Ohio River Valley Water Sanitation Commission

POLLUTION CONTROL STANDARDS
for discharges to the Ohio River

Proposed 2006 Revision

Proposed additions are indicated in **bold**
Proposed deletions are indicated by ~~strikeout~~

I. AUTHORITY AND PURPOSE

The Ohio River Valley Water Sanitation Compact (the Compact) was signed in 1948 by the Governors of the States of Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, and West Virginia, following the consent of the United States Congress and enactment of the Compact into law by the legislatures of the eight states. The Compact created the Ohio River Valley Water Sanitation Commission (the Commission) as a body corporate with powers and duties set forth in it for the purpose of abating water pollution within the Compact District. Article I of the Compact mandates that all waters in the District be placed and maintained in a satisfactory, sanitary condition, available for certain beneficial uses. It is the mission of the Commission to insure protection of these uses and to preserve the waters for other legitimate purposes.

The Compact grants the Commission authority to carry out its mission. Article VI states that "the guiding principle of this Compact shall be that pollution by sewage or industrial wastes originating within a signatory State shall not injuriously affect the various uses of the interstate waters." Minimum requirements for the treatment of sewage and industrial waste then are established in Article VI, as well as the authority of the Commission to require higher degrees of treatment where they are determined to be necessary after investigation, due notice, and hearing. Article VI concludes by authorizing the Commission to "adopt, prescribe, and promulgate rules, regulations and standards for administering and enforcing the provisions of this article."

Article IX of the Compact grants the Commission authority to issue orders, after investigation and hearing, for the purpose of achieving compliance with its standards. Any court of general jurisdiction or any United States District Court in the signatory states may be used by the Commission in order to enforce such orders.

It is the policy of the Commission to rely on the member states for the primary enforcement of its standards. Each of the member states is authorized to do so under the legislation that enabled its membership in the Compact. Each of the member states is authorized to administer the federal/state National Pollutant Discharge Elimination System (NPDES) as established in Section 402 of the Federal Clean Water Act. Sections 301(b)(1)(C) and 510 of the Federal Act require that permits issued under that system incorporate applicable standards promulgated by an interstate agency wherever they are more stringent than comparable state or federal standards. The NPDES permits are therefore the primary means by which the Commission's Standards are implemented and enforced.

These standards set forth the uses to be protected in the Ohio River (Section III), as established in the Compact; establish water quality criteria to assure that those uses will be achieved (Section IV), and set waste water discharge requirements (Section V) needed to attain the water quality criteria. The standards also recognize the rights of individual states to adopt and apply more stringent regulations.

Specific waste water discharge requirements are established in these regulations and must be incorporated into discharge permits issued under the authority of the NPDES or state discharge permitting programs when they are more stringent than:

1) applicable U.S. EPA technology-based effluent guidelines required under Sections 301, 304, 306, and 307 of the Federal Clean Water Act, or

2) any state treatment requirements, effluent standards, or water quality-based effluent limits.

In the absence of promulgated Federal effluent guidelines pursuant to Sections 301, 304, 306, and 307 of the Clean Water Act, the Compact signatory states have the responsibility to establish effluent limitations to be included in any discharge permit, consistent with the standards contained herein using Best Professional Judgment on a case-by-case basis.

II. DEFINITIONS

A "Acute criteria" means the highest concentrations of toxic substances to which organisms can be exposed for a brief period of time **(**as measured by approved short-term exposure tests) without causing mortality or other unacceptable effects.

B. "Biological integrity" means the ability of an aquatic ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to those best attainable given eco-regional attributes and the modified habitat types of the river.

C. “Chronic Criteria” means the highest concentrations of toxic substances to which organisms can be exposed indefinitely without causing long-term harmful effects on growth and/or reproduction or other unacceptable effects (as measured by approved long-term exposure tests).

D. “Combined Sewer Overflow” means a discharge from a sewer system designed to convey sanitary waste waters and storm water through a single-pipe system to a treatment facility, at a point in the system prior to the treatment facility.

E. “Compact,” as used in these regulations, means the Ohio River Valley Water Sanitation Compact and is an agreement entered into by and between the states of Indiana, West Virginia, Ohio, New York, Illinois, Kentucky, Pennsylvania, and Virginia, which pledges each to the other of the signatory states faithful cooperation in the control of existing and future pollution of the waters in the Ohio River Basin. This Compact created the Ohio River Valley Water Sanitation Commission.

F. “Cooling Water” means water used as a heat transfer medium for once-through cooling or cooling tower blow down to which no industrial wastes, toxic wastes, residues from potable water treatment plants, untreated sewage, or other wastes, exclusive of antifouling agents approved by the appropriate regulatory agencies, are added prior to discharge.

G. “Contact Recreation” means recreational activities where the human body may come in direct contact with water of the Ohio River.

H. “Dry Weather Flow Conditions” means flow conditions within a combined sewer system resulting from one or more of the following: flows of domestic sewage, ground water infiltration, commercial and industrial wastewaters, and any non-precipitation event related flows. Other non-precipitation event related flows that are included in dry weather flow conditions will be decided by the permitting agency based on site specific conditions.

~~H.~~**I.** “Early Life Stages” of fish means the pre-hatch embryonic period, the post-hatch free embryo or yolk-sac fry, and the larval period, during which the organism feeds. Juvenile fish, which are anatomically rather similar to adults, are not considered an early life stage.

~~I.~~**J** “Industrial Wastes” means any liquid, gaseous, solid materials or waste substances or combination thereof other than cooling water as herein defined, resulting from any process or operation including storage and transportation, manufacturing, commercial, agricultural, and government operations.

~~J.~~**K** “Mixing Zone” means that portion of the water body receiving a discharge where effluent and receiving waters are not totally mixed and uniform with the result that the zone is not representative of the receiving waters and may not meet all ambient water quality standards or other requirements of any signatory state applicable to the particular receiving waters. **Water quality criteria must be met at the edge of the mixing zone.**

~~K.~~**L**"Net Discharge" is determined by excluding the amount of a pollutant in the intake water when determining the quality of a discharge if both the intake and discharge are from and to the same body of water.

~~L~~**M** "96 hour LC_{50}" as used in these regulations, means the concentration of a substance that kills 50 percent of the test organisms within 96 hours. The test organisms shall be representative important species indigenous to the Ohio River or standard test organisms.

~~M.~~**N** The "Ohio River," as used in these regulations, extends from the point of confluence of the Allegheny and Monongahela rivers at Pittsburgh, Pennsylvania, designated as Ohio River mile point 0.0 to Cairo Point, Illinois, located at the confluence of the Ohio and Mississippi Rivers, 981.0 miles downstream from Pittsburgh.

~~N.~~**O** "Ohio River Valley Water Sanitation Commission" (the Commission) means a body corporate created by authority of the Compact and is the operating agency established to implement the Compact. It consists of three representatives of each signatory state and three representatives of the federal government.

~~O.~~**P** "Other Wastes" means any waste other than sewage, cooling water, residues from potable water treatment plants, industrial wastes or toxic wastes which, if discharged to the Ohio River, could cause or contribute to any violations of these regulations, or of any water quality standards of any signatory state, or which may be deleterious to the designated uses. Other wastes include, but are not limited to: garbage, refuse, decayed wood, sawdust, shavings, bark and other wood debris and residues resulting from secondary processing, sand, lime cinders, ashes, offal, night soil, silt, oil, tar, dyestuffs, acids, chemicals, heat or other materials and substances not sewage or industrial wastes which may cause or might reasonably be expected to cause or contribute to the pollution of the Ohio River.

~~P.~~**Q** "Persistent Substances" means those substances that have a half-life for degradation under natural environmental conditions of more than four days. All other substances are non-persistent.

~~Q.~~**R** "Pollution" means the human-made or human-induced alteration of the chemical, physical, biological and radiological integrity of the waters of the Ohio River.

~~R.~~**S** "Representative Aquatic Species" means those species of aquatic life whose protection and propagation will assure the sustained presence of a balanced indigenous community. Such species are representative in the sense that maintenance of suitable water quality conditions will assure the overall protection and sustain propagation of the balanced, indigenous community.

~~S.~~**T** "Residues from Potable Water Treatment Plants" means those wastes emanating from processes used in water purification. Such processes may include sedimentation, chemical coagulation, filtration, iron and manganese removal, softening and disinfection.

~~T~~.**U** “Sewage” means water-carried human or animal wastes from such sources as residences; industrial, commercial, or government establishments; public or private institutions; or other places. For the purposes of these standards, the admixture of sewage with industrial wastes, toxic wastes, or other wastes, shall be subject to treatment requirements for those types of wastes, but shall also be regarded as sewage.

~~U~~.**V**“Substantially Complete Removal” means removal to the lowest practicable level attainable with current technology.

~~V~~.**W** “Toxic Wastes” means wastes containing substances or combinations of substances in concentrations which might reasonably be expected to cause death, disease, behavioral abnormalities, genetic mutations, physiological malfunctions, including those in reproduction, or physical deformations in fish, other aquatic life, wildlife, livestock, or humans.

~~W~~.**X** “Waste water” means sewage and/or industrial wastes as herein defined.

III. DESIGNATED USES

The Ohio River, as hereinbefore defined, has been designated by the Compact as available for safe and satisfactory use as public and industrial water supplies after reasonable treatment, suitable for recreational usage, capable of maintaining fish and other aquatic life, and adaptable to such other uses as may be legitimate. It is the purpose of these Pollution Control Standards to safeguard the waters of the Ohio River for these designated uses. No degradation of the water quality of the Ohio River that would interfere with or become injurious to these uses shall be permitted.

IV. WATER QUALITY CRITERIA

A. General

The minimum conditions which the waste water discharge requirements (Section V) are intended to achieve in the receiving waters outside the mixing zone are as follows:

1. Freedom from anything that will settle to form objectionable sludge deposits which interfere with designated water uses.

2. Freedom from floating debris, scum, oil and other floating material in amounts sufficient to be unsightly or deleterious.

3. Freedom from materials producing color or odors to such a degree as to create unaesthetic conditions or a nuisance.

4. Freedom from substances in concentrations which are toxic or harmful to humans, animals, or fish and other aquatic life; which would in any manner adversely affect the flavor, color, odor, or edibility of fish and other aquatic life, wildlife, or livestock; or which are otherwise detrimental to the designated uses specified in Section III.

B. Aquatic Life Protection

~~To provide protection of warm water aquatic life habitats,~~ **To protect aquatic life,** the following criteria shall be met outside the mixing zone:

1. BIOLOGICAL: The biological integrity of the Ohio River shall be **safeguarded,** protected and preserved.

2. DISSOLVED OXYGEN: The average concentration shall be at least 5.0 mg/L for each calendar day; the minimum concentration shall not be less than 4.0 mg/L. During the April 15-June 15 spawning season, a minimum concentration of 5.0 mg/L shall be maintained at all times.

3. TEMPERATURE: Allowable stream temperatures are:

Month/Date	Period Average		Instantaneous Maximum	
January 1-31	45°F	7.2°C	50°F	10.0°C
February 1-29	45	7.2	50	10.0
March 1-15	51	10.6	56	13.3
March 16-31	54	12.2	59	15.0
April 1-15	58	14.4	64	17.8
April 16-30	64	17.8	69	20.6
May 1-15	68	20.0	73	22.8
May 16-31	75	23.9	80	26.7
June 1-15	80	26.7	85	29.4
June 16-30	83	28.3	87	30.6
July 1-31	84	28.9	89	31.7
August 1-31	84	28.9	89	31.7
September 1-15	84	28.9	87	30.6
September 16-30	82	27.8	86	30.0
October 1-15	77	25.0	82	27.8
October 16-31	72	22.2	77	25.0
November 1-30	67	19.4	72	22.2
December 1-31	52	11.1	57	13.9

4. pH: No value below 6.0 standard units nor above 9.0 standard units.

5. AMMONIA

a. Acute Criterion Concentration: The one-hour average concentration of total ammonia-nitrogen (mg/L) shall not exceed, more than once every three years on the average, the ACC (acute criterion) calculated using the following equation:

$$ACC = \frac{0.411}{1 + 10^{(7.204-pH)}} + \frac{58.4}{1 + 10^{(pH-7.204)}}$$

b. Chronic Criterion Concentration: The 30-day average concentration of total ammonia-nitrogen (in mg/L) shall not exceed, more than once every three years, the CCC (chronic criterion) calculated using the following equations:

i. When fish early life stages are present (from March 1 to October 31):

$$CCC = \left(\frac{0.0577}{1 + 10^{(7.688-pH)}} + \frac{2.487}{1 + 10^{(pH-7.688)}}\right) * MIN[2.85 \textbf{ OR } (1.45*10^{[.028*(25-T)]})]$$

Where:

T = Temperature, °C

Note: For the above equation, multiply the parenthetical equation by 2.85 when temperature is less than or equal to 14.51ºC. When temperature is greater than 14.51ºC, multiply the parenthetical equation by $(1.45 * 10^{(0.028*(25-T)})$.

ii. When fish early life stages are absent (from November 1 to the last day of February

$$CCC = \left(\frac{0.0577}{1 + 10^{(7.688-pH)}} + \frac{2.487}{1 + 10^{(pH-7.688)}}\right) * (1.45 * 10^{0.028* (25- (MAX [T \textbf{ OR } 7]))})$$

Where:
T = Temperature, °C

Note: For the above equation, the last term should be $10^{(0.028\ (25-T))}$ for all temperatures greater than 7ºC. When temperatures are 7ºC or less, the last term in the equation should be $10^{(0.028\ (25-7))}$ or $10^{(0.504)}$

iii. In addition, the highest four-day average within the 30-day period should not exceed 2.5 times the chronic criterion.

Acute and chronic criteria concentrations for total ammonia-nitrogen (in mg/L) or different combinations of pH and temperature are shown in Appendix A.

6. CHEMICAL CONSTITUENTS:

a. Not to exceed the following concentrations:

Constituent	Chronic Criterion Concentration (µg/L)	Acute Criterion Concentration (µg/L)
Arsenic (dissolved)	150	340
Chromium (VI)(dissolved)	11	16
Cyanide (free)	5.2	22
Mercury (dissolved)	0.77	1.4
Selenium (total)	5	20

b. For constituents with criteria dependent upon water hardness, dissolved metals acute aquatic life criteria shall be calculated as the total recoverable acute criteria multiplied by the conversion factor according to the table below.

Constituent	Total Recoverable Acute Criterion (µg/L)	Dissolved Criterion Conversion Factor
Cadmium	$e^{(1.128(\ln Hard)-3.6867)}$	1.136672-[ln(Hard)*0.041838]
Chromium (III)	$e^{(0.819(\ln Hard+3.7256)}$	0.316
Copper	$e^{(0.9422(\ln Hard)-1.700}$	0.960
Lead	$e^{(1.273(\ln Hard)-1.460)}$	1.46203-[ln(Hard)*0.145712]
Nickel	$e^{(0.846(\ln Hard)+2.255)}$	0.998
Silver	$e^{(1.72(\ln Hard)-6.52)}$	0.850
Zinc	$e^{(0.8473(\ln Hard)+0.884)}$	0.978

c. For constituents with criteria dependent upon water hardness, dissolved metals chronic aquatic life criteria shall be calculated as the total recoverable chronic criterion multiplied by the conversion factor according to the following table.

Constituent	Total Recoverable Chronic Criterion (µg/L)	Dissolved Criterion Conversion Factor
Cadmium	$e^{(0.7852(\ln Hard)-2.715)}$	1.101672-[ln(Hard)*0.041838]
Chromium (trivalent)	$e^{(0.819(\ln Hard)+0.6848)}$	0.860
Copper	$e^{(0.8545(\ln Hard)-1.702)}$	0.960
Lead	$e^{(1.273(\ln Hard)-4.705)}$	1.46203-[ln(Hard)*0.145712]
Nickel	$e^{(0.846(\ln Hard)+0.0584)}$	0.997
Zinc	$e^{(0.8473(\ln Hard)+0.884)}$	0.986

d. Concentrations for metals are dissolved (except selenium, which is total recoverable), unless it can be demonstrated to the satisfaction of the Commission and its member states, that a more appropriate analytical technique is available which provides a measurement of that portion of the metal present which causes toxicity to aquatic life.

e. Waste water discharge requirements for these constituents shall be expressed as total recoverable limits, and shall be based on the dissolved aquatic life criteria, the appropriate translators (as listed in Appendix B), the in-stream concentration upstream of the point of discharge, and the minimum ~~7-day, 10-year stream~~ **appropriate design** flow as contained in Appendix C. **The appropriate design flow shall be the seven day, ten year low flow for chronic criteria, and the one day, ten year low flow for acute criteria.** Translators, other than those listed in Appendix B, may be used after a successful demonstration to the Commission and its member states. Criteria for cadmium, trivalent chromium, copper, lead, nickel, silver and zinc at specified hardness values are listed in Appendix C.

7. OTHER TOXIC SUBSTANCES:

Water quality criteria for substances not otherwise specified in this section shall be derived based on the following:

a. For the Protection of Aquatic Life, methodologies set forth in U.S. EPA's final Water Quality Guidance for the Great Lakes System, adopted in the Federal Register, March 23, 1995, shall be used (see Appendix D).

b. Limiting concentrations other than those derived from the above may be used for the protection of aquatic life when justified on the basis of scientifically defensible evidence.

C. Human Health Protection

~~To provide protection to human health,~~ **To protect human health,** the following criteria shall be met outside the mixing zone:

1. BACTERIA:

a. ~~Maximum allowable level of fecal coliform bacteria for use as a source~~ **Protection** of public water supply **use** -- f~~or the months of November through April~~, **Public water supply use shall be protected at all times. Fecal coliform bacteria** content shall not exceed 2,000/100 mL as a monthly geometric mean based on not less than five samples per month.

~~b. Maximum allowable level of fecal coliform bacteria for contact recreation -- for the months of May through October, content shall not exceed~~

~~200/100 mL as a monthly geometric mean based on not less than five samples per month; nor exceed 400/100 mL in more than 10 percent of all samples taken during the month.~~

b. Protection of contact recreation use – during the months of May through October, contact recreation use shall be protected whenever the river velocity is 2 miles per hour or less.

i. Fecal coliform bacteria content shall not exceed 200/100 mL as a monthly geometric mean based on not less than 5 samples per month; nor exceed 500/100 mL in more than 10 percent of all samples taken during the month,

or

ii. *Escherichia coli* bacteria content shall not exceed 130/100 mL as a monthly geometric mean, based on not less than five samples per month, nor exceed 400/100 mL in more than 10 percent of the samples taken during the month.

~~c. Maximum allowable level of *Escherichia coli* bacteria for contact recreation -- for the months of May through October, measurements of *Escherichia coli* bacteria may be substituted for fecal coliform. Content shall not exceed 130/100 mL as a monthly geometric mean, based on not less than five samples per month, nor exceed 240/100 mL in any sample.~~

2. CHEMICAL CONSTITUENTS:

Not to exceed the following concentrations:

Constituent	Concentration mg/L
Arsenic	0.010
Barium	1.0
Chloride	250
Fluoride	1.0
Mercury	0.000012
Nitrite + Nitrate Nitrogen	10.0
Nitrite Nitrogen	1.0
Phenolics	0.005
Silver	0.05
Sulfate	250

3. RADIONUCLIDES: Gross total alpha activity (including radium-226, but excluding radon and uranium) shall not exceed 15 picocuries per liter (pCi/L) and combined radium-226 and radium-228 shall not exceed 4 pCi/L. Concentration of total gross beta particle activity shall not exceed 50 pCi/L; the concentration of total strontium-90 shall not exceed 8 pCi/L.

4. OTHER TOXIC SUBSTANCES: Water quality criteria for substances not otherwise specified in this section shall be derived based on the following:

a. For the protection of human health, criteria ~~published by the United States Environmental Protection Agency pursuant to Section 304(a) of the Federal Clean Water Act shall be used. Those criteria~~ are listed in Appendix E to these regulations.

i. For substances identified as human carcinogens, waste water discharge requirements shall be developed based on the in-stream concentration above the point of discharge, and calculated so as to prevent one additional cancer per one million population at the harmonic mean stream flow (see Appendix C).

ii. For substances not identified as human carcinogens, waste water discharge requirements shall be developed based on the in-stream concentration above the point of discharge and calculated to meet the water quality criteria at the minimum 7-day, 10-year flow (see Appendix C).

b. Limiting concentrations other than those derived from the above may be used for the protection of human health when justified on the basis of scientifically defensible evidence.

D. Site-Specific Criteria

Alternative site-specific criteria for the constituents listed herein may be approved if they are demonstrated to be appropriate to the satisfaction of the Commission. Such demonstrations shall utilize methods contained in the Water Quality Standards Handbook (US EPA publication EPA823-B94005A, August 1994).

V. WASTE WATER DISCHARGE REQUIREMENTS

A. General

1. No discharge of sewage, industrial wastes, toxic wastes, other wastes, cooling water or residues from potable water treatment plants shall cause or contribute to a violation of these waste water discharge requirements, shall preclude the attainment of any designated use of the main stem waters of the Ohio River, or ~~shall interfere with the attainment~~ **cause or contribute to a violation** of the water quality criteria set forth in Section IV.

2. All discharges of sewage, industrial wastes, toxic wastes, other wastes, cooling water

or residues from potable water treatment plants shall be treated or otherwise modified so as to provide:

a. Substantially complete removal of settleable solids, which may form sludge deposits;

b. Substantially complete removal of oil, debris, scum and other floating material;

c. Reduction of total suspended solids and other materials to such a degree that the discharge will not produce a substantial negative visible contrast to natural conditions in turbidity, color or odor of the river, or impart taste to potable water supplies, or cause tainting of fish flesh;

d. Reduction of all substances in amounts which, when concentrated or combined in the receiving stream, would result in conditions toxic or harmful to humans, animals, or fish and other aquatic life; which would in any manner adversely affect the flavor, color, odor, or edibility of fish and other aquatic life, wildlife, or livestock; or which are otherwise detrimental to the designated water uses specified in Section III.

3. Each holder of an individual NPDES permit shall post **and maintain** a permanent marker at the establishment under permit as follows:

a. A marker shall be posted on the stream bank at each outfall discharging directly to the Ohio River.

b. The marker shall consist, at a minimum, of the name of the establishment to which the permit was issued, the permit number, and the outfall number. The information shall be printed in letters not less than two inches in height.

c. The marker shall be a minimum of 2 feet by 2 feet and shall be a minimum of 3 feet above ground level.

B. Sewage

1. MINIMUM LEVEL OF TREATMENT:

Sewage shall be treated prior to discharge, to meet the following effluent limitations in addition to the requirements of Section V.A.

a. Biochemical Oxygen Demand

i. Five-day biochemical oxygen demand (BOD_5) - the arithmetic mean of the values for effluent samples collected in a month shall not exceed 30

mg/L, and the arithmetic mean of the values for effluent samples collected in a week shall not exceed 45 mg/L. **The monthly average percent removal shall not be less than 85 percent.**

ii. Five-day carbonaceous biochemical oxygen demand ($CBOD_5$) may be substituted for BOD_5, provided that the arithmetic mean of the values for effluent samples collected in a month shall not exceed 25 mg/L, and the arithmetic mean of the values of effluent samples collected in a week shall not exceed 40 mg/L.

b. Suspended Solids

The arithmetic mean of the values for effluent samples collected in a month shall not exceed 30 mg/L, and the arithmetic mean of the values for effluent samples collected in a week shall not exceed 45 mg/L. **The monthly average percent removal shall not be less than 85 percent.**

c. pH

The effluent values for pH shall be maintained within the limits of 6.0 to 9.0 standard units.

d. Bacteria

i. ~~During the months of November through April~~, **T**he geometric mean of the fecal coliform bacteria content of effluent samples collected in a month shall not exceed 2,000/100 mL.

ii. During the months of May through October, the geometric mean of the fecal coliform bacteria content of effluent samples collected in a month shall not exceed 200/100 mL, and no more than 10 percent of the values shall exceed ~~400~~**500**/100 mL.

iii. During the months of May through October, *Escherichia coli* may be substituted for fecal coliform provided the geometric mean of the values for effluent samples collected in a month shall not exceed 130/100 mL, and no more than 10 percent of the values shall exceed ~~240~~**400**/100 mL.

2. ALTERNATIVE TREATMENT:

Such facilities as waste stabilization ponds and trickling filters shall be deemed to provide effective treatment of sewage, provided that the requirements of Sections V.A., V.B.1.(c) and (d) are met, that the effluent does not cause any violations of applicable states' water quality standards or Sections III and IV of these regulations, and that the following requirements are met:

a. Biochemical Oxygen Demand

i. Five-day biochemical oxygen demand (BOD_5) -- the arithmetic mean of the values for effluent samples collected in a month shall not exceed 45 mg/L; and the arithmetic mean of the values for effluent samples collected in a week shall not exceed 65 mg/L. **The monthly average percent removal shall not be less than 65 percent.**

ii. Five-day carbonaceous biochemical oxygen demand ($CBOD_5$) may be substituted for BOD_5, provided that the levels are not less stringent than the following: the arithmetic mean of the values for effluent samples collected in a month shall not exceed 40 mg/L and; the arithmetic mean of the values for effluent samples collected in a week shall not exceed 60 mg/L.

b. Suspended Solids

The arithmetic mean of the values for effluent samples collected in a month shall not exceed 45 mg/L; and the arithmetic mean of the values for effluent samples collected in a week shall not exceed 65 mg/L. **The monthly average percent removal shall not be less than 65 percent.**

3. COMBINED SEWER SYSTEMS

a. Prohibition of Dry Weather Discharges

No combined sewer overflow to the Ohio River shall occur ~~unless there has been rainfall in greater than trace amounts or significant melting of frozen precipitation during the immediately preceding 24 hours, or unless the discharge is caused by river elevation at or above the established flood stage~~ **under dry weather flow conditions unless the discharge is caused by elevated river stage. All discharges from combined sewers must be in compliance with the NPDES permit and the National Combined Sewer Overflow Control Policy.**

b. System Overflows During Wet Weather

A direct discharge, if caused by temporary excess flows due to storm water collected and conveyed through combined sewer systems, shall not be considered in violation of these waste water discharge requirements, providing that the discharger is demonstrating compliance with the nine minimum controls as specified in the ~~US EPA's~~ national Combined Sewer Overflow Control Policy ~~(EPA 830-B-94-001, April 1994).~~ The nine minimum controls are as follows:

1. Proper operation and regular maintenance programs for the sewer system and the CSOs;
2. Maximum use of the collection system for storage;
3. Review and modification of pre-treatment requirements to assure CSO impacts are minimized;
4. Maximization of flow to the POTW for treatment;
5. Prohibition of CSOs during dry weather;
6. Control of solid and floatable materials in CSOs;
7. Pollution prevention;
8. Public notification to ensure that the public receives adequate notice of CSO occurrences and CSO impacts;
9. Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

In addition, the system must be operated in accordance with an approved Long Term Control Plan, where required, and the discharge must not interfere with the attainment of the water quality criteria set forth in Section IV **except as follows for combined sewer systems with an approved, fully implemented, long term control plan and approved Use Attainability Analysis (UAA):**

The approved Long Term Control Plan and UAA will identify the conditions, at or above which, the contact recreation use and associated bacteria criteria cannot be achieved, and will identify alternative bacteria criteria that can be achieved. The alternative bacteria criteria may apply for a period not to exceed two days following the condition.

c. Treatment of Flows from Combined Sewer Systems during Wet Weather Conditions

In cases where municipal wastewater treatment plants serving combined sewer areas have primary treatment capacity in excess of secondary treatment capacity, opportunities may exist for partial treatment of combined flows which would otherwise be discharged as untreated combined sewer overflows. In such cases, in order to maximize the treatment of wet weather flows from combined sewer systems and reduce the frequency and duration of combined sewer overflow (CSO) events, bypass of the secondary treatment during wet weather conditions may be allowed on an interim basis, provided the following conditions are met:

1. the facilities are properly operated and maintained,
2. the maximum possible quantity of waste water (determined through an approved engineering study) receives secondary treatment in accordance with discharge requirements, and
3. the discharge does not cause exceedances of water quality

criteria in the Ohio River outside the mixing zone.

Bypasses of secondary treatment which are necessary in order to implement a CSO long-term control plan which includes primary treatment options at the municipal wastewater treatment plant may be allowed, provided it is not technically or financially feasible to provide secondary treatment of greater amounts of wet weather flow. The consideration of feasible alternatives should be documented in the development of the long-term control plan.

C. Industrial Wastes, Including Toxic Wastes

1. The minimum level of treatment for industrial wastes including toxic wastes, prior to discharge shall be in accordance with national effluent limitations and guidelines adopted by the Administrator of the United States Environmental Protection Agency pursuant to Sections 301 and 302 of the Federal Clean Water Act, national standards of performance for new sources adopted pursuant to Section 306 of the Federal Clean Water Act, and national toxic and pretreatment effluent limitations, adopted pursuant to Section 307 of the Federal Clean Water Act or in accordance with the standards of the state in which the discharge occurs.

2. Effluent limitations for discharges of industrial wastes including toxic wastes may be based on the net discharge of pollutants **provided that the following conditions are met:**

- **Any determination for net discharge of pollutants must be made on a pollutant-by-pollutant, outfall-by-outfall, basis.**
- **A net discharge of pollutants would only be allowed in the absence of a TMDL applicable to the discharge.**
- **The facility withdraws 100 percent of the intake water containing the pollutant from the same body of water into which the discharge is made.**
- **The facility does not contribute any additional mass of the identified intake pollutant to its wastewater.**
- **The facility does not alter the identified intake pollutant chemically or physically in a manner that would cause adverse water quality impacts to occur that would not occur if the pollutants were left in-stream.**
- **The facility does not increase the identified intake pollutant concentration, as defined by the permitting authority, at the edge of the mixing zone, or at the point of discharge if a mixing zone is not allowed, as compared to the pollutant concentration in the intake water, unless the increased concentration does not cause or contribute to an excursion above an applicable water quality standard.**
- **The timing and location of the discharge would not cause adverse water quality impacts to occur that would not occur if the identified intake pollutant were left in-stream.**

D. Residues from Potable Water Treatment Plants

The use of controlled discharge for residues from potable water treatment plant processes of sedimentation, coagulation and filtration may be authorized provided that, as a minimum, the discharge meets all the requirements of Section IV.A. and V.A.

E. Cooling Water

1. A discharge of cooling water shall meet the requirements of Section V.A. and shall not cause violations of the temperature criteria set forth in Section IV.B.3., except as authorized by a variance issued pursuant to Section 316(a) of the Federal Clean Water Act.
2. Any cooling water additives that will ultimately be discharged to the environment must be approved by the appropriate state agency.

F. Other Wastes

The discharge of Other Wastes (other than those specified above) shall meet the requirements of Section V.A. and shall not cause or contribute to a violation of the water quality criteria set forth in Section IV.

VI. MIXING ZONE DESIGNATION

A. Where mixing zones are allowed by the permitting authority, the specific numerical limits for any mixing zone shall be determined on a case-by-case basis, and shall include considerations for existing uses, linear distance (i.e., length and width) from the point of discharge, surface area involved, and volume of receiving water within the defined zone.

B. Conditions within the mixing zone shall not be injurious to human health, in the event of a temporary exposure.

C. Acute water quality criteria, as specified in Section IV.B.6, will apply at all points within the mixing zone; however, states may at their discretion allow a smaller zone in the immediate vicinity of the point of discharge in which acute criteria are exceeded, provided the zone does not impact the water of another state, **but the acute criteria must be met at the edge of the acute mixing zone or zone of initial dilution. Acute mixing zones shall be calculated in accordance with one of the approaches presented in appendix F, or by such other method as may be demonstrated to be appropriate to the Commission.**

D. The mixing zone shall be free from substances attributable to sewage, industrial wastes, toxic wastes, other wastes, cooling water, or residues from potable water treatment plants in quantities which:

1. Settle to form sludge deposits;
2. Float as debris, scum, or oil;
3. Contaminate natural sediments so as to cause or contribute to a violation of:
    a. appropriate stream criteria outside the mixing zone, or
    b. any condition of the designated uses of the water.
4. Impart a disagreeable flavor or odor to flesh of fish or other aquatic life, wildlife or livestock which are consumed by humans and which acquire such a flavor because of passage through or ingestion of the waters from the mixing zone.

E. The mixing zone shall be located so as not to interfere significantly with migratory movements and passage of fish, other aquatic life, and wildlife. No mixing zone shall adversely impact water quality so as to interfere with potable or industrial water supplies, bathing areas**,** reproduction of fish, other aquatic life and wildlife.

F. In no case shall a permitting authority grant a mixing zone that would likely jeopardize the continued existence of any endangered or threatened species listed under Section 4 of the Federal Endangered Species Act or result in the destruction or adverse modification of such species' critical habitat.

G. Mixing zones shall be prohibited for Bioaccumulative Chemicals of Concern (BCCs) as ~~defined below~~ **set forth in this paragraph**. ~~Existing~~ **D**ischarges ~~with mixing zones for~~ BCCs **in existence on or before October 16, 2003 may** ~~will~~ be allowed until ~~ten years from the date of these Pollution Control Standards (October 16, 2003)~~. **October 16, 2013 to eliminate mixing zones for these chemicals; however, no increase in such discharges will be allowed.** ~~New~~ **D**ischarges of BCCs **that come into existence after October 16, 2003** are subject to this prohibition immediately.

Bioaccumulative Chemicals of Concern (BCCs)

BCCs are defined as any chemicals that accumulate in aquatic organisms by a human health bioaccumulation factor (BAF) greater than 1000 (after considering various specified factors), and have the potential upon entering surface waters to cause adverse effects, either by themselves or in the form of their toxic transformation, as a result of that accumulation. Currently, the list of BCCs (as described in the Final Rule to Amend the Final Water Quality Guidance for the Great Lakes System to Prohibit Mixing Zones for Bioaccumulative Chemicals of Concern, includes:

Lindane	Mirex
Hexachlorocyclohexane	Hexachlorobenzene
alpha-Hexachlorocyclohexane	Chlordane

beta-Hexachlorocyclohexane	DDD
delta-Hexachlorocyclohexane	DDT
Hexachlorobutadiene	DDE
Photomirex	Octachlorostyrene
1,2,4,5-Tetrachlorobenzene	PCBs
Toxaphene	2,3,7,8-TCDD
Pentachlorobenzene	Mercury
1,2,3,4-Tetrachlorobenzene	Dieldrin

H. If mixing zones from two or more proximate sources interact or overlap, the combined effect must be evaluated to ensure that applicable values will be met in the area where any applicable mixing zones overlap.

~~I. Mixing zones shall be calculated in accordance with one of the approaches presented in Appendix F, or by such other method as may be demonstrated to be appropriate to the Commission and its member states.~~

VII. LIMITATION

Nothing contained in these regulations shall be construed to limit the powers of any state signatory to the Compact to promulgate more stringent criteria, conditions and restrictions to further lessen or prevent the pollution of waters within its jurisdiction.

VIII. VARIANCE

A. The Commission may grant a variance from the provisions of Section V of these standards, provided that the uses set forth in Section III are maintained and that the water quality criteria set forth in Section IV are met. The applicant for a variance shall adhere to the following:

1. The specific reasons for the variance shall be clearly stated in writing;

2. The burden of proof is upon the applicant to assure that the uses set forth in Section III are maintained;

3. Prior concurrence of the state where the applicant's discharge is located and those state(s) that may be affected must be obtained;

4. Such additional information shall be provided to the Commission upon request.

B. A variance may be granted for a period not to exceed the life of the applicable discharge permit; the applicant may apply for a variance renewal prior to the expiration of the permit.

IX. ANALYTICAL METHODS

Tests or analytical determinations establish compliance or non-compliance with the Waste Water Discharge Requirements and stream criteria established herein shall be made in accordance with accepted procedures such as those contained in the: (a) latest edition of Standard Methods for the Examination of Water and Waste Water prepared and published jointly by the American Public Health Association (APHA), American Water Works Association (AWWA), and Water Environment Federation (WEF); (b) Annual Book of ASTM Standards, Part 31 - Water published by the American Society for Testing and Materials; (c) Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR 136) by the U.S. Environmental Protection Agency; or (d) by such other methods as are approved by the Commission as equal or superior to or not available within methods in documents listed above, provided such other test methods are available to the public.

X. SEVERABILITY CLAUSE

Should any one or more of the Pollution Control Standards hereby established or should any one or more provisions of the regulations herein contained be held or determined to be invalid, illegal or unenforceable, for any reason whatsoever, all other standards and other provisions shall remain effective.

Appendix A

Acute And Chronic Criteria Concentrations For Total Ammonia-Nitrogen (In Mg/L) For Varying Combinations Of PH And Temperature

Table A1 pH-Dependent Values of the Acute Criteria for Total Ammonia-Nitrogen

pH	Acute Criterion (mg/L)		pH	Acute Criterion (mg/L)
6.0	55.0		7.6	17.0
6.1	54.2		7.7	14.4
6.2	53.2		7.8	12.1
6.3	52.0		7.9	10.1
6.4	50.5		8.0	8.41
6.5	48.8		8.1	6.95
6.6	46.8		8.2	5.73
6.7	44.6		8.3	4.71
6.8	42.0		8.4	3.88
6.9	39.2		8.5	3.20
7.0	36.1		8.6	2.65
7.1	32.9		8.7	2.20
7.2	29.5		8.8	1.84
7.3	26.2		8.9	1.56
7.4	23.0		9.0	1.32
7.5	19.9			

Table A2: Temperature and pH-Dependent Values of the Chronic Criteria for Total Ammonia-Nitrogen (when Fish Early Life Stages Present - March 1 - October 31)

pH	Temperature, Celsius									
	0	14	16	18	20	22	24	26	28	30
6	6.95	6.95	6.32	5.55	4.88	4.29	3.77	3.31	2.91	2.56
6.1	6.91	6.91	6.28	5.52	4.86	4.27	3.75	3.30	2.90	2.55
6.2	6.87	6.87	6.24	5.49	4.82	4.24	3.73	3.28	2.88	2.53
6.3	6.82	6.82	6.19	5.45	4.79	4.21	3.70	3.25	2.86	2.51
6.4	6.75	6.75	6.13	5.39	4.74	4.17	3.66	3.22	2.83	2.49
6.5	6.67	6.67	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.57	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.44	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.29	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	6.12	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7	5.91	5.91	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.67	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.39	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	5.08	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.73	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.36	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.98	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.58	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.18	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.80	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8	2.43	2.43	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.90
8.1	2.10	2.10	1.91	1.68	1.47	1.29	1.14	1.00	0.88	0.77
8.2	1.79	1.79	1.63	1.43	1.26	1.11	0.97	0.86	0.75	0.66
8.3	1.52	1.52	1.39	1.22	1.07	0.94	0.83	0.73	0.64	0.56
8.4	1.29	1.29	1.17	1.03	0.91	0.80	0.70	0.62	0.54	0.48
8.5	1.09	1.09	0.99	0.87	0.76	0.67	0.59	0.52	0.46	0.40
8.6	0.92	0.92	0.84	0.73	0.65	0.57	0.50	0.44	0.39	0.34
8.7	0.78	0.78	0.71	0.62	0.55	0.48	0.42	0.37	0.33	0.29
8.8	0.66	0.66	0.60	0.53	0.46	0.41	0.36	0.32	0.28	0.24
8.9	0.56	0.56	0.51	0.45	0.40	0.35	0.31	0.27	0.24	0.21
9	0.49	0.49	0.44	0.39	0.34	0.30	0.26	0.23	0.20	0.18

Table A3: Temperature and pH-Dependent Values of the Chronic Criteria for Total Ammonia-Nitrogen (when Fish Early Life Stages Absent)

pH	Temperature, Celsius									
	0-7	8	9	10	11	12	13	14	15	16
6	11.3	10.6	9.92	9.30	8.72	8.20	7.70	7.20	6.70	6.30
6.1	11.2	10.5	9.87	9.25	8.67	8.13	7.62	7.15	6.70	6.28
6.2	11.2	10.5	9.81	9.19	8.62	8.08	7.58	7.10	6.66	6.24
6.3	11.1	10.4	9.73	9.12	8.55	8.02	7.52	7.05	6.61	6.19
6.4	11.0	10.3	9.63	9.03	8.47	7.94	7.44	6.98	6.54	6.13
6.5	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46	6.06
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36	5.97
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25	5.86
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10	5.72
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93	5.56
7	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73	5.37
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49	5.15
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22	4.90
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92	4.61
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59	4.30
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23	3.97
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85	3.61
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47	3.25
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71	2.54
8	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36	2.21
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03	1.91
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74	1.63
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48	1.39
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25	1.17
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06	0.99
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.95	0.89	0.84
8.7	1.26	1.18	1.11	1.04	0.98	0.92	0.86	0.80	0.75	0.71
8.8	1.07	1.01	0.94	0.88	0.83	0.78	0.73	0.68	0.64	0.60
8.9	0.92	0.86	0.81	0.76	0.71	0.66	0.62	0.58	0.55	0.51
9	0.79	0.74	0.69	0.65	0.61	0.57	0.54	0.50	0.47	0.44

Note: At 15°C and above, the criteria for fish ELS absent is the same as the criteria for fish ELS present.

Appendix B

Numerical Values Of Dissolved Metals Criteria At Specified Hardness Levels

Hardness	Cadmium		Chromium^{+3}		Copper		Lead	
	Chronic Criterion (µg/L)	Acute Criterion (µg/L)	Chronic Criterion (µg/L)	Acute Criterion (µg/L)	Chronic Criterion (µg/L)	Acute Criterion (µg/L)	Chronic Criterion (µg/L)	Acute Criterion (µg/L)
50	1.34	2.01	42.0	323	4.95	6.99	1.17	30.1
100	2.24	4.26	74.1	570	8.96	13.4	2.52	64.6
150	3.02	6.62	103	794	12.7	19.7	3.90	100
200	3.73	9.03	131	1005	16.2	25.8	5.31	136
250	4.40	11.5	157	1207	19.6	31.9	6.72	172
300	5.03	14.01	182	1401	22.9	37.8	8.13	209

Hardness	Nickel		Silver		Zinc	
	Chronic Criterion (µg/L)	Acute Criterion (µg/L)	Chronic Criterion (µg/L)	Acute Criterion (µg/L)	Chronic Criterion (µg/L)	Acute Criterion (µg/L)
50	28.9	260	---	1.0	65.7	65.1
100	52.0	468	---	3.4	118	117
150	73.3	660	---	6.9	167	165
200	93.4	842	---	11.4	213	211
250	113	1,017	---	16.7	257	255
300	132	1,186	---	22.8	300	297

Dissolved Metals Translators

Constituent	Acute Criterion Translator	Chronic Criterion Translator
Arsenic	1.000	1.000
Cadmium	1/(1.136672-[ln(hard)*0.041838]	1/(1.101672-[ln(hard)*0.041838]
Chromium (trivalent)	3.165	1.163
Chromium (hexavalent)	1.018	1.040
Copper	1.042	1.042
Lead	1/(1.46203-[ln(hard)*0.145712]	1/(1.46203-[ln(hard)*0.145712]
Mercury	1.176	1.176
Nickel	1.002	1.003
Silver	1.176	---
Zinc	1.022	1.014

Appendix C

Critical Flow Values

FROM	TO	Minimum 1-day 10-year Low-Flow in cfs[1]	Harmonic Mean Flow in cfs[2]
Pittsburgh (MP 0.0)	Montgomery Dam (MP 31.7)	4,200	16,200
Montgomery Dam (MP 31.7)	Willow Island Dam (MP 161.7)	5,000	20,500
Willow Island Dam (MP 161.7)	Racine Dam (MP 237.5)	5,170	24,500
Racine Dam (MP 237.5)	R.C. Byrd Dam (MP 279.2)	5,170	26,000
R.C. Byrd Dam (MP 279.2)	Guyandotte River (MP 305.2)	5,870	34,500
Guyandotte River (MP 305.2)	Big Sandy River (MP 317.1)	6,000	35,900
Big Sandy River (MP 317.1)	Greenup Dam (MP 341.0)	7,000	38,400
Greenup Dam (MP 341.0)	Meldahl Dam (MP 436.2)	7,960	42,100
Meldahl Dam (MP 436.2)	McAlpine Dam (MP 606.8)	8,670	45,300
McAlpine Dam (MP 606.8)	Newburgh Dam (MP 776.1)	8,670	49,000
Newburgh Dam (MP 776.1)	Uniontown Dam (MP 846.0)	10,000	60,900
Uniontown Dam (MP 846.0)	Smithland Dam (MP 918.5)	12,700	78,600
Smithland Dam (MP 918.5)	Cairo Point (MP 981.0)	40,900	175,000

[1]Minimum 7-day, 10-year flow (in cubic feet per second) provided by the U.S. Corps of Engineers
[2]Based on Commission analysis of stream flow data provided by the U.S. Corps of Engineers

Appendix E

Clean Water Act Section 304(a)
Human Health Criteria for Priority Pollutants

Priority Pollutant	Human Health Criteria (µg/L)
Antimony	5.6[A]
Copper	1300[G]
Methylmercury	0.3 mg/kg[D]
Nickel	610[A]
Selenium	170[H]
Thallium	1.7[A]
Zinc	7400[G]
Cyanide	700[A]
Asbestos	7 million fibers/L[C]
2,3,7,8-TCDD (Dioxin)	0.000000005[B]
Acrolein	190
Acrylonitrile	0.051[A,B]
Benzene	2.2[A,B]
Bromoform	4.3[A,B]
Carbon Tetrachloride	0.23[A,B]
Chlorobenzene	680[A,G,H]
Chlorodibromomethane	0.4[A,B]
Chloroform	5.7[B,F]
Dichlorobromomethane	0.55[A,B]
1,2-Dichloroethane	0.38[A,B]
1,1-Dichloroethylene	0.057[B]
1,2-Dichloropropane	0.5[A,B]
1,3-Dichloropropene	10
Ethylbenzene	3100[A]
Methyl Bromide	47[A]
Methylene Chloride	4.6[A,B]
1,1,2,2-Tetrachloroethane	0.17[A,B]
Tetrachloroethylene	0.69[B]
Toluene	6800[A,H]
1,2-Trans-Dichloroethylene	700[A,H]
1,1,2-Trichloroethane	0.59[A,B]

Priority Pollutant	Human Health Criteria (µg/L)
Pentachlorophenol	0.27[A,B]
Phenol	21000[A,G]
2,4,6-Trichlorophenol	1.4[A,B]
Acenaphthene	670[A,G]
Anthracene	8300[A]
Benzidine	0.000086[A,B]
Benzo(a) Anthracene	0.0038[A,B]
Benzo(a) Pyrene	0.0038[A,B]
Benzo(b) Fluoranthene	0.0038[A,B]
Benzo(k) Fluoranthene	0.0038[A,B]
Bis(2-Chloroethyl) Ether	0.03[A,B]
Bis(2-Chloroisopropyl) Ether	1400[A]
Bis(2-Ethylhexyl)Phthalate	1.2[A,B]
Butylbenzyl Phthalate	1500[A]
2-Chloronaphthalene	1000[A]
Chrysene	0.0038[A,B]
Dibenzo(a,h) Anthracene	0.0038[A,B]
1,2-Dichlorobenzene	2700[A]
1,3-Dichlorobenzene	320
1,4-Dichlorobenzene	400[H]
3,3'-Dichlorobenzidine	0.021[A,B]
Diethyl Phthalate	17000[A]
Dimethyl Phthalate	270000
Di-n-Butyl Phthalate	2000[A]
2,4-Dinitrotoluene	0.11[B]
1,2-Diphenylhydrazine	0.036[A,B]
Fluoranthene	130[A]
Fluorene	1100[A]
Hexachlorobenzene	0.00028[A,B]
Hexachlorobutadiene	0.44[A,B]
Hexachlorocyclopentadiene	240[G,H]

Priority Pollutant	Human Health Criteria (ug/L)
Trichloroethylene	2.5[B]
Vinyl Chloride	2.0[B]
2-Chlorophenol	81[A,G]
2,4-Dichlorophenol	77[A,G]
2,4-Dimethylphenol	380[A]
2-Methyl-4,6-Dinitrophenol	13
2,4-Dinitrophenol	69
Pyrene	830[A]
1,2,4-Trichlorobenzene	260
Aldrin	0.000049[A,B]
alpha-BHC	0.0026[A,B]
beta-BHC	0.0091[A,B]
gamma-BHC (Lindane)	0.019[B]
Chlordane	0.0008[A,B]
4,4'-DDT	0.00022[A,B]
4,4'-DDE	0.00022[A,B]
4,4'-DDD	0.00031[A,B]

Priority Pollutant	Human Health Criteria (ug/L)
Hexachloroethane	1.4[A,B]
Ideno(1,2,3-cd) Pyrene	0.0038[A,B]
Isophorone	35[A,B]
Nitrobenzene	17[A]
N-Nitrosodimethylamine	0.00069[A,B]
N-Nitrosodi-n-Propylamine	0.005[A,B]
N-Nitrosodiphenylamine	3.3[A,B]
Dieldrin	0.000052[A,B]
alpha-Endosulfan	62[A]
beta-Endosulfan	62[A]
Endosulfan Sulfate	62[A]
Endrin	0.76[A]
Endrin Aldehyde	0.29[A]
Heptachlor	0.000079[A,B]
Heptachlor Epoxide	0.000039[A,B]
Polychlorinated Biphenyls	0.000064[A,B,E]
Toxaphene	0.00028[A,B]

Footnotes:

A This criterion has been revised to reflect The Environmental Protection Agency's q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of May 17, 2002. The fish tissue bioconcentration factor (BCF) from the 1980 Ambient Water Quality Criteria document was retained in each case.

B This criterion is based on carcinogenicity of 10^{-6} risk. Alternate risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10^{-5}, move the decimal point in the recommended criterion one place to the right).

C This criterion for asbestos is the Maximum Contaminant Level (MCL) developed under the Safe Drinking Water Act (SDWA).

D This fish tissue residue criterion for methylmercury is based on a total fish consumption rate of 0.0175 kg/day.

E This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.)

F Although a new RfD is available in IRIS, the surface water criteria will not be revised until the National Primary Drinking Water Regulations: Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) is completed, since public comment on the relative source contribution (RSC) for chloroform is anticipated.

G The organoleptic effect criterion is more stringent than the value for priority toxic pollutants.

H EPA has issued a more stringent MCL. Refer to drinking water regulations (40 CFR 141) or Safe Drinking Water Hotline (1-800-426-4791) for values.

I This human health criterion is the same as originally published in the Red Book which predates the 1980 methodology and did not utilize the fish ingestion BCF approach. This same criterion value is now published in the Gold Book.

J EPA under the Safe Drinking Water Act has issued a more stringent Maximum Contaminant Level (MCL). Refer to drinking water regulations 40CFR141 or Safe Drinking Water Hotline (1-800-426-4791) for values.

K This criterion for manganese is not based on toxic effects, but rather is intended to minimize objectionable qualities such as laundry stains and objectionable tastes in beverages.

APPENDIX F

ALTERNATE APPROACHES FOR CALCULATING **ACUTE** MIXING ZONES

(temporarily removed bold formatting on title to show proposed revision)

Alternative 1

Apply the acute criterion at the end-of-pipe.

Alternative 2 (for high velocity discharges => 3 m/s)

The acute criterion should be met within 50 times the discharge length scale (50 times square root of the cross-sectional pipe area). The scientific basis for this alternative is that these conditions will ensure that the acute criterion is met within a few minutes under practically all conditions.

Alternative 3 (for low velocity discharges < 3 m/s)

The acute criterion should be met:

1) Within 10% of the distance from the end-of-pipe to the edge of the regulatory mixing zone in any direction. This will restrict the acute zone to a relatively small area around the discharge pipe.
2) Within a distance of 50 times the square root of the pipe diameter (discharge length scale). This will ensure a dilution factor of at least ten at the edge of the acute mixing zone.
3) Within a distance of 5 times the local in any horizontal direction water depth. This will ensure that mixing zones are not established in shallow, near-shore waters.

Alternative 4 (demonstration by discharger) A discharger may demonstrate that a drifting organism would not be exposed to 1-hour average concentrations exceeding acute aquatic life criteria or would not receive harmful exposure when evaluated by other valid toxicological analyses.