000 mg/l.
 - GW4. Ground water having a natural total dissolved solids concentration in excess of 10,000 mg/l.

It should be noted that GW1 replaces "GW Central Pine Barrens as it appears in N.J.A.C. 7:9-14.6. GW2, GW3 and GW4 are new classes of Ground Water which relate to Designated Use Categories under N.J.A.C. 7:9-6.6 herein.

A rationale is required for categories (GW2) and (GW3). These categories are based on the EPA Quality Criteria for Drinking Water, 1976 and the Federal Safe Drinking Water Act (PL 93-523).

500 mg/l or less - The natural inorganic salts that normally contribute to the dissolved solids content of these waters do not cause problems in drinking water at this concentration. For irrigation use, this concentration will not usually cause noticeable effects. The Public Health Service Drinking Water Standard (1962) recommended a maximum dissolved solids concentration of 500 mg/l unless more suitable supplies were not available.

500 - 10,000 mg/l) - The Federal Safe Drinking Water Act recommends protection of all aquifers as potential sources of drinking water, if the total dissolved solids content of ground water is less than 10,000 mg/l.

D. REVISIONS TO QUALITY STANDARDS

GW-1. Pine Barrens Designated Area

Addition of criteria in Pine Barrens to include the following substances. Concentrations are in mg/l.

Arsenic 0.05	Selenium - Natural background
Barium 1.0	Silver 0.01
Cadmium-Natural background	Sodium 10.0
Chloride 10.0	Sulfate 15.0
Chromium-Natural background	Zinc 5.0
Copper 1.0	Aldrin/Dieldrin 0.000003
Cyanide 0.2	Benzidine 0.0001
Fluoride 2.0	DDT and Metabolites 0.000001
Foaming Agents 0.5	Endrin 0.000004
Iron 0.3	Phenol 0.001
Lead-Natural background	Polychlorinated
Mercury-Natural background	Biphenyls 0.000001
Ammonia 0.5	Toxaphene 0.000005

The metals given in the above table replace N.J.A.C. 7:9-14.6 (b) 1 vi.

Coliform Bacteria shall be limited by the more restrictive of the following:

As determined by the membrane filter method, coliform bacteria shall not exceed 4 per 100 ml in more than one sample when less than 20 are examined per month; or

As determined by the fermentation tube method with a standard portion of 10 ml, coliform bacteria shall not be present in three or more portions in more than one sample when less than 20 samples are examined per month; or

The prevailing criteria adopted pursuant to the Federal Safe Drinking Water Act (PL 93-523).

Addition of "color" and "oil and grease, and petroleum hydrocarbons" at the "None Noticeable" levels. For "Petroleum Hydrocarbons" the goal is none detectable utilizing the U.S.E.P.A. - Environmental Monitoring and Support Laboratory Method (Freon Extractable - Silica Gel Adsorption - Infrared Measurement); at present the "None Noticeable" criteria shall apply.

Change in the concentrations of the following substances in the Central Pine Barrens:

- 1) Total dissolved solids has been changed from 250 mg/l (N.J.A.C. 7:9-14.6 (b) 1 v.) to less than 100 mg/l. The change is made to better approximate ambient water quality levels for ground water in the Central Pine Barrens area and for the protection of existing surface water quality.
- 2) Odor and Taste producing substances (N.J.A.C. 7:9-14.6 (b) 1 viii.) has been changed to "None Noticeable".

The levels for pH (N.J.A.C. 7-9:14.6 (b) 1 i.), 5-day B.O.D. (N.J.A.C. 7:9-14.6 (b) 1 ii.), nitrate-nitrogen (N.J.A.C. 7:9-14.6 (b) 1 iii.), and Total Phosphate (N.J.A.C. 7:9-14.6 (b) 1 iv.) have been incorporated into the proposed standards unchanged.

2. GW2 to 4 Standards were added for the remainder of the State as shown in Section 7:9-6.6.

E. REVISIONS TO DESIGNATED AREAS

The Central Pine Barrens area description was revised and adopted on July 19, 1979 to better delineate the area throughout which the Central Pine Barrens water quality criteria would apply.

The remainder of the state is designated on the basis of the natural ground-water quality as indicated by the total dissolved solids content of the ground water. Because of this, a geographical area designation has no meaning since the water quality underlying an area may vary both vertically and horizontally. Therefore, it is most practical to apply and administer use categories for ground water quality that reflect this variability.

Thus for other than specific geographical area designations (like the Central Pine Barrens), the designation for ground water is by depth and areal extent of ground water at similar total dissolved solids concentration.

F. ADDITION OF EFFLUENT STANDARDS

There is an obvious need for rules to control the activities of man that can cause ground-water pollution. These activities include but are not limited to: individual home subsurface sewage disposal systems, spray disposal of municipal and industrial wastes, lagoons, land fills, and accidental spills or any other discharge on the land or into waters.

Although certain of these activities are subject to rules under current regulations, there are no current standards which limit concentrations of specific pollutants discharged on or into the ground.

This section of the Ground-Water Standards provides the framework for establishing limitations on pollutants that could enter ground waters of the state. Although the state of the art does not permit limitations to be established at this time, the section provides narrative criteria that restrict any activity from contravening the ground-water quality criteria in section 6.6 of these standards.

G. EXEMPTIONS

Certain existing and proposed activities that are potential sources of pollution, are administered under other State regulations. The Department proposes to exempt these activities from meeting the Effluent Standards of the regulations provided that all other applicable regulations are met. The activities exempted from the Effluent Standards include:

- 1) Existing individual home subsurface sewage disposal systems which dispose of individual household wastes.
- 2) Farming operations that employ "Best Management Practices" as developed by Areawide 208 Water Quality Management Planning Programs (as in 7:9-14.6(b)ii).

BASIS FOR SELECTION OF SUBSTANCES AND CRITERIA

The discussion of the criteria is organized in two categories, toxic pollutant criteria and other criteria.

A) Toxic Pollutant Criteria

The Criteria and Standards Division of the United States Environmental Protection Agency has published (43 Federal Register 4109, January 31, 1978) a list of 65 toxic pollutants pursuant to section 307 (a) (1) of the Federal Water Pollution Control Act as amended by section 53(a) of the Clean Water Act of 1977 (PL 95-217). The United States Environmental Protection Agency has published (44 Federal Register 15926 March 15, 1979, and 44 Federal Register 43660 July 25, 1979) water quality criteria for 53 of the 65 toxic pollutants. These are currently available from USEPA for public comment. When published in final form these criteria may form the basis for enforceable standards. In the interim the New Jersey Department of Environmental Protection has included seventeen (17) of these toxic pollutants in the currently proposed ground-water standards. These seventeen have been selected for inclusion at this time since each of the criteria for these substances have been previously established by scientific review, published, and undergone public comment as noted in the appropriate subsequent sections of this document. These substances include;

- | | |
|---------------------------|-------------------------------|
| 1. Arsenic and compounds | |
| 2. Cadmium and compounds | 10. Silver and compounds |
| 3. Chromium and compounds | 11. Zinc and compounds |
| 4. Copper and compounds | 12. Aldrin/Dieldrin |
| 5. Cyanide | 13. Benzidine |
| 6. Lead and compounds | 14. DDT and Metabolites |
| 7. Mercury and compounds | 15. Endrin |
| 8. Phenol | 16. Polychlorinated Biphenyls |
| 9. Selenium and compounds | 17. Toxaphene |

It is anticipated that the criteria for the 65 toxic pollutants which are being finalized by the United States Environmental Protection Agency will form, in large part, the basis for future State Ground-Water Quality Regulations and Effluent Limitations to be promulgated under this subchapter. These criteria are based on the best available scientific knowledge. DEP intends to adopt some or all of these criteria as standards at such time as they have received final comment, if the State considers the numerical criteria to be based upon sufficient scientific data. Each toxic numerical criteria will be proposed and adopted in accordance with the N.J. Administrative Procedures Act. The same procedure will be followed for numerical criteria

for other toxics as they are proposed by EPA. In addition the Department will consider other sources of scientific information as they affect the scientific numerical criteria.

The Department recognizes the hazards to man and the environment posed by the carcinogenic, mutagenic, and teratogenic tendencies of many toxic pollutants and recognizes its responsibility to regulate activities which release these materials into the environment.

The first 11 substances on the currently proposed list of seventeen toxic pollutants are set at levels intended to protect human health via the designated use of ground water as a potable water supply. The concentrations proposed for substances numbered 12 through 17 are set at levels to protect aquatic organisms via the designated use of ground water for surface water replenishment.

The following sections discuss the basis for each of the toxic pollutants.

ARSENIC

(50 micrograms per liter)

The Department recommends a limit of 50 micrograms per liter (ug/l) based on the National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975). This level is also New Jersey's current surface water criterion. The National Academy of Sciences (42 Federal Register 35,764; July 11, 1977) recommends additional study on arsenic and indicates the 50 ug/l limit provides a narrow margin of safety for the maximum no observed adverse effect level of 100 ug/l. NAS also notes the potential carcinogenic effects of inorganic arsenic compounds, but they point out the lack of proven carcinogenicity from animal studies. NAS concludes therefore, that it is impossible to estimate quantitatively a risk of cancer for intake of arsenic in any form or concentration.

CADMIUM

(10 micrograms per liter)

The Department has set a limit of 10 micrograms per liter (ug/l) for cadmium based on protecting human health from the toxic properties of cadmium ingested through water. This concentration is the same that has been used over the years to protect public health.

This criteria has been employed and supported by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962), National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975), National Academy of Sciences, Recommendations on Drinking Water and Health (42 Federal Register 35764; July 11,

1977), United States Environmental Protection Agency (44 Federal Register 15938; March 15, 1979) and New Jersey's surface water quality criterion.

CHROMIUM (Hexavalent)
(50 micrograms per liter)

The Department's recommendation of 50 micrograms per liter (ug/l) for hexavalent chromium is based on the value used by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962) and the National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975) to protect human health.

However this value is independent of potential carcinogenic effects. The National Academy of Science has recommended additional study on total chromium, if current studies show it to be a single source carcinogen.

COPPER
(1 milligram per liter)

The value of one milligram per liter (1 mg/l) for copper is employed pursuant to the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962), National Interim Secondary Drinking Water Regulations (42 Federal Register 17144; March 31, 1977), National Academy of Sciences, Recommendations on Drinking Water and Health (42 Federal Register 35764; July 11, 1977), and New Jersey's Surface Water Criterion.

CYANIDE
(0.2 milligrams per liter)

The cyanide concentration of 0.2 milligram per liter (mg/l) is employed as New Jersey's ground-water quality limit. It is based upon the known toxic effects of cyanide on humans at a safety factor of 25 and conforms with the level employed by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962).

New Jersey's limit of 0.2 mg/l cyanide in ground water will protect the designated use as a water supply and also establish the need for and effectiveness of pollution control programs.

At this time, EPA is examining the carcinogenicity of cyanide and the findings might eventually require a reconsideration of this cyanide standard.

LEAD

(50 micrograms per liter)

The 50 micrograms per liter (ug/l) concentration proposed as a limit for lead in water is supported by all the current authoritative sources of information. The level of 50 ug/l to protect human health is supported by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962), United States Environmental Protection Agency Quality Criteria for Water, 38 Federal Register 29646; October 26, 1973), National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975) and has been adopted as part of New Mexico's and Colorado's ground-water quality standards.

MERCURY

(2 micrograms per liter)

The level of 2 micrograms per liter (2 ug/l) for mercury in water is based upon the National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975). The National Academy of Sciences (42 Federal Register 35764; July 11, 1977) does not take exception to this value since most of the water supplies in the United States are below this value.

The States of New York, New Mexico and Colorado have all adopted 2 ug/l as a ground-water standard.

PHENOL

(1 microgram per liter)

The concentration of 1 microgram per liter (ug/l) is based upon the rationale developed by the United States Environmental Protection Agency (Quality Criteria for Water, 38 Federal Register 29646; October 26, 1973). This value prevents aesthetic problems associated with phenolic compounds and is entirely independent of potential carcinogenic tendencies.

SELENIUM

(10 micrograms per liter)

The concentration of 10 micrograms per liter (ug/l) for selenium is supported by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962), the National Academy of Sciences (42 Federal Register 35764; July 11, 1977), and the United States Environmental Protection Agency (44 Federal Register 15926; March 15, 1979).

SILVER

(10 micrograms per liter)

The concentration of 10 micrograms per liter (ug/l) is based on the rationale presented by the United States Environmental Protection Agency (Ambient Water Quality Criteria, 44 Federal Register 15926; March 15, 1979).

ZINC

(5 milligrams per liter)

The zinc concentration of 5 milligrams per liter (mg/l) is supported by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962), the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973), the National Academy of Sciences (42 Federal Register 35764; July 11, 1977), and has been adopted by New York State as part of the ground-water standards.

ALDRIN/DIELDRIN

(0.003 micrograms per liter)

There is one concentration for both substances because aldrin is rapidly transformed to dieldrin and usually is not found in a pure form in the environment. The National Academy of Sciences (Recommendations on Drinking Water and Health, 42 Federal Register 35764; July 11, 1977) developed a risk level concentration for dieldrin. A risk of 0.00026 was assigned to dieldrin for causing cancer in man, over a lifetime of drinking 1 liter of water daily at a concentration of 1 microgram per liter. This risk level is above the 95% confidence level. The United States Environmental Protection Agency has set an ambient water quality criteria for Aldrin/Dieldrin at 0.003 micrograms per liter (40CFR129).

BENZIDINE

(0.1 micrograms per liter)

The concentration of 0.1 micrograms per liter was developed by the United States Environmental Protection Agency (42 Federal Register 2588; January 12, 1977) in determining an ambient water quality criteria for benzidine at 0.1 micrograms per liter (40 CFR 129).

DDT AND METABOLITIES

(0.001 micrograms per liter)

The limit of 0.001 micrograms per liter (ug/l) is based on the criterion developed by the United States Environmental Protection Agency in establishing an ambient water quality criteria for DDT (42 Federal Register 2588; January 12, 1977, and 40 CFR 129).

The National Academy of Sciences has published (40 Federal Register 59566; December 24, 1975) an assigned risk of 0.000012 on DDT and metabolites in causing cancer in man over a lifetime of drinking 1 liter of water at a concentration of 1 microgram per liter. This risk is in the upper 95% confidence level.

ENDRIN
(0.004 micrograms per liter)

The concentration of 0.004 micrograms per liter (ug/l) is based on the criterion developed by the United States Environmental Protection Agency in establishing the ambient water quality criteria limitation for endrin (42 Federal Register 2588; January 12, 1977, and 40 CFR 129).

Endrin is one of the substances for which there is a National Interim Primary Drinking Water Standard at a concentration of 0.2 ug/l (40 Federal Register 59566; December 24, 1975).

POLYCHLORINATED BIPHENYLS (PCBs)
(0.001 microgram per liter)

The National Academy of Sciences assigned a risk of 0.0000031 to PCB's in causing cancer in man over his lifetime if he consumed one liter of water per day containing 1 microgram per liter of PCB's (42 Federal Register 35764; July 11, 1977). On this basis the proposed concentration affords a good margin of safety against PCB related diseases.

TOXAPHENE
(0.005 micrograms per liter)

The limit of 0.005 micrograms per liter (ug/l) is based on the criterion developed by the United States Environmental Protection Agency in establishing the ambient water quality criterion for toxaphene (42 Federal Register 2588; January 12, 1977).

The National Interim Primary Drinking Water Standard for Toxaphene is 5 micrograms per liter (40 Federal Register 59566; December 24, 1975).

The National Academy of Sciences recommended 8 ug/l to produce no adverse effects (42 Federal Register 35764; July 11, 1977).

B) Criteria for Other Substances

The following items complete the list of items shown on the table in section 6.6 of the proposed ground-water standards. The basis for each of the specific criteria are listed in the following sections.

AMMONIA (unionized NH₃)

(0.5 milligrams per liter statewide, except as noted)

The Department recommends a limit of 0.5 milligrams per liter (mg/l) for unionized ammonia in ground water for two reasons: 1. To protect the designated use of surface water replenishment, and, 2. as a indication of potential pollution problems.

The limit of 0.5 mg/l provides an early warning system for pollution and is reasonable considering the 0.02 mg/l value recommended by the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973) for the protection of freshwater aquatic life.

The State of Colorado has adopted a ground-water standard of 0.5 mg/l for ammonia.

BARIUM

(1.0 milligrams per liter)

The barium criterion of 1.0 milligram per liter (mg/l) is supported by the National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975), the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973), New York's ground-water criterion, and New Jersey's surface water criterion.

The barium limit is based upon effects on human health.

Biochemical Oxygen Demand (5-Day)

(3 milligrams per liter for Central Pine Barrens Area)

The level of less than or equal to 3 milligrams per liter is incorporated into this subchapter from N.J.A.C. 7:9-14.6 (b) 1.

CHLORIDE

(250 milligrams per liter statewide, except
10 milligrams per liter in Pine Barrens Critical Area)

The limit of 250 milligrams per liter (mg/l) is based upon the levels set by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962), the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973), the National Interim Secondary Drinking Water Standards (42 Federal Register 171441; March 31, 1977), New York State's ground-water standard and New Jersey's Secondary Drinking Water Standard.

The 250 mg/l limit assures little or no taste in drinking water. Chlorides are not considered a health hazard at concentrations less than 1000 mg/l. At concentrations greater than 1000 mg/l, other substances frequently associated with chlorides, such as sodium, would likely limit water use.

The chloride limit of 10 mg/l in the Pine Barrens Critical Area is based upon ambient water quality in the Pine Barrens Critical Area.

TASTE, COLOR, ODOR, OIL AND GREASE
AND PETROLEUM HYDROCARBONS
(None Noticeable)

The Department is recommending a narrative statement for these items as an initial indication of potential pollution and for aesthetics.

Color and odor appear in the National Safe Drinking Water Regulations as secondary drinking water requirements; odor has a maximum level recommendation of 3 Threshold Odor Number (T.O.N.) and Color is at 15 units. New Jersey's Safe Drinking Water Act Regulations have recommended 3 T.O.N. for odor and 10 units (Standard Colbalt Scale) for color. For Petroleum Hydrocarbons the goal is none detectable utilizing the U.S.E.P.A., Environmental Monitoring and Support Laboratory Method (Freon Extractable - Silica Gel Absorption - Infrared Measurement); at present the none noticeable criteria shall apply.

In conclusion, it appears that the narrative statement for color, taste and odor as given, i.e. "none noticeable" adequately provides for the aesthetic quality of ground waters.

FLUORIDE
(2.0 milligrams per liter)

The level of 2.0 milligrams per liter for fluoride protects against objectionable dental fluorosis. The National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 24, 1975) and New Jersey's Drinking Water Regulations have supported 2.0 mg/l fluoride limit.

FOAMING AGENTS
(0.5 milligrams per liter)

The criterion recommendation of 0.5 milligrams per liter (mg/l) for foaming agents is based on the National Interim Secondary Drinking Water Regulations. (42 Federal Register 17144; March 31, 1977). The limit applies only to those foaming agents that are "methylene blue active substances" (MBAS).

New York's ground-water standards have a maximum limit of 0.5 mg/l for foaming agents in ground water, but allow the determination of the agents to be made by any test they decide is appropriate.

IRON

(0.3 milligrams per liter)

The recommended limit of 0.3 milligrams per liter (mg/l) for iron in ground water is based on protecting the use of ground waters for water supply, and is mainly an aesthetic consideration.

Iron concentrations greater than 0.3 mg/l in water are objectionable because they can stain plumbing fixtures, utensils, and fabrics. Also, at about 1 mg/l of iron, the water may have an unpleasant taste.

The 0.3 mg/l level for iron is supported by the United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962) and the National Interim Secondary Drinking Water Regulations (42 Federal Register 17144; March 31, 1977)

MANGANESE

(0.05 milligrams per liter)

The limit of 0.05 milligrams per liter (mg/l) for manganese in ground water is based on protecting the ground water for potable water supplies. Concentrations above 0.05 mg/l can cause brownish staining and objectionable tastes. The United States Public Health Service (Drinking Water Standards, United States Public Health Service Publication #956, 1962) and the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973) employ a 0.05 mg/l limit for manganese.

NITRATE-NITROGEN

(10 milligrams per liter statewide, except Central Pine Barrens which is 2 milligrams per liter)

A limit for nitrates in ground water is important, both as an indication of pollution and to protect human health. The Department employs a limit of 10 milligrams per liter (mg/l) for nitrate - nitrogen ($\text{NO}_3\text{-N}$). This is 44.4 mg/l of the nitrate ion. High nitrates in ground water have been associated with fatal poisoning of infants (infant cyanosis, methemoglobinemia). Nitrates are a precursor of nitrosamines which have been shown to be carcinogens.

The basis for the 10 milligram per liter limit is given in the National Interim Primary Drinking Water Regulations (40 Federal Register 59566; December 25, 1975) and is supported by the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973) and the National Academy of Sciences (42 Federal Register 35764, July 11, 1977).

The limit of 2 mg/l nitrate-nitrogen in the Pine Barrens Critical Area is based upon ambient water quality and protection of surface waters. (N.J.A.C. 7:9-14.6 (b) 1 iii.)

pH
(5-9 statewide except Central
Pine Barrens Area which is 4.2-5.8)

The range of 5-9 pH units for domestic water supplies is supported by the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973). pH is one of the most important chemical properties of water since it regulates the chemical behavior of many components of the ground-water system.

The pH values of 4.2-5.8 for the Central Pine Barrens are based upon ambient water quality (N.J.A.C. 7:9-14.6 (b) 1 i.)

Phosphate, Total
(0.7 milligrams per liter for
the Central Pine Barrens Area)

The level of less than 0.7 milligrams of Total Phosphate is based on ambient ground-water quality and is incorporated here pursuant to N.J.A.C. 7:9-14.6 (b) 1 iv.

SODIUM
(50 milligrams per liter)

The National Academy of Sciences (42 Federal Register 35764, July 11, 1977) has presented a rationale for a sodium limit of 100 mg/l. The New Jersey Safe Drinking Water Act Regulations (N.J.A.C. 7:10 - 1.1 et seq.) requires a recommended limit of 50 mg/l to protect consumers requiring a low sodium intake.

SULFATES
(250 milligrams per liter statewide except the
Central Pine Barrens which is 15 mg/l)

The limit of 250 milligrams per liter (mg/l) for sulfates in ground water is employed because of laxative effects and mineral tastes which occur above this level. The level of 250 mg/l for sulfates is supported by the United States Environmental Protection Agency (38 Federal Register 29646; October 26, 1973) and is part of New York State's ground-water standards and New Jersey's Secondary Drinking Water Regulations. The level of 15 mg/l is based upon existing water quality in the Central Pine Barrens.

TOTAL DISSOLVED SOLIDS

(less than or equal to 500 milligrams per liter statewide, except the Central Pine Barrens Area which is less than or equal to 100 mg/l; and any area of the State where the natural background is greater than 500 milligrams per liter).

Total dissolved solids is an index of the mineralization of water. The definition of total dissolved solids employed here follows that developed by the United States Environmental Protection Agency (41 Federal Register 52780; December 1, 1976) where total dissolved residue is the total filterable residue dried at 180°C.

The total dissolved solids concentration of ground water is the criterion employed to segregate the ground waters of the State into use categories. In the Central Pine Barrens Area the limit of 100 mg/l is employed. The 100 mg/l criteria for TDS is employed in the Central Pine Barrens since it is more reflective of ambient water quality. The remainder of the State is designated on the basis of the natural ground-water quality as indicated by the total dissolved solid content of the ground water.

COLIFORM BACTERIA

The Department is recommending the most stringent of the following criteria:

Either, As determined by the membrane filter method, coliform bacteria shall not exceed 4 per 100 ml in more than one sample when less than 20 are examined per month; or,

As determined by the fermentation tube method, with a standard portion of 10 mg/l, coliform bacteria shall not be present in three or more portions in more than one sample when less than 20 samples are examined per month; or,

The prevailing criteria adopted pursuant to the Federal Safe Drinking Water Act (PL93-523).

The rationale for a Fecal Coliform Bacteria criteria in ground water is as a first line of defense against potential pollution from animal waste. These bacteria are always present in the intestinal tract of humans and other warm-blooded animals, and are eliminated in large numbers in fecal wastes. Thus, their presence indicates potential bacteriological pollution.

The National Interim Primary Drinking Water Regulations include the first two criteria recommendations shown above, but these criteria are repeated here in the event the final drinking water standards do not include them.

RADIONUCLIDES

The Department is recommending the following narrative criteria statement for radioactive substances:

"Prevailing regulations adopted by the U.S. Environmental Protection Agency pursuant to sections 1412, 1415, and 1450 of the Public Health Services Act, as amended by the Safe Drinking Water Act, (PL93-523)".

The inclusion of this statement is in keeping with Federal and State regulations regarding Radionuclides. Also, additional regulatory control is available under the toxic pollutant definition, if radioactive substances reach concentrations at which they are toxic pollutants. In that case, they would be under toxic pollutant regulatory jurisdiction also.

OTHER TOXIC POLLUTANTS

The United States Environmental Protection Agency has compiled a list of 65 toxic pollutants (43 Federal Register 4109; January 31, 1978). Currently the U.S.E.P.A. are developing criteria for these pollutants pursuant to Section 304 (a) of the Clean Water Act (33 U.S.C. 1314 a). Seventeen of these substances are included in the current proposed Ground-Water Regulations for New Jersey. It is the intent of the Department of Environmental Protection to adopt criteria for other Toxic Pollutants as outlined in the prior section on Toxic Pollutants.

The following is provided for public information. The following documents have been published in the Federal Register and by the source agencies as separate documents.

- 1) 40 Federal Register 59566; December 24, 1977 has also been published as; "National Interim Primary Drinking Water Regulations" United States Environmental Protection Agency, Washington D.C.; Publication #EPA-570/9-76-03 (see also 40 CFR 141).
- 2) 38 Federal Register 29646; October 26, 1973 has also been published as; "Quality Criteria for Water", Criteria Branch of the Criteria and Standards Division, Office of Water Planning and Standards, United States Environmental Protection Agency, Washington, D.C., 20460, 1976.
- 3) 42 Federal Register 35764; July 11, 1977 has also been published as; "Drinking Water and Health", Safe Drinking Water Committee, National Research Council and the National Academy of Sciences, 2101 Constitution Ave., Washington, D.C., 20418.

It should be noted that substances numbered 1,3,5,7,8,12, 14,22,23, 26,30,31,32,33,34,35,36 and 37 that appear in N.J.A.C. 7:9-6.6 are toxic pollutants and appear on the list of toxic pollutants established by the United States Environmental Protection Agency (43 Federal Register 4109; January 31, 1978).

Criteria for some of these substances (#1,3,5,7,8,12,14,22,23,26, and 33) are intended to protect human health via the designated use of ground water for potable water supply. The concentrations for some organic substances (#30,31,32,33,34,36, and 37) are at levels to protect aquatic organisms via the designated use of ground water for surface replenishment.

SUBCHAPTER 6 GROUND-WATER QUALITY STANDARDS

7:9-6.1 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 ground-water resources, use classification, quality criteria, and the designated uses of ground waters of the State pursuant to N.J.S.A. 13:1D-1 et seq., 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 pollutant limitations and other requirements applicable to those discharger activities that cause pollutants to enter the ground waters of the State.
- (c) This subchapter shall not apply to:
 - 1. Discharges which emanate from individual subsurface sewage disposal systems which were in existence or for which a building permit had been issued prior to January 23, 1978 in the Central Pine Barrens and in the remainder of the State prior to the effective date of these regulations provided that such systems are installed and are operating in conformance with N.J.S.A. 58:11-23 et seq., and all other Federal, State and local laws. Furthermore, any water quality standards in existence prior to January 23, 1978 in the Central Pine Barrens and prior to the effective date of these regulations in the remainder of the State shall remain in effect for previously existing individual on-site disposal systems; and
 - 2. Discharges from farming operations which are in compliance with existing Best Management Practices and all applicable Federal and State laws. Furthermore, any water quality standards in existence prior to the effective date of these regulations shall remain in effect for existing farming discharges.

7:9-6.2 Construction

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

7:9-6.3 Definitions

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

"Agriculture water supply" means water used for livestock, horticulture, and silviculture.

"Best management practices" means procedures and methods to control to the extent feasible, pollution from nonpoint sources as described in (208) Areawide Water Quality Management Plans.

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

"Designated area" means the geographic extent of waters where use classes and criteria described herein are to be protected or met.

"Designated use" means present or potential uses of ground water.

"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.

"Discharge allocation certification" means a determination by the department of the waste load allocation which will become the effluent limits in a discharger's final pollution control permit and which will be the basis for the design of any required treatment or pretreatment works.

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

"Effluent limitation" means any restriction on quantities, quality, rates and concentration of chemical, physical, thermal, biological and other constituents of pollutants.

"Farming" means the cultivation of the land in order to produce commercial crops including both plant and animal products. Feed-lots are excluded from this definition.

"Ground waters" means the portion of water beneath the earth's surface that is at or below the zone of saturation where all the openings are filled with water.

"Individual subsurface sewage disposal system" means a system for the disposal of sewage to the ground, which is so designed and constructed to treat sewage in a manner that will retain most of the settleable solids in a septic tank and to discharge the liquid portion to an adequate disposal area.

"Individual household waste" means an ordinary domestic waste which contains only trace amounts of toxic pollutants which occur incidentally in household products.

"Industrial water supply" means water used for processing or cooling.

"Natural background" means the innate level of a water quality parameter which occurs in water without the influence of man.

"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.

"Toxic pollutants" means those substances, or combination of substances, which after discharge and 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, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformations, in such organisms or their offspring.

"Treatment works" means any device or systems, whether public or private, used in the storage, treatment, recycling or reclamation of municipal or industrial waste of a liquid nature including intercepting sewers, outfall sewers, sewage collection systems, cooling towers and ponds, pumping power and other equipment and their appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; and any other works including sites for the treatment process or for ultimate disposal of residues resulting from such treatment. Additionally, "treatment

works" means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of pollutants, including storm water runoff, or industrial waste in combined or separate storm water and sanitary sewer systems.

"Water quality criteria" means a designated concentration of a constituent that, when not exceeded, will protect an organism, an organismic community, or a prescribed water use or quality.

"Wildlife" means all undomesticated animals.

"Zone of saturation" means that portion of the earth's crust which is saturated with water.

7:9-6.4 Statements of Policy

- (a) Water is vital to life and comprises an invaluable natural resource which is not to be abused by any segment of the State's population or its economy. It is the policy of this State to restore, enhance, and maintain the chemical, physical and biological integrity of its waters, to protect public health, to safeguard fish and aquatic life and scenic and ecological values and to enhance the domestic, municipal, recreational, industrial and other uses of water.
- (b) It is the policy of the department not to permit the introduction of pollutants into the ground waters of the State which are known or suspected to be toxic, carcinogenic, mutagenic, or teratogenic. The department, to the maximum extent possible, will direct its control efforts to require the removal of such pollutants from discharges where such discharges are shown to already occur in the waters of the State.
- (c) Existing and potential uses of ground water shall be maintained and protected. Where existing quality is inadequate to support existing uses, such quality shall be upgraded.
- (d) The department shall define the designated uses which are to be protected and maintained, identify those waters to which each designated use applies, and establish numerical or descriptive criteria for water quality substances in a manner that is consistent with the designated uses and policies described in this section.

- (e) The purpose of these rules is to protect the ground waters of the State for use as agricultural, industrial, and potable water supplies and other reasonable uses, and as a supplement to surface waters for recreation, wildlife, fish and other aquatic life, agriculture, industry, and potable water supply.
- (f) Discharges to ground water which subsequently discharges into surface waters and which would cause a contravention of those surface water quality standards shall not be permitted.
- (g) Existing ground-water quality which exceeds those levels necessary to support designated uses shall be maintained and protected unless the State chooses to allow lower water quality as a result of necessary and justifiable economic or social development. In no event, however may degradation of water quality interfere with or become injurious to existing designated uses. Additionally no degradation shall be allowed in ground waters which constitute an outstanding National resource such as ground waters of National and State Parks and wildlife refuges and ground waters of exceptional ecological significance.
- (h) Where existing ground-water quality does not meet the criteria listed herein, due primarily to man's activities, it is the policy and objective of the department that the quality be restored and upgraded to the minimum levels of quality stated in section 6 of this subchapter.
- (i) When existing water quality does not conform with the established minimum criteria solely as a result of natural causes, natural water quality characteristics shall prevail.
- (j) The following statements concern the nondegradation of Central Pine Barrens water quality.
 1. The Central Pine Barrens Area constitutes a unique and particularly fragile ecosystem compared with other coastal areas. Furthermore, the ground waters in the Central Pine Barrens have a major impact on the quantity and quality of the surface waters in the Central Pine Barrens. The vast high quality ground-water reservoir in the area necessitates a special State ground-water quality policy. In light of the vulnerable character of the area, the Department of Environmental Protection shall not, in the performance of its statutory duties, approve any activity which, alone or in combination with other activities, will cause degradation in the existing ground-water quality characteristics of the Central Pine Barrens.

2. The State's Central Pine Barrens water quality policy is not intended to interfere with water use for the operation of cranberry bogs or blueberry production.

7:9-6.5 Ground Water Designated Uses And Quality Criteria

- (a) The department will adopt as part of these regulations, after proper procedure, Water Quality Criteria and Effluent Limitations for additional toxic pollutants pursuant to the Clean Water Act, Sections 301, 304, and 307 of P.L. 92-500, as amended by PL 95-217 (33 U.S.C.A. 1251 et seq., 1978)
- (b) When existing ground-water quality does not meet the criterion listed in section 6 of this subchapter, due primarily to man's activities, the department shall, after a review of all available scientific and technical data, determine whether it shall require dischargers, through a schedule of compliance or other manner deemed appropriate by the department, to restore and upgrade the ground water to the minimum levels of quality stated in section 6 of this subchapter. One of the major considerations in making such a determination shall be whether, in the opinion of the department, the degradation constitutes an imminent threat to public health and safety.

The timing, nature, and extent of the compliance procedure shall be determined solely by the department after a review of the specific factors affecting each individual case.

- (c) Class GW2 ground water having a natural total dissolved solids (TDS) concentration of 500 mg/l or less shall be suitable for potable water supply, industrial water supply, agricultural water supply, continual replenishment of surface waters to maintain the quantity and quality of the surface waters of the State, and other reasonable uses. Quality criteria for these waters may be found in section 6 of this subchapter.
- (d) Class GW3 ground water having a natural TDS concentration between 500 mg/l and 10,000 mg/l shall be suitable for conversion to fresh potable waters, or other reasonable beneficial uses. Quality criteria for these waters may be found in section 6 of this subchapter.
- (e) Class GW4 ground water having a natural total dissolved solids concentration in excess of 10,000 mg/l shall be suitable for any reasonable beneficial use. Effluent limits and quality criteria will be determined on a case by case basis for these waters.

- (f) Class GW1 ground water in the Central Pine Barrens shall be suitable for potable water supply, agricultural water supply, continual replenishment of surface waters to maintain the existing quantity and high quality of the surface waters in the Central Pine Barrens, and other reasonable uses. Quality criteria for these waters may be found in section 6 of this subchapter.

7:9-6.6 Ground-Water Quality Criteria

The criteria in this section are, in part, based upon the criteria in the United States Environmental Protection Agency Publication entitled Quality Criteria for Water, 1976. The maximum limits for a specific criterion shall be exceeded only as a result of natural conditions.

7:9-6.7 Ground Water Designated Areas

- (a) All areas of the State shall be classified either: Statewide, except Central Pine Barrens; or Central Pine Barrens.
- (b) The Statewide designated area shall be all areas of the State except as provided in subsection (c) of this section.
- (c) The Central Pine Barrens Area* boundaries will underlie the following surface water drainages:
1. Mullica River Watershed
 - i. Mullica River and tributaries upstream of Lower Bank Road Bridge at Lower Bank to source.
 - ii. Wading River and tributaries upstream of Route 542 Bridge to source.
 - (A) Freshwater segment of Ives Branch and its tributaries from 10 foot contour crossing Ives Branch.
 - iii. West Branch Bass River and tributaries upstream from the Bass River State Forest Boundary (where it crosses the West Branch of Bass River, downstream of Stage Road).
 - iv. East Branch Bass River and tributaries upstream from the Bass River State Forest boundary (where it crosses the East Branch Bass River, downstream of Stage Road).
 - v. Indian Cabin Creek and tributaries upstream from Egg Harbor City Lake to source.

* The Boundary of Central Pine Barrens is further clarified by the Official Map which is available for review at the New Jersey Department of Environmental Protection, Division of Water Resources or appropriate county planning board, board of health, or municipality.

7:9-6.6
GROUND-WATER QUALITY CRITERIA

(All concentrations are in milligrams per liter unless otherwise noted)

<u>Pollutant</u>	<u>Class GW1</u>	<u>Class GW2</u>	<u>Class GW3</u>
	Ground-Water Quality Criteria for the Central Pine Barrens	Ground-Water Quality Criteria Statewide where the Total Dissolved Solids (TDS, Natural Background) Concentration is less than or Equal to 500 mg/l	Ground-Water Quality Criteria Statewide where the Total Dissolved Solids (TDS, Natural Background) Concentration is between 500 and 10,000 mg/l
1 Arsenic*	0.05	0.05	0.05
2 Barium	1.0	1.0	1.0
3 Cadmium*	Natural Background	0.01	0.01
4 Chloride	10	250	Natural Background
5 Chromium* (Hexavalent)	Natural Background	0.05	0.05
6 Color	None Noticeable	None Noticeable	None Noticeable
7 Copper*	1.0	1.0	1.0
8 Cyanide	0.2	0.2	0.2
9 Fluoride	2.0	2.0	2.0
10 Foaming Agents	0.5	0.5	0.5
11 Iron	0.3	0.3	0.3
12 Lead*	Natural Background	0.05	0.05
13 Manganese	0.05	0.05	0.05
14 Mercury*	Natural Background	0.002	0.002
15 Nitrate-N	2	10	10

7:9-6.6
GROUND-WATER QUALITY CRITERIA

(All concentrations are in milligrams per liter unless otherwise noted)

<u>Pollutant</u>	<u>Class GW1</u>	<u>Class GW2</u>	<u>Class GW3</u>
	<u>Ground-Water Quality Criteria for the Central Pine Barrens</u>	<u>Ground-Water Quality Criteria Statewide where the Total Dissolved Solids (TDS, Natural Background) Concentration is less than or Equal to 500 mg/l</u>	<u>Ground-Water Quality Criteria Statewide where the Total Dissolved Solids (TDS, Natural Background) Concentration is between 500 and 10,000 mg/l</u>
16 Ammonia	0.5	0.5	0.5
17 BOD - (5 Day)	3	-	-
18 Odor & Taste	None Noticeable	None Noticeable	None Noticeable
19 Oil & Grease, and Petroleum Hydrocarbons**	None Noticeable	None Noticeable	None Noticeable
20 pH (Standard Units)	4.2-5.8	5-9	5-9
21 phosphate, Total	0.7	-	-
22 Selenium*	Natural Background	0.01	0.01
23 Silver*	0.01	0.01	0.01
24 Sodium	10	50	Natural Background
25 Sulfate	15	250	Natural Background
26 Zinc*	5	5	5
27 Total Dissolved Solids	100	500	Natural Background

*and any compounds

**For "Petroleum Hydrocarbons" the goal is none detectable utilizing the U.S.E.P.A. Environmental Monitoring and Support Laboratory Method (Freon extractable - Silica Gel adsorption - Infrared Measurement); at present the "None Noticeable" Criteria shall apply.

7:9-6.6

GROUND-WATER QUALITY CRITERIA

(All concentrations are in milligrams per liter unless otherwise noted)

Pollutant	Class GW1 Ground-Water Quality Criteria for the Central Pine Barrens	Class GW2	Class GW3
		Ground-Water Quality Criteria Statewide where the Total Dissolved Solids (TDS, Natural Background) Concentration is less than or Equal to 500 mg/l	Ground-Water Quality Criteria Statewide where the Total Dissolved Solids (TDS, Natural Background) Concentration is between 500 and 10,000 mg/l
28 Coliform Bacteria	(1) As determined by the membrane filter method, coliform bacteria shall not exceed four per 100 ml in more than one sample when less than 20 are examined per month; or (2) As determined by the fermentation tube method, with a standard portion of 10 ml, coliform bacteria shall not be present in three or more portions in more than one sample when less than 20 samples are examined per month; or (3) The prevailing criteria adopted pursuant to the Federal Safe Drinking Water Act (PL93-523).		
29 Radionuclides	Prevailing regulations adopted by the United States Environmental Protection Agency pursuant to sections 1412, 1415, and 1450 of the Public Health Services Act, as amended by the Safe Drinking Water Act (PL93-523).		
30 Aldrin/Dieldrin	0.000003	0.000003	0.000003
31			
32 Benzidine	0.0001	0.0001	0.0001
33 DDT and Metabolites	0.000001	0.000001	0.000001
34 Endrin	0.000004	0.000004	0.000004
35 Phenol	0.001	0.001	0.001
36 Polychlorinated Biphenyls	0.000001	0.000001	0.000001
37 Toxaphene	0.000005	0.000005	0.000005
38 Other Toxic Pollutants	-----Pursuant to section 5 of this subchapter -----		

2. Cedar Creek (Lacey Twp.) and tributaries upstream of Route 9 (head of tide) surrounded by the northern ridgeline; and the southern ridgeline west of the Garden State Parkway and the southern ridgeline (between the Garden State Parkway and Route 9) as defined by Lacey Road, Manchester Avenue, and Haines Road.
3. All fresh waters west of the Garden State Parkway bounded by the Mullica and Cedar Creek (Lacey Township) watersheds.
4. Toms River Watershed
 - i. Davenport Branch and tributaries upstream from Route 530 to source.
 - ii. Unnamed tributary to Michaels Branch through Keswick Grove and tributaries upstream from the east crossing of the Penn Central Railroad to source.
5. Rancocas Creek Watershed
 - i. South Branch Rancocas Creek and tributaries upstream from Route 206 to source.
 - ii. Jade Run and tributaries upstream from Route 206 to source.
 - iii. Mt. Misery Brook and tributaries upstream of the western intersection of the Lebanon State Forest boundary at Mt. Misery.
 - iv. Tributaries to Pole Bridge Branch upstream of the Penn Central Railroad.
6. The Central Pine Barrens boundary underlies the surface water drainages in the following State and National Parks, Forests, and Fish and Wildlife lands.
 - i. Greenwood Branch and tributaries within the boundaries of Greenwood Rancocas Reserve and Lebanon State Forest.
 - ii. Tributaries to Country Lake, Mirror Lake and Hanover Lake within the boundaries of the Whitesbog Fish and Wildlife Management Area and Lebanon State Forest.

- iii. All waters within the Wharton Tract State Forest.
- iv. All waters within the following portions of the Bass River State Forest.
 - (1) That portion located on the New Gretna and Oswego Lake USGS Quadrangle Maps which is uninterrupted by private lands and contiguous to the Ives Branch and Bartletts Branch watersheds lying both north and south of Stage Road.
 - (2) That portion located on the New Gretna USGS Quadrangle Map which is uninterrupted by private lands and contiguous to and lying to the south of Stage Road.
 - (3) That portion located on the New Gretna and Oswego Lake USGS Quadrangle Maps which is uninterrupted by private lands and contiguous to and lying to the southeast of the Garden State Parkway.

7:9-6.8 Effluent Standards And Discharger Requirements

- (a) Any discharger of a pollutant onto the land or into the ground water, either directly or indirectly, shall obtain a permit pursuant to N.J.S.A. 58:10A-1 et seq.
- (b) The review of any discharge into the ground water or onto the land will consider all of the scientific and technical criteria and parameters as set forth in the most recent edition of the appropriate guidelines for that discharge as developed and published by the department.
- (c) Where total dissolved solids are in excess of 10,000 mg/l discharger requirements and effluent limitations will be established on a case by case basis.
- (d) In developing effluent guidelines and limitations, special attention shall be given to protecting aquifer recharge areas.

7:9-6.9 Procedures for Modifying Ground-Water Quality Based Effluent Limitations

- (a) The criteria for modifying ground-water quality based effluent limitations where existing ground-water quality is currently better than applicable ground-water quality criteria are as follows:

1. Whenever the department determines that existing ground-water quality in an area is consistently better in quality than established ground-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, the applicant may request a modification of such effluent limitations. Such a request shall be made, in writing, within 30 days of notice of intent to issue the Discharge Allocation Certificate. If the department does not receive such a request for modification, the draft 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 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 draft effluent limitations and the benefits to be obtained in maintaining existing ground 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) A detailed scientific assessment shows that the alternative effluent limitations will not interfere with or be injurious to designated ground 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) A detailed scientific assessment shows that the alternative effluent limitations will not interfere with or be injurious to designated ground water uses.
 2. In no case shall degradation be allowed in ground waters which constitute an outstanding national resource such as waters underlying National and State parks and wildlife refuges and ground waters of exceptional ecological significance.
 3. A ground-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 or designated uses.
- (b) Criteria for modifying ground-water quality based effluent limitations where existing ground-water quality is equal to or worse than applicable ground-water quality criteria are as follows:
1. Whenever the department determines that ground-water quality is consistently worse than or equal to applicable ground-water quality criteria, the department may establish effluent limitations which can reasonably be expected to attain and maintain water quality standards. However, the applicant may request a modification of such effluent limitations. Such a request shall be made, in writing, within 30 days of notice of intent to issue the Discharge Allocation Certificate. If the department does not receive such a request for modification, the draft effluent limitations shall become final. In no case shall the department establish a ground-water quality based effluent limitation less stringent than that necessary to attain or maintain water quality criteria unless the applicant for any such effluent limitation modification demonstrates to the department, after 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 criteria. 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 to protect existing ground-water uses.
3. A ground 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 variance will not be renewed unless the criteria of this subsection are fully met.

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