ALASKA LEGISLATURE COMMITTEE FILES 1991-1992 8672
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criteria at the $10^{-6}$ risk level for dioxin (0.014 parts per quadrillion) is not supportable given expected exposures. We are closely examining the $10^{-6}$ risk level and associated criteria and the action of other states. An issues paper summarizing our findings is in preparation.

The economic analysis now being prepared by DEC will indicate the mills' cost of compliance with the $10^{-6}$ dioxin human health criterion proposed by EPA in the preliminary draft permits, and will help determine the risk of mill closure. Criteria at the $10^{-6}$ level certainly present a greater threat to the mills that at the $10^{-5}$ level.

It should be noted that dioxin remains one of the most toxic compounds known. Indications are that, while carcinogenic potential actually is less than previously suspected, other systemic toxic effects are as great or greater than previously suspected. Pulp mills in other locations, for example, Oregon, presently must comply with criteria at the $10^{-6}$ level.

(15) What were the findings of the 1990 multimedia study conducted by EPA at the Sitka pulp mill?

Response, DEC: The multimedia study included sampling for the presence of dioxins, furans, and approximately 250 other organic and inorganic compounds in several APC waste streams and in soils, sediments and water around the Sitka area (fly ash and floating sludge from APC, leachate and sludge from the city landfill, sediment from Silver Bay and Blue Lake, soil from areas around Sitka, water from Blue Lake - Sitka's drinking water source and seafood from Silver Bay, Thimbleberry Lake and Blue Lake). The study report also completes a preliminary risk assessment for exposure to dioxins and furans by people living in Sitka.

Very low concentrations of dioxins and furans were found in the Sitka area. At these low concentrations, using worst case exposure assumptions, the likelihood of health effects occurring is also very low. The analysis presented in this report is not intended to be considered a formal risk assessment.

Trace levels (0 to 22 parts per trillion) of dioxins and furans were found in floating residue, soils and sediments. These levels appear to be similar to background concentrations reported for the U.S. and other countries throughout the world. No dioxins or furans were found in leachate from the landfill and water from Blue Lake. The highest levels were found in ask from the pulp mill power boilers. High concentrations of dioxins and furans in ash from incinerators have been previously documented in other municipal and industrial settings. Seafood from Silver Bay also contained trace levels of dioxins and furans. The range in concentration from (0 to 3 parts per trillion) is similar to other background levels measured in the U.S. Subsequent seafood samples taken from Silver Bay (halibut and

salmon) and Ward Cove (rock fish and salmon) show similar concentrations of dioxins and furans. However, crab liver samples from Ward Cove had elevated concentrations of a furan (2,3,7,8-TCDF, 68.7 ng/kg wet weight).

(16) Do DEC and the Attorney General agree with EPA's explanation of why Alaska does not comply with section 303(c)(2)(B) of the Clean Water Act?

Response, DEC: In a letter of October 9, 1991 and in DEC's comments on the draft National Toxics Rule, DEC opposed EPA's assertion that "the Attorney General has decided that the adoption by reference is invalid." This assertion clearly was a misunderstanding, and since has been vacated by EPA. In the comments on the rule, DEC also opposed EPA's inclusion of acute criteria for aquatic life. In a January response, EPA maintained that whether or not the State has adopted acute criteria by reference is ambiguous, so inclusion of acute criteria in the rule is appropriate. DEC does agree that the State has not adopted a human health risk level, or chronic aquatic life criteria since 1985.

Response, Law: Please refer to our response to question number 10. We do not agree with the statement that "Alaska is included in today's proposal because although the State had previously adopted all section 304(a) criteria by reference, the State Attorney General has decided that the adoption by reference is invalid." 56 Fed. Reg. 58,476. The filing of a certified copy of a regulation with the Lieutenant Governor's Office raises a rebuttable presumption that the regulation was duly adopted. AS 44.62.100(a)(1). Since the filing of the regulation, our office has not determined the validity of the adoption of the section 304(a) criteria. Nonetheless, adoption by reference of the section 304(a) criteria would not fully meet the requirements of section 303(c)(2)(b), and thus the state would still be subject to the National Toxics Rule.

(17) Please set forth a detailed history and chronology of DEC's compilation and submission of the section 304(l) list. What criteria were used for inclusion on the list? In the submission, DEC asserted that only 47 waterbodies were impaired, but EPA insisted upon using a list of 112 waterbodies. Which list does DEC believe is correct?

Response, DEC: Section 304(l) of the Clean Water Act ("Individual Control Strategies for Toxic Pollutants") was an amendment added in 1987. It required each state to submit three lists of waters to EPA in February 1989. The nature of each list is described below, along with DEC's date of submittal.

The "Short List" was a list of waters not meeting water quality standards due to discharges of toxic pollutants from point sources. The "Mini List" was a list of waters not meeting water quality standards due to discharges of toxic pollutants from point sources or nonpoint sources. DEC submitted these two lists to EPA on February 23, 1989. The Short List

contained only one waterbody, Port Valdez. The Mini List contained two waterbodies, Ship Creek (Anchorage) and Skagway Harbor.

The "Long List" was a list of waterbodies not expected to maintain "water quality which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water." This was interpreted by EPA to include all waters not meeting standards from <u>any pollutant</u> and <u>any source</u>. The Long List, containing 35 waters, was submitted to EPA on May 26, 1989.

On April 12, 1989, DEC submitted a supplement to the Short List identifying the Alyeska Pipeline Service Company's ballast water treatment facility as the point source affecting Port Valdez.

On June 16, DEC submitted to EPA the State's supplement to the Long List of 112 "Suspected" waterbodies, those "needing further investigation to determine whether they are meeting or maintaining water quality standards."

EPA issued approval of the State's three lists on June 9, 1989. On May 31, 1990, EPA withdrew approval of the State's Long List, claiming the State had not fulfilled certain commitments to further evaluate additional waters suspected of belonging on the Long List. The State vigorously opposed the grounds for EPA's decision to withdraw during the public comment period in a letter dated October 5, 1990. Nonetheless, in a letter dated September 24, 1991, EPA issued a final Long List of waters it believed met the requirements of section 304(l). EPA's list essentially added the State's list of Suspected waters onto the Long List, making it considerably longer than the State's list.

The three lists submitted by the State were derived from the broad list of waters not meeting water quality standards prepared in 1988 for the Statewide Water Quality Assessment Report submitted to EPA under section 305(b) of the Clean Water Act. The criterion used by DEC within the context of each of the three lists was <u>definitive documentation of violation of State Water Quality Standards</u>. Waters lacking definitive documentation were placed on the Suspect List. In EPA's interpretation, the Long List was to include both documented and suspected violations of Water Quality Standards.

DEC firmly believes that EPA erred in its determination; DEC clearly expressed the State's view in the letter of October 5, 1990. In preparing the Long List, DEC followed EPA's national guidance that the list should contain only waters with documented violation of Water Quality Standards. In its withdrawal of approval and substitution of a federal list, EPA Region 10 ignored this national guidance.

(18) What effort has DEC made to limit the application of EPA's proposed toxics rule to waterbodies within Alaska which DEC believes to be adversely affected by toxic pollutants? What challenge to the rule does DEC intend to make, based on EPA's admission that data on toxic discharges in Alaska are limited?

Response, DEC: The National Toxics Rule will impose federal toxic water quality criteria for the State of Alaska until such time as State adopts its own criteria, has them approved by EPA, and is formally withdrawn from the federal toxics rule. These criteria will be applied by EPA in NPDES permits as the operative State criteria. They will only be applied as water quality-based effluent limits in NPDES permits where a given pollutant causes, or has reasonable potential to cause, exceedance of a water quality criterion. That determination is made, for existing facilities, based on past discharge monitoring by the operator; and for new facilities, based on the operator's projected pollutant discharge levels. Both take into account the modelled dilution in the authorized mixing zone. Thus the toxic criteria, whether federal or State, are applied in permits through an analysis of each pollutant discharged, based either on data or on projected discharge levels.

Any challenge by the State of Alaska on the National Toxics Rule likely would not be based on EPA's admission that data on toxic discharges in Alaska are limited.

(19) Does DEC intend to work with the pulp mills in designing mixing zones for the mill outfalls?

Response, DEC: Yes, DEC will work with the mills in designating mixing zones. The Water Quality Standards require that a mixing zone be "as small as practicable," but the zone can be expanded upon a suitable demonstration of need by the operator. This determination will require technical input and data from the mill. The determination will consider economically and technologically feasible treatment and/or process modifications as well as adverse impacts to aquatic life and human health.

(20) Is DEC reviewing the pulp mill preliminary draft permits for accuracy and consistency with the State Water Quality Standards? Will the results be reflected in DEC's rulemaking?

Response, DEC: Yes. In the review of NPDES permits, DEC verifies criteria and procedures used by EPA to derive effluent limitations, and reviews other provisions of permits relating to State Water Quality Standards. DEC will use the information gained in the upcoming revision of Water Quality Standards. The revised standards will address any ambiguity of the current State standards and adopt specific numeric criteria.

(21) Does DEC agree with EPA's application of the human health criteria from EPA's November 19, 1991 proposed toxics rule to the State's mixing zone regulation (18 AAC 70.032) as was done in the preliminary draft pulp mill permits? If not, why not?

Response, DEC: EPA asserts that the basis for criteria in the preliminary draft pulp mill permits is not the draft National Toxics Rule, but the State Water Quality Standards. Criteria used by EPA in the permits are based on the EPA "Gold Book." The State opposes the imposition of human health criteria at the $10^{-6}$ risk level. The State also does not agree with EPA's preliminary decision not to grant a mixing zone for carcinogens. We feel EPA's decision is based on misinterpretation of the State's mixing zone regulations. In a March 22, 1992, letter to EPA prepared at EPA's request, Commissioner Sandor explicitly clarified the State's mixing zone regulations as they relate to granting a mixing zone for carcinogens. The preliminary draft permits did not reflect the State's position. Subsequent meetings with EPA in Seattle have resolved the issue in favor of the State in granting due deference to the State in the interpretation of its own regulations.

(22) Has DEC determined the capital and operating costs to the pulp mills of complying with EPA's preliminary draft permits?

Response, DEC: APC estimates that it will cost $104 million to come into compliance under the new preliminary draft permit. The lion's share of that cost is to meet EPA's proposed dioxin and color discharge limits. Collectively, these total $89 million, or roughly 86 percent of APC's estimated $104 million total cost.

Currently, the Department has no information to either support or refute the published numbers. The Department, in conjunction with the University of Alaska's Institute of Environment and Natural Resources, will address this question over the coming weeks.

(23) What is EPA doing to promote development of wetlands criteria, biological criteria, and sediment criteria? How will these things affect Alaska? How is DEC organized to handle these matters?

Response, DEC: EPA's national agenda for water quality standards calls for state development of wetlands criteria, biological criteria, and sediment criteria. EPA has published guidance documents in each of these areas, particularly for sediment and biological criteria. Several states are experimenting with these items, and some states have regulations in place. The state of Washington, for example, recently promulgated comprehensive criteria for sediment quality, and Oregon is advanced in the use of biological criteria. The current markup bill in Congress for amendment of the Clean Water Act includes a specific requirement for all states to develop sediment criteria. We must expect that all

of these matters will come to Alaska with time, but we cannot predict schedules until the Clean Water Act is reauthorized. DEC is beginning to examine biological criteria, but does not plan to implement any of the three criteria types in the immediate future.

# BRIEFING MATERIALS

# FEDERAL WASTEWATER DISCHARGE (NPDES) PERMITS AND THE ALASKA WATER QUALITY STANDARDS

Prepared for the Senate Resources Committee

of the Alaska State Legislature

Alaska Department of Environmental Conversation

May 4, 1992

## SENATE RESOURCES COMMITTEE BRIEFING PACKAGE

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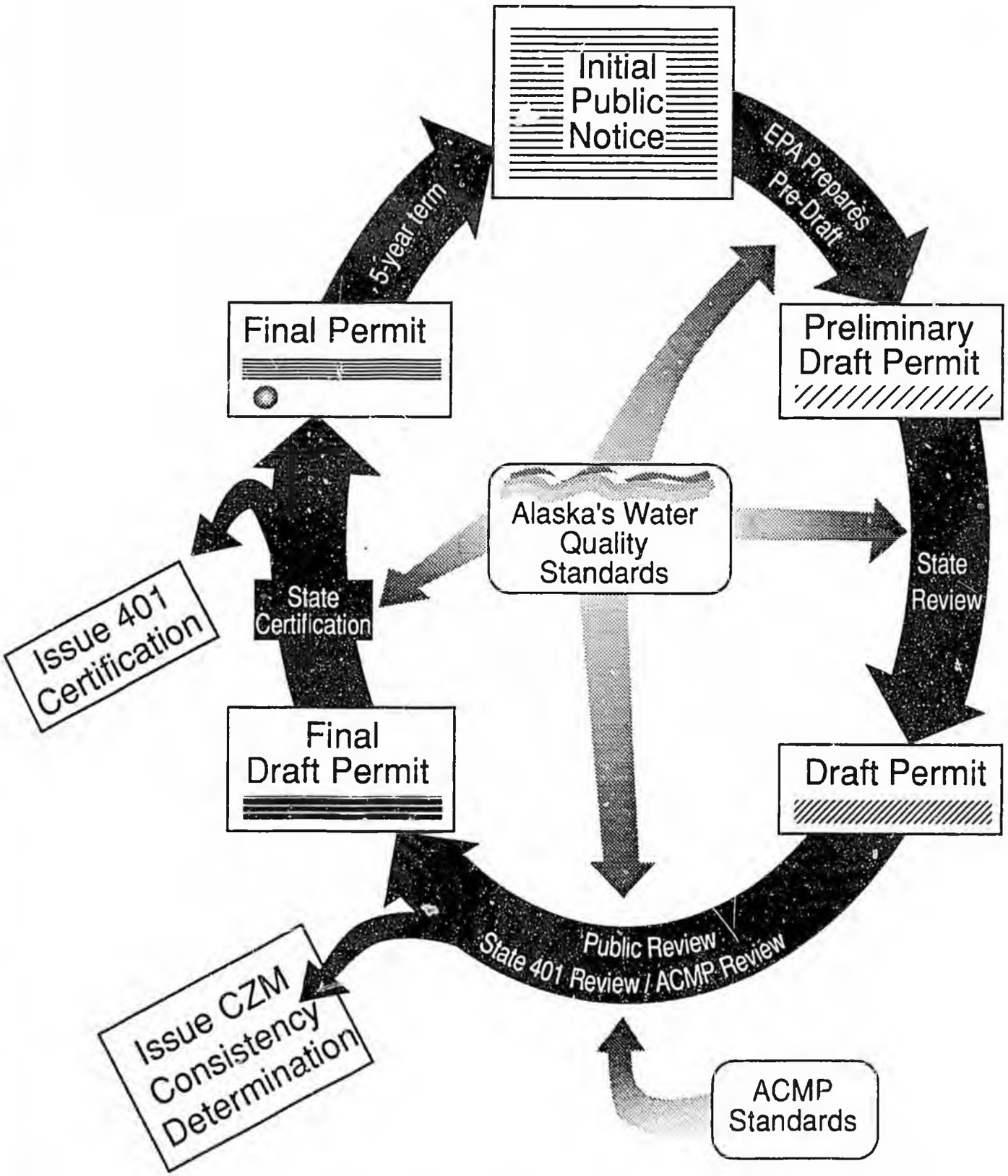
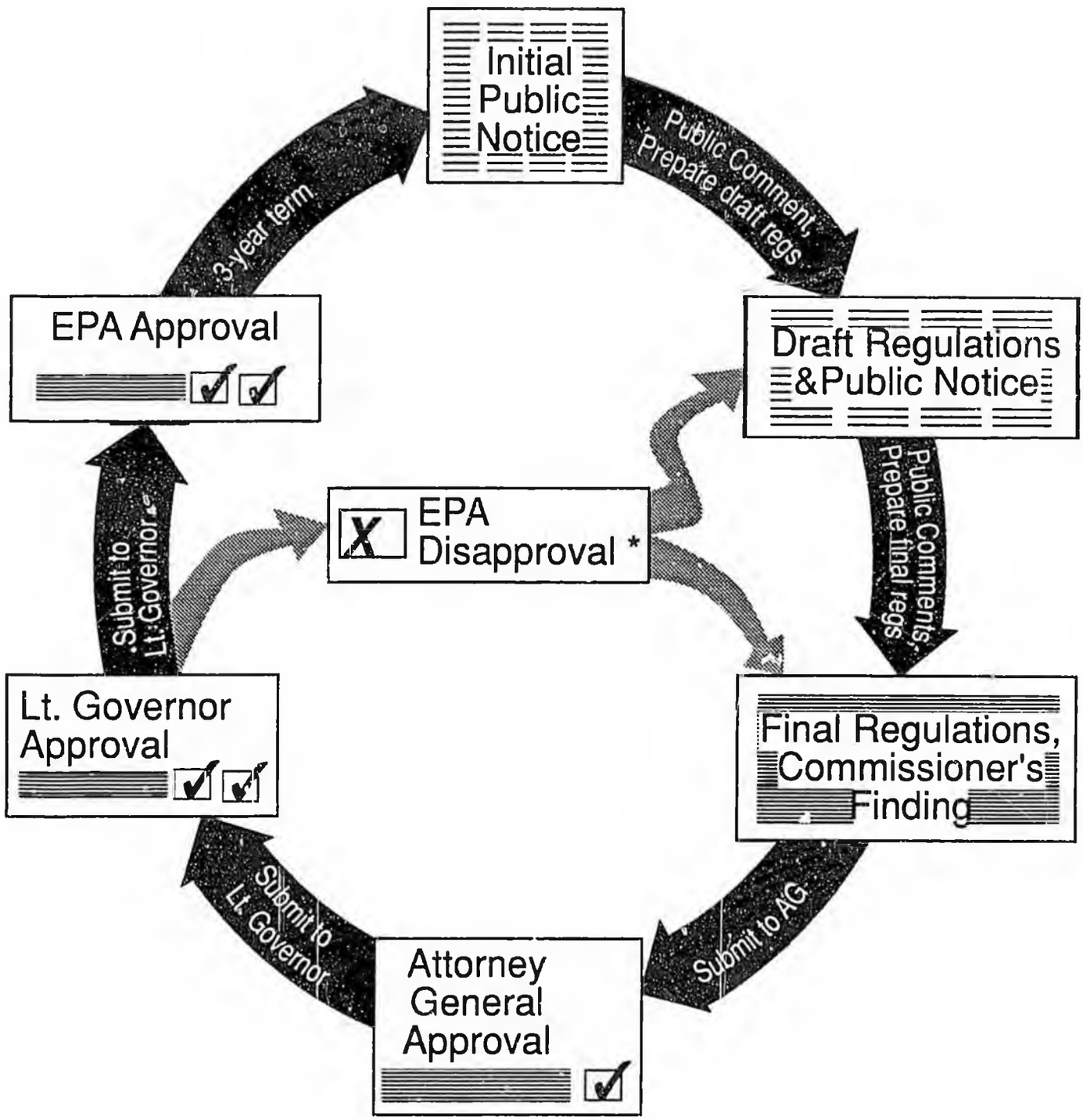
# NPDES Permit Process



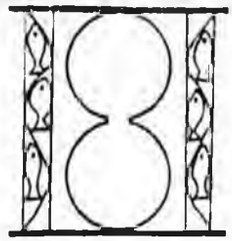
# *Process for Triennial Revision of Water Quality Standards*




* If EPA disapproves regulations, the State has 90 days to make changes. Otherwise EPA is obligated to promulgate federal Water Quality Standards for the State.

# National Toxics Rule

| | |
|---|---|
| **1987** | Clean Water Act Mandate given [Section. 303 (c) (2) (B)]—States must adopt toxic pollutant criteria. EPA must promulgate federal criteria in regulation for states that do not. |
| **1988** | EPA published guidance to states on achieving compliance with the Clean Water Act. |
| **April 1990** | EPA sent notice to states not in compliance that they would be included in the federal regulation. |
| **October 1991** | DEC sent letter to EPA supporting the validity of Alaska's adoption of EPA criteria by reference. |
| **November 1991** | EPA published the draft National Toxics Rule, including Alaska for carcinogenic criteria, chronic aquatic life criteria since 1985, and acute aquatic life criteria. |
| **December 1991** | DEC sent comments to EPA on the National Toxics Rule, opposing adoption of acute criteria and clarifying other matters. |
| **January 1992** | EPA prepared a response to Alaska's comments, noting that acute aquatic life criteria would be retained, but agreeing with other state comments. |
| **???** | Final National Toxics Rule promulgated. |



# A Brief History of the Classification of Alaskan Waters

From a Review of Water Quality Objectives/Standards Since 1949

**1949** The Alaska Water Pollution Control Board was established by the territorial legislature under the authority of Chapter 117, titled simply "An Act". The Alaska Water Pollution Control Board was responsible for administration of the Alaska Water Pollution Control "Act" to safeguard Alaskan waters from pollution and establish standards of water purity which affect public health, fish and wildlife, recreation and industrial development.

According to Amos Alter (Person. comm., 1992), Director of the Division of Sanitation and Engineering for the Alaska Department of Health in 1949, there was only one person assigned to actively administer the water pollution control program. It wasn't possible for this one person to classify all Alaskan waters for different uses. It was also generally believed by the Board that Alaska had a unique chance to protect it's pristine waters, unlike states that already had many polluted waterbodies. Therefore, it was determined that Alaskan waters should be generally protected for the highest water use. This was "water supply and their sources." Initial limits were provided by the US Public Health Service (USPHS) and included federal Drinking Water Standards.

**1952** The first Water Quality Objectives table of standards was produced. This is found in a paper titled, "Pollution Control Council, Pacific Northwest Area". It was developed through the coordination of the engineering representatives from pollution control agencies in Alaska, British Columbia, Idaho, Montana, Oregon, and Washington. These standards were applicable to those regions and the Territory of Alaska.

It is in this table, "applicable to the receiving waters for salt and fresh surface waters and underground waters," that the first employment of protecting waters for the highest water use is evident. For example, for the parameter "toxic, colored or other deleterious substances", the USPHS standards applied to four of the five listed water uses.

**1959** The Territory of Alaska became the State of Alaska. Concurrently, the Alaska Administrative Procedure Act became effective. Water Quality Objectives were published in the Administrative Code, Title 7, under Health and Welfare. The Water Pollution Control Board was disbanded. The Water Quality Objectives were under the broad authority of A.S. Title 46, (Water) and A.S. Title 16, (Fish and Game). The Commissioner of Health and Welfare after conducting public hearings, could establish standards and/or group the designated waters of the state into classes.

The Water Quality Objectives adopted by the State of Alaska were the same table established in 1952 by the Territory.

**1952 - 1979** For 27 years the original work and intent of the Alaska Water Pollution Control Board and the Pacific Northwest Council were repeated in succeeding Water Quality Standard (WQS) revisions. Clarifications in language and some modifications were made but these did not change the character of the original work. Key elements in the classification of state waters follow:

1. It was possible through public hearings to reclassify waters for specific uses. If waters were not reclassified, the "highest water use" superceded the other uses for a given waterbody.

2. The burden of justifying a reclassification was placed on those wishing to reclassify a waterbody.

3. In 1970, Ward Cove in Ketchikan, Ship Creek in Anchorage, Chena River, Fairbanks, and Silver Bay in Sitka were classified for specific uses as were all coastal waters. In 1971, both Ward Cove and Silver Bay were deleted from the reclassification list.

4. In 1973 the following significant clarification was made: "if waters have more than one use, the most stringent water quality criterion of the the uses shall apply." Up until 1979, numeric limits were primarily found in the USPHS Drinking Water Standards because other criteria had not been developed. It became more evident with this wording clarification that criteria and designated uses

were integral parts of a water quality standard.

The Department of Environmental Conservation was created in July of 1971 as a split off from the Division of Environmental Health in the Department of Health and Welfare. DEC made few changes in the 1971 Water Quality Standards from previous Department of Health and Welfare standards. Reclassification required public hearings, the approval of the Commissioner of DEC and concurrence by the Administrator of the EPA for interstate waters.

**1979** In 1979 significant changes were made in style, format and content of the WQS. Water quality criteria applicable to each use were significantly broadened in scope and detail. It was in this revision that aquatic life criteria made their first appearance with the adoption of federal criteria from the 1976 Red Book for the parameter of "toxic and other deleterious organic and inorganic substances." The USPHS Drinking Water Standards were also replaced by the Alaska Drinking Water Standards. It was now stated that between the Drinking Water Standards and the aquatic life criteria, the more stringent should be chosen as the applicable criterion. This practice continues today and in most cases, EPA's aquatic life criteria are more stringent than the Drinking Water Standards.

In general, the WQS took a more restrictive turn in 1979. There were many more stipulations that had to be met before a waterbody could be reclassified. For the first time, there was a section that included waterbodies ineligible for reclassification (parks, refuges, etc.). Another section spelled out what conditions defined the designated uses. To eliminate a use for a given waterbody it would have to be proven that those conditions did not exist. Ship Creek and marine waters were deleted from the reclassified list in this revision.

Key points are that although significant alterations were made in 1979, it was still quite possible to reclassify a waterbody after public hearings and the approval of the Commissioner. The burden of proof was on the applicant and the applicant only had to address "existing uses" of the waterbody in the reclassification procedures.

**1979 - 1987** During this period, amendments were proposed and adopted through the public process, but no comprehensive Water Quality Standard document was published with the incurred changes. No significant amendments were made concerning reclassification of waterbodies during this time.

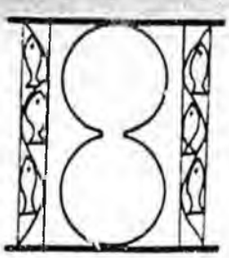
In 1982 one important amendment was the adoption by reference of federal aquatic life criteria for 64 compounds or classes of compounds listed in the 1980 EPA Ambient Water Quality Criteria documents. This adoption by reference includes the bulk of the numeric criteria in effect today. Human health criteria for non-carcinogens also were adopted at that time.

In 1984 Nolan Creek and five tributaries near Wiseman were reclassified for the industrial use.

**1987 - Today** In 1987, revised Water Quality Standards were published. It was in this revision that aquatic life criteria for nine compounds, published by EPA in 1985, were adopted by reference. The procedures for reclassifying state waters were extensively modified to make them consistent with 1983 EPA regulations. The Clean Water Act does not address procedures for reclassifying state waters. At the time of this revision, two waterbodies remained on the reclassified list, Nolan Creek and Chena River. Although not referred to specifically in the WQS, the department now had to comply with EPA regulations in order to reclassify waterbodies of the state. Significant federal requirements follow:

A) To exclude a designated use through reclassification, it was no longer enough to show that the designated use was not an "existing use" of the waterbody. One also had to prove that the designated use was not "attainable." This provision added a new and more difficult element in the formula for reclassification of state waters. It has proven to be onerous and costly to show that some designated uses might not be attained at some place in time, by some method.

B) EPA's regulations also require that a structured scientific study called a "use attainability

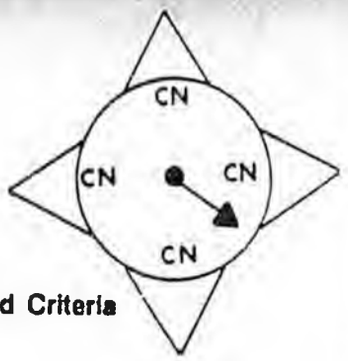


analysis" (UAA) must be conducted to prove that a use cannot be attained. Therefore, the decision to reclassify a waterbody is made after conducting a use attainability analysis. The State's request to reclassify must be approved by the Regional Administrator of EPA. High costs of analysis and strict EPA guidelines were prohibitive for considering all suggested reclassifications proposed. Based on these factors, a provision was added in the WQS that the decision on whether to proceed with a reclassification was at the department's discretion.

In November, 1989 an amendment to the WQS included a revision of the section on Classification of Waters. As a result of the Tolovana Use Attainability Analysis, the Department removed some protected use classes from 14 streams or segments of streams in the Tolovana River Basin. The cost to the state was extensive and it proved to be very difficult to eliminate significant "attainable" uses that would satisfy the original intent of the applicant. In the final analysis, the department's cost and efforts to reclassify or not to reclassify rested solely on EPA's final approval. Therefore, even if the department wished to reclassify a waterbody, the department decisions can be vetoed by EPA according to the 1983 EPA regulations still in effect today.

The 1989 WQS revision retained the same procedures for reclassification adopted in 1987, and they remain the same today.

KW/WQM, February 1992




# *ALASKA WATER QUALITY STANDARDS HISTORICAL UPDATE*

**The History of How Revisions of the Water Quality Standards Have Affected Criteria**
Using The Cyanide Criteria As An Example

**1949 - 1979** During this period, chemical constituents could not exceed the US Public Health Service Standards. The USPHS Drinking Water Standards did not contain a limit for cyanide. They did, however, make recommendations based on standards developed for cyanide by other agencies and countries. The cyanide limits used by other agencies and countries appeared to be based on the toxicity to fish and not to man. It was recommended that cyanide concentrations be kept below **10 ug/l** in water. For the protection of the health of human populations, concentrations above **200 ug/l** constituted grounds for rejection of the supply. (1962, USPHS Drinking Water Standards)

**1979 - 1982** In 1979 with the adoption by reference of the EPA 1976 Red Book criteria, the state cyanide standard for aquatic life automatically became the cyanide criterion in the Red Book. The new criterion was the chronic value of **5 ug/l** for freshwater and marine aquatic life and wildlife. The human health limit remained at **200 ug/l**.

The USPHS Drinking Water Standards were replaced by the Alaska Drinking Water Standards in 1979. With the addition of EPA aquatic life criteria to the WQS, a provision was added that between the Drinking Water Standards and the aquatic life criteria, the most stringent should be chosen as the applicable criteria. There was no Alaska Drinking Water Standard for cyanide so the aquatic life criterion of 5.0 ug/l was the only criterion to choose from. To date there still is no Alaska Drinking Water Standard for cyanide so the **aquatic life** criteria automatically apply to fresh, salt and groundwaters of the state.

**1982 - 1987** In 1982 with the adoption by reference of the 1980 EPA Water Quality Criteria documents, the value for cyanide again automatically changed. At this time, EPA provided criteria for fresh and saltwater and for both acute (higher concentrations allowed for short periods) and chronic (lower concentrations allowable over the long term) conditions. The WQS state that only the most stringent value applies. This means that the chronic criteria must be selected.

For free cyanide, the aquatic life criterion for freshwater became **3.5 ug/l** applied as a 24-hour average. For saltwater the criterion became **2.0 ug/l**. The department also adopted human health criteria for noncarcinogens from the 1980 criteria documents. The cyanide criterion EPA recommended was identical to the USPHS Drinking Water Standards which was **200 ug/l**. Since the aquatic life criterion of 3.5 ug/l for freshwater was more stringent, it automatically superceded the human health criterion of 200 ug/l.

**1987 - 1992** In 1987, aquatic life criteria for nine compounds were adopted by reference. These included replacement criteria for free cyanide. The "new" freshwater, chronic criterion for free cyanide was **5.2 ug/l** (4-day average). The criterion for saltwater was **1.0 ug/l** (1-hour average). The saltwater criterion is the acute value because there is no chronic criterion for cyanide.

These criteria for cyanide remain the same today and new cyanide criteria are not expected to be published by EPA in the near future. **A table on the following page summarizes the applicable criteria for cyanide since 1949.**

KW/WQM, February 1992

## THE DEVELOPMENT OF CYANIDE CRITERIA FROM 1949 TO 1992

| Period and Source | Criteria for Aquatic Life | Criteria for Human Health |
|---|---|---|
| 1949 - 1979<br>US Public Health Service Standards | 10 ppb | 200 ppb |
| 1979 - 1982<br>EPA 1976 Red Book | 5 ppb<br>(Chronic) | 200 ppb |
| 1982 - 1987<br>EPA 1980 Water Quality Criteria Document for FREE Cyanide | Freshwater = 3.5 ppb<br>(24-Hour Average)<br><br>Saltwater = 2.0 ppb<br>(4-Day Average, est.) | 200 ppb |
| 1987 - 1992<br>EPA 1984 Water Quality Criteria Document for FREE Cyanide | Freshwater = 5.2 ppb<br>(4-Day Average)<br><br>Saltwater = 1.0 ppb<br>(1-Hour Average) | 200 ppb |

**Notes:**

1. "ppb" = parts per billion, equivalent to micrograms per liter (ug/l).

2. **For cyanide**, only the aquatic life criteria are applicable to protect surface and groundwaters because they are more stringent than human health criteria.

3. The 1986 EPA "Gold Book" contains excerpts from the 1976 "Red Book" and the 1980 and 1984 EPA Water Quality Criteria documents.

# MEMORANDUM STATE OF ALASKA

**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**Division of Environmental Quality**

TO: Water Quality Standards
Work Group Member

DATE: January 27, 1992

FILE NO.:

FROM: Katy Wilkinson

PHONE NO.: 465-5302

SUBJECT: Water Quality Standard Questionnaires

Enclosed are the first four of a group of questionnaires on Water Quality Standard issues that we are addressing in this revision. Also enclosed is a copy of the **1991 Summary Response To Public Comments On The Revision of Alaska's Water Quality Standards** and a one page article from Science magazine that may be of interest.

We will continue to compose questionnaires on various topics based on issues we said we'd address in the Triennial Response Summary, federal requirements and a few topics from the EPA in Region 10 "wish list." I have also formed an outside D.E.C "Help" Group composed of industry, some environmental groups and a few folks who have requested to be participants.

I would like to reiterate that the initial public comment period is over for this revision. We are seeking your input on the WQS revision that will again go back out for a full public review when it is completed.

The issues are varied and I hope that these questionnaires while raising questions will also serve to inform you on the WQS. Thank you for your time and effort.

ADEC Water Quality Work Group Members

Jeff Hock/EQ Monitoring Lab
Cameron Leonard/Assistant Attorney General, Fairbanks
Bill Lamoreaux/Anchorage District Office
Bruce Erickson/Western District Office
Les Buchholz/Kenai District Office
Simon Mawson/Pipeline Corridor Regional Office
Ron Doyel/Matanuska-Susitna District Office
Paul Pinard/Matanuska-Susitna District Office
Jane Tonkin/Cordova Field Office
Clara Jodwalis/Northern Regional Office
Dick Stokes/Southeast Regional Office
Ron Flinn/Southeast Regional Office
Amy Kruse/Southeast Regional Office
Sharmon Stambaugh/Southeast Regional Office
Pete McGee/Northern Regional Office
Joyce Beelman/Northern Regional Office
Al Keglar/Juneau District Office
Steve Haavig/Juneau District Office
Jim Clare/Sitka District Office
Barry Hogarty/Ketchikan District Office
Randy Romenesko/Nome District Office
Doug Dasher/Interior District Office
Svendt Brandt-Erichsen/Southcentral Regional Office
Ursula Spannagel/Southeast Regional Office
Mike Menge/EQ Director
Billie Wilson/Paralegal Assistant/Commissioner's Office
Dick Nenahlo/Pipeline Corridor Regional Office
George Wilson/Pipeline Corridor Regional Office
Jim Hayden/Central Office
Robert Dolan/Southcentral Regional Office
Arnie Shryock/Kodiak District Office
Brad Fristoe/Northern Regional Office
Kenwyn George/Central Office
Robert Regis/Assistant Attorney General/Juneau
Conrad Christianson/Northern Regional Office
Bill Morgan/Northern Regional Office
Tim Rumfelt/Southcentral Regional Office
Doug Redburn/Central
Dave Sturdevant/Central
Bonnie Friedman/Central

"-hard science remains our most reliable compass in a turbulent sea of environmental concerns."

William K. Reilly
EPA Administrator

## #1 Water Quality Standard Review Questionnaire/January 1992

Topic: FECAL COLIFORM BACTERIA STANDARD FOR PRIMARY CONTACT RECREATION IN SURFACE WATERS OF THE STATE

**The Current Standard for Both Fresh and Marine Waters:**

| | |
|---|---|
| Water Recreation (I) contact recreation | Based on a minimum of 5 samples taken in a 30 day period, the mean shall not exceed 20 FC/100 ml, and not more than 10% of the total samples shall exceed 40 FC/100 ml. |

Based on Triennial Review comments from the public, the fecal coliform standard for contact recreation is being reviewed. This criterion first appeared in Alaska Water Quality Standards in 1979. Substantiation for this criterion is not readily available. However, the suggested reasoning is that if a swimmer ingests water accidentally then that water should be protected at the same level as for the drinking water use.

The 1976 EPA Red Book recommended for Bathing Waters (the primary contact recreation equivalent) that the fecal coliform bacteria level should not exceed 200 colonies per 100 ml. Many states adopted this criterion directly into their standards and most remain the same today. According to the American Fisheries Society who critiqued the Red Book, "The criterion proposed for bathing waters is acceptable for human health based on the current state of epidemiological information available from recreational water studies."

EPA's 1986 water quality criteria document for bacteria maintains the validity of 200 colonies per 100 ml as the standard for contact recreation. However, the document recommends that measurement of fecal coliforms be replaced with measurement of E. coli and entercocci because they more accurately indicate risk of disease from exposure. To revise the bacteria criteria to reflect E. coli and enterococci as a new measure is beyond the scope of the present review and will be considered at a later time.

In some of the public comments for the Triennial Revision of the WQS, the view was expressed that this standard should be increased from 20 to 200 colonies per 100 ml to be consistent with the Federal fecal coliform standard for primary contact recreation.

Based on the results of a comprehensive bacterial monitoring program on several creeks in the Anchorage bowl, the Municipality of Anchorage Department of Health and Human Services believes that the current standard is too stringent. They have found that streams flowing from undeveloped, pristine areas have values that exceed 20 FC/100 ml.

Attached is a summary of other states' fecal coliform criteria for contact recreation in surface waters, provided by the Municipality of Anchorage. Two states use 100; Alaska is the only state below 100. The rest use 200 and 240.

MOA - DHHS
STATE STANDARDS FOR BACTERIA (EPA 1972)
NOVEMBER 1991
LEE B.

| STATE | PRIMARY/BODY CONTACT RECREATION FECAL COLIFORMS | TOTAL COLIFORMS |
|---|---|---|
| Alabama | 200/100 ml | |
| Alaska | 20/100 ml | |
| Arizona | 200/100 ml | |
| Arkansas | | 1,000/100 ml |
| Colorado | 100/100 ml | 1,000/100 ml |
| Connecticut | | 1,000/100 ml |
| Delaware | | 1,000/100 ml |
| District of Columbia | 240/100 ml | |
| Florida | | 1,000/100 ml |
| Hawaii | 200/100 ml | 1,000/100 ml |
| Indiana | 200/100 ml | |
| Iowa | 200/100 ml | |
| Kansas | 200/100 ml | |
| Kentucky | 200/100 ml | 1,000/100 ml |
| Louisiana | | 1,600,100 ml |
| Maine | 200/100 ml | 1,000/100 ml |
| Maryland | 240/100 ml | 5,000/100 ml |
| Massachusetts | | 70/100 ml |
| Michigan | 100/100 ml | 1,000/100 ml |
| Minnesota | | 1,000/100 ml |
| Mississippi | | 1,000/100 ml |
| Nebraska | 200/100 ml | |
| New Hampshire | 240/100 ml | |
| New Jersey | 200/100 ml | |
| New Mexico | 200/100 ml | |
| North Carolina | 200/100 ml | |
| North Dakota | | 1,000/100 ml |
| Ohio | | 1,000/100 ml |
| Oklahoma | 200/100 ml | 1,000/100 ml |
| Oregon | | 1,000/100 ml |
| Pennsylvania | | 1,000/100 ml |
| Rhode Island | | 1,000/100 ml |
| South Carolina | 200/100 ml | |
| South Dakota | 200/100 ml | |
| Tennessee | | 1,000/100 ml |
| Texas | 200/100 ml | |
| Utah | | 1,000/100 ml |
| Virginia | 200/100 ml | 2,400/100 ml |
| Washington | 240/100 ml | 1,000/100 ml |
| Wisconsin | | 1,000/100 ml |
| Wyoming | 240/100 ml | |

LB/jgk97

## #1 Water Quality Standard Review Questionnaire\January 1992

Respondent's Name: _____

**QUESTION**

1. Identify the fecal coliform criterion you believe should be proposed in this revision of the Water Quality Standards to protect the use of contact recreation in the surface waters of the State.

   20 FC/100 ml (current criterion) ☐

   100 FC/100 ml ☐

   200 FC/100 ml ☐

   Other _____

**Further Suggestions or Reasoning for Your Selection**

_____

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. If you have further questions feel free to call Katy Wilkinson at 465-5302.

Attn. Katy Wilkinson
D.E.C./Water Quality Management
P.O. Box O
Juneau, Alaska 99801-1800

# CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

Attn. Katy Wilkinson
D.E.C./Water Quality Management
P.O. Box O
Juneau, Alaska 99801-1800

"There's always an easy solution to every human problem-
neat, plausible and wrong."

H.L. Mencken

## #2 Water Quality Standard Questionnaire/January 1992

Topic: ORGANOLEPTIC CRITERIA

### EPA's Definition

An organoleptic criterion defines a concentration of a compound that imparts an undesirable taste and\or odor to water. It is applied as a human health criterion but is considered to be mostly aesthetic. The research papers that discuss taste and odor thresholds are cryptic in their descriptions of test methodologies, number of subjects tested and concentration\response relationships. Thus the quality of organoleptic data is often much lower than that of toxicological data used in establishing other criteria (Federal Register\Vol. 45, No. 231\Friday, November 28, 1980, p. 79355).

EPA's water quality criteria documents state, "It should be recognized that organoleptic data as a basis for establishing a water quality criterion have limitations and have no demonstrated relationship to potential adverse human health effects." The most recent organoleptic criteria proposed by EPA were published in 1980.

Also, when the organoleptic data are listed in EPA criteria documents there are few or no references. This could make them difficult to defend.

### Organoleptic Criteria and The Alaska Water Quality Standards

The AWQS currently adopt by reference numeric organoleptic criteria for **23** compounds (See Table 1 of the Workbook or Note 5 in the AWQS). For **12** compounds, the **only** criteria listed are organoleptic. There are no other numeric criteria for fresh or saltwater for these 12 compounds. Most of these are in the chlorinated phenol class.

In the AWQS, for toxic and other deleterious organic and inorganic substances, in freshwater, an organoleptic narrative criterion for the uses a) aquaculture and b) growth and propagation of fish, shellfish, and other aquatic life, and wildlife, is stated as follows:

**Substances shall not be present or exceed concentrations which individually or in combination impart undesirable odor or taste to fish or other aquatic organisms as determined either by bioassay or organoleptic test (See Note 5 and 8).**

In marine water, the same narrative criterion is stated for the same uses as freshwater in addition to the use of **harvesting for consumption of raw mollusks or other raw aquatic life**.

Currently there is no EPA or State implementation guidance for using organoleptic criteria as water quality standards. In Alaska, we have not applied organoleptic criteria to date and when it has been attempted there have been too many difficulties for sound implementation and enforcement. Therefore their use, placement in the AWQS, and overall purpose in the regulatory setting are under review.

Organoleptic criteria are meant to be applied as aesthetic human health criteria relating to taste or smell when drinking water or eating fish and wildlife. EPA does not recommend using them to supercede fresh or saltwater criteria that are based on sound toxicological data (i.e., EPA's aquatic life criteria).

## #2 Water Quality Standard Questionnaire\January 1992

**Questions**

1. Should the **numeric** organoleptic criteria adopted by reference be elevated into regulation as it appears in Table 1 of your workbooks?

Yes ☐ No ☐

2. Of the 23 compounds listed, are there any for which organoleptic criteria are important and necessary in certain cases?

Yes ☐ No ☐

A. If so, cite the compounds and cases when organoleptic criteria should be used.

_____

_____

_____

_____

B. List literature that is readily available to support the validity of the criteria for compounds cited in 2A.

_____

_____

_____

3. Should the **narrative** organoleptic criteria be retained?

Yes ☐ No ☐

4. If retained, to which designated uses should either the narrative or numeric organoleptic criteria apply?

_____

_____

5. If there are any wording changes recommended in the narrative criterion please write them below.

_____

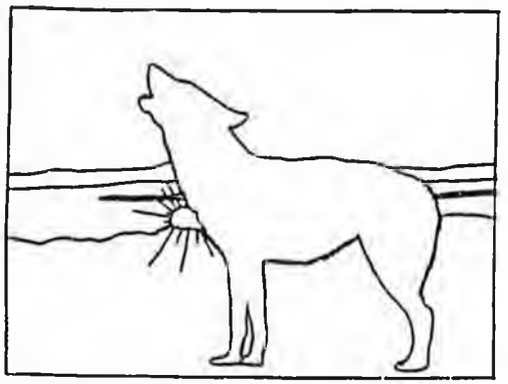
_____

_____

THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. **If you need more space on the above questions or have further suggestions on how to implement organoleptic criteria, please add attached pages.** If you have other questions feel free to call Katy Wilkinson at 465-5302.

"The Chemical Abstract Service has assigned registry numbers to some 10 million chemicals. Roughly 70,000 chemicals are used in commerce; fewer than 10,000 have some health effects data; and about 100 have some direct human data. Certainly these data limitations are formidable." (From Dr. Kim, Director of the Division of Environmental Health Assessment, New York State Department of Health).



## #3 Water Quality Standard Questionnaire/January 1992

Topic: LOWEST OBSERVED EFFECT LEVELS (LOELs) OR LOWEST OBSERVED EFFECT CONCENTRATIONS (LOECs)

**What Is an LOEL or LOEC?**

An LOEL or LOEC is the lowest concentration of a toxicant shown to have statistically significant adverse effects (i.e., reproduction, respiration, growth, behavior, etc.) on plants or animals in exposure studies.

In other words, aquatic plants and organisms are exposed in water to varying concentrations of toxic substances. The lowest concentration that results in statistically significant adverse effects is recorded as the LOEL or LOEC.

Since 1980, for saltwater and freshwater, to establish **final** aquatic life criteria, EPA requires toxicity test results from 1 species in eight different families, 3 acute-chronic tests, 1 algal test and 1 bioconcentration test. EPA follows a set of calculations to **derive** final critiera from these toxicity test results. When available data are insufficient to derive final criteria, EPA presents the LOEL as an interim criterion. It is generally presumed that final criteria will be lower values (more stringent) than LOELs. For example, when EPA calculates the final chronic value, their method is to use a conservative approach in order to approximate a no observed effects level over the long term.

The LOEL is applied only when there is no final criterion available. Currently in the Alaska Water Quality Standards (AWQS), the department has adopted by reference LOELs for fresh or saltwater for 58 compounds. This represents about one-half of the the total number of compounds for which there are criteria. The time and tax dollars it has taken to develop LOELs is significant. As an example, it took EPA several years to develop the LOEL for dioxin in freshwater.

**Discussion**

Since LOELs represent interim criteria, what are the chances that EPA will update LOELs to final criteria status? In 1985, EPA published updated criteria for eight compounds. Since then, only a few replacement criteria have been developed. **A federal district court ruled July 17, 1991** (NRDC v. EPA, DC EVa, No. 3:91CV00058, 7/17/91) **that it is not mandatory that the EPA develop and**

update numerical water quality criteria under the Clean Water Act. According to EPA attorney, Roland Dubois, "Narrative criteria will also satisfy the law."

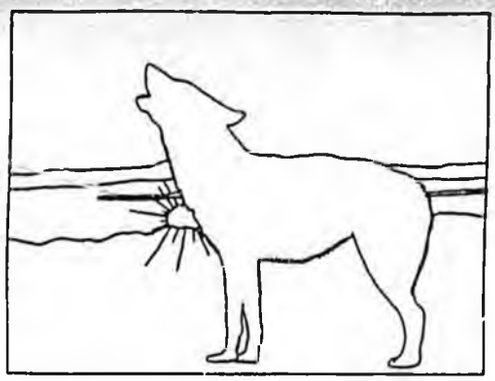
At this writing there is no guarantee that the present LOELs will be updated to final criteria by EPA. The "new" thinking in the high level ranks of EPA is to set environmental priorities based on "relative" risks to natural ecology and human welfare due to the heavy costs to society of environmental regulation (Raymond Loehr, Chair of the Science Advisory Board, 1991). In this relative risk scenario, the Science Advisory Board has placed **toxics** in the **relatively medium risk** category. This placement could translate into less funding for criteria developments of toxic pollutants in lieu of higher priority risks (March/April EPA Journal, 1991, p. 11).

**Some Final Thoughts**

1. To delete the LOELs from the WQS is to have no numeric criteria for fresh or saltwater for 58 compounds.

2. To apply an across the board factor to reduce the LOELs to a presumed no-effect-concentration is to ignore the research and charactistics of the individual compounds. Science Advisory Board member, Dr. Neuhold stated the following in April of 1990 and his view still holds true: "A significant body of scientific research has been undertaken in the last 15 years confirming that reliance on arbitrary safety factors is no longer appropriate, particularly with nonpersistent toxicants." In some cases the LOELs may prove to be more than protective for indigenous Alaskan species and in other cases, not protective enough.

3. LOELs may be the best available criteria for some time to come. Therefore, one alternative is to apply them and include a narrative to allow for site-specific criteria changes based on the results of no-effects-level toxicity tests on indigenous species.



The Congress, in 1978, established the Science Advisory Board to provide independent scientific and engineering advice to EPA and to those committees of Congress responsible for environmental matters (EPA Journal, March/April, 1991)

## #3 Water Quality Standard Review Questionnaire\January 1992

1. Should the LOELs shown in Table 1 of the Workbook be included in a similar table in the WQS?

   A. If they are included, what kind of qualifying narrative, if any, should be included to address the fact that some of the criteria may not provide sufficient protection?

2. If the LOELs are not used for those 58 compounds, what criteria could replace them, if any?

THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. If you need more space please add attached pages. If you have further questions feel free to call Katy Wilkinson at 465-5302.

"Unfortunately, the arbitrary standard can develop a life of its own, and become the purpose itself, rather than the imperfect expression of the purpose."

H.L. Lewis

## #4 Water Quality Standard Questionnaire/January 1992

TOPIC: 0.01 TIMES THE LOWEST MEASURED 96-HOUR LC50 (FOR MOST SENSITIVE ALASKAN ORGANISMS) CRITERIA

### Background Information

In August of 1991, the Department issued a policy paper stating that the 0.01 times the 96Hr LC50 values should not be applied, and that the criteria presented in Table 1 of the WQS workbooks (Gold Book chronic in most cases) should continue to be used to protect the receiving waters of the State. The main reasons for this conclusion were that 0.01 is scientifically outdated as an acute to chronic ratio, and that insufficient toxicity testing data are available for Alaska. This provision first appeared in AWQS in 1979. Since then, there have only been a couple of cases when it has been applied. If you do not have a copy of the policy paper, please write or call Katy Wilkinson at 465-5302 (address on back of attached questionnaire). Additionally, this criterion has been misused by EPA in at least five NPDES permits to **derive** wastewater effluent limits. This is not the intended purpose or use of this criterion.

### Excerpts From The Current Alaska Water Quality Standards Containing the .01 x 96HR LC50 Provision

| I. FRESH WATER USES * | II. MARINE WATER USES * | TOXIC AND OTHER DELETERIOUS ORGANIC AND INORGANIC SUBSTANCES |
|---|---|---|
| Water Supply aquaculture<br><br>Growth and Propagation of Fish, Shellfish, other Aquatic Life, and Wildlife | Water Supply aquaculture<br><br>Growth and Propagation of Fish, Shellfish, Aquatic Life, and Wildlife<br><br>Harvesting for Consumption of Raw Mollusks or other Raw Aquatic Life | Substances shall not individually or in combination exceed 0.01 times the lowest measured 96 hour $LC_{50}$ (See Note 8) for life stages of species identified by the department as being the most sensitive, biologically important to the location, or exceed criteria cited in EPA, Quality Criteria for Water (See Note 5) or Alaska Drinking Water Standards (18 AAC 80), whichever concentration is less. |
| Water Supply aquaculture | Water Supply aquaculture | PETROLEUM HYDROCARBONS, OILS AND GREASE<br><br>Shall not exceed 0.01 times the continuous flow 96 hour $LC_{50}$ or, if not available, the static test 96 hour $LC_{50}$ for the species involved. (See Notes 8 and 9). |
| Growth and Propagation of Fish, Shellfish, other Aquatic Life, and Wildlife | Growth and Propagation of Fish, Shellfish, Aquatic Life, and Wildlife | Total hydrocarbons in the water column shall not exceed 15 ug/l or 0.01 of the lowest measured continuous flow 96 hour $LC_{50}$ for life stages of species identified by the department as the most sensitive, biologically important species in a particular location, whichever concentration is less (See Notes 8 and 9). Total aromatic hydrocarbons in the water column shall not exceed 10 ug/l, or 0.01 of the lowest measured continuous flow 96 hour $LC_{50}$ for life stages of species identified by the department as the most sensitive, biologically important species in a particular location whichever concentration is less (See Notes 9 and 10). |

The 0.01 x 96Hr LC50 provision **will be deleted** from the revised 1992 Water Quality Standards. A new approach is needed if we are to retain the ability to develop criteria based on toxicity tests of Alaskan species. Such criteria could be used, for example where we want to address site-specific Alaskan conditions. There is currently no intent for the Department to get seriously into the business of toxicity testing. However, we may want to address site-specific cases, probably by requiring permittees to conduct the toxicity testing. Implementation would be at the Department's discretion.

**Alternatives To The 0.01 Times The 96Hr-LC50 Criterion**

1. Do **not replace** the 0.01 LC50 provision with any other narrative criterion at this time. This would place the sole burden of protecting Alaskan species on EPA's national numeric criteria, many of which are LOELs.

2. Replace 0.01 LC50 with a discretionary provision allowing criteria to be developed through Alaskan species toxicity testing based on the **No Observed Effects Level** (NOEL) test method. This would mean requiring applicants to do NOEL toxicity tests. According to one Triennial Response commentor, the State of California's Ocean Plan uses this approach.

**Key Points of Triennial Response Commentors:**

a) Treatment of chronic toxicity limits as **instantaneous** limits are not approriate.
b) No **single** application factor should be applied for all compounds.
c) **Actual** concentration and length of exposure are always considered.

Although this is a cursory treatment of a complex subject please review and respond to the questions on the following page as best as you can.

## CHANGE IS HERE TO STAY

### #4 Water Quality Standard Questionnaire/January 1992

1. Do not replace the 0.01 x 96HR LC50 provision with any other narrative criterion at this time and defer it for three years until the next WQS revision?

yes ☐ no ☐

2. Replace the 0.01 x 96Hr LC50 with a discretionary provision allowing criteria to be developed through Alaskan species toxicity testing based the NOEL test method.

yes ☐ no ☐

A) If your answer is yes, please suggest specifics. For example, should there be a minimum of three species tested? What species? Is it a given that the applicant must pay for and provide the site-specific criteria? What specific cases would merit requiring site-specific criteria? Suggest regulatory language that best spells out how and when this provision should be used.

3. Are there other narrative criteria that you can suggest to address the special consideration of allowing for site-specific, Alaskan toxicity testing? If so please elaborate below.

THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. If you need more space please add attached pages. If you have further questions, feel free to call Katy Wilkinson at 465-5302.

# MEMORANDUM STATE OF ALASKA

**DEPARTMENT OF ENVIRONMENTAL CONSERVATION**
**Division of Environmental Quality**

TO: Water Quality Standards
Work Group Member

DATE: April 1, 1992

FILE NO.:

FROM: Katy Wilkinson

PHONE NO.: 465-5302

SUBJECT: Water Quality Standard Questionnaires

Enclosed are four more questionnaires on Water Quality issues that we are addressing in the revision. Also enclosed are a copy of a public notice sent out by our section requesting information on waterbodies that may not meet Water Quality Standards; a paper titled, "A Brief History of the Classification of Alaskan Waters;" and a one page historical update titled "The History of How Revisions of the Water Quality Standards Have Affected Criteria - Using the Cyanide Criteria As An Example." I hope that these historical briefs in addition to the questionnaires will help you to understand how certain aspects of the WQS have evolved.

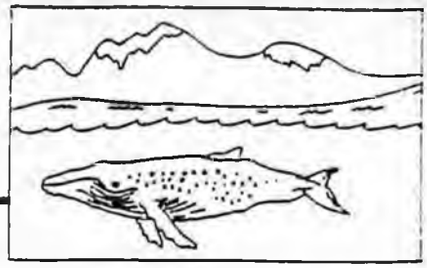
Responses to the first eight questionnaires will have to be in by May 15. I appreciate those who have responded in a timely manner on the first four. We encourage everyone to participate. Please do not feel that your answers must reflect years of careful study on the subject. We are interested in your thoughts, ideas and common sense approaches of what will work versus what won't.

I would like to reiterate that once the revision is compiled, it will go out for a full public review. The target date for the final public review is this September. The public will also have the opportunity to respond to all the questionnaires as you have.

The next topic on the WQS agenda is human health criteria. I have been working to develop a table of human health criteria for the state as required by Section 303(c)(2)(B) of the Clean Water Act. This will be the next product that will be sent out for your review. In the interim, if you have any questions on WQS issues that I may be able to help you with please feel free to give me a call. Thank you for your time and interest.

ADEC Water Quality Work Group Members

Jeff Hock/EQ Monitoring Lab
Cameron Leonard/Assistant Attorney General, Fairbanks
Bill Lamoreaux/Anchorage District Office
Bruce Erickson/Western District Office
Les Buchholz/Kenai District Office
Simon Mawson/Pipeline Corridor Regional Office
Ron Doyel/Matanuska-Susitna District Office
Paul Pinard/Matanuska-Susitna District Office
Jane Tonkin/Cordova Field Office
Clara Jodwalis/Northern Regional Office
Dick Stokes/Southeast Regional Office
Ron Flinn/Southeast Regional Office
Amy Kruse/Southeast Regional Office
Sharmon Stambaugh/Southeast Regional Office
Pete McGee/Northern Regional Office
Joyce Beelman/Northern Regional Office
Al Keglar/Juneau District Office
Steve Haavig/Juneau District Office
Jim Clare/Sitka District Office
Barry Hogarty/Ketchikan District Office
Randy Romenesko/Nome District Office
Doug Dasher/Interior District Office
Svendt Brandt-Erichsen/Southcentral Regional Office
Ursula Spannagel/Southeast Regional Office
Mike Menge/EQ Director/Central Office
Billie Wilson/Paralegal Assistant/Commissioner's Office
Dick Nenahlo/Pipeline Corridor Regional Office
George Wilson/Pipeline Corridor Regional Office
Jim Hayden/Central Office
Robert Dolan/Southcentral Regional Office
Arnie Shryock/Kodiak District Office
Brad Fristoe/Northern Regional Office
Kenwyn George/Central Office
Robert Regis/Assistant Attorney General/Juneau
Conrad Christianson/Northern Regional Office
Bill Morgan/Northern Regional Office
Tim Rumfelt/Southcentral Regional Office
Doug Redburn/Central Office
Dave Sturdevant/Central Office
Bonnie Friedman/Central/Anchorage
Kit Ballentine/EH Director/Central Office
Tim Wingerter/Pipeline Corridor Regional Office
Linda Himmelbauer/EQ Monitoring Lab
Mehrdad Nadem/Pipeline Corridor Regional Office
Jean Bodeau/Central/Anchorage



**#5 Water Quality Standard Questionnaire/February 1992**

Topic: TOTAL AROMATIC HYDROCARBON STANDARD

The current water quality criterion for total aromatic hydrocarbons (TAH) to protect the growth and propagation of fish, shellfish, and wildlife use for fresh and marine waters is as follows:

> **Total aromatic hydrocarbons in the water column shall not exceed 10 ug/l, or 0.01 of the lowest measured continuous flow 96Hr LC50 for life stages of species identified by the Department as the most sensitive, biologically important species in a particular location, whichever concentration is less.**

In the Triennial Review of the Water Quality Standards, the Department is proposing to delete the 0.01 times the 96Hr LC50 provision because it is based on acute (LC50) rather than chronic measurement, and because the application factor of 0.01 is scientifically outdated. The DEC Water Quality Standards group is reviewing alternative provisions based on discretionary use of chronic testing.

Due to the proposed deletion of the 0.01 LC50 provision, a review of information related to the existing criteria based on this application factor, including TAH, is warranted. The Water Quality Management Section is requesting any information you may have on hydrocarbon toxicity using water soluble fractions.

**Background Information**

The TAH criterion of 10 ug/l (or parts per billion) was adopted into the AWQS in 1979. The Department used a two-tiered approach to establish this criterion: (1) a review of laboratory and field test literature on the sublethal, chronic and acute levels of aromatic hydrocarbons to determine actual chronic values of the most sensitive species; and (2) a comparative approach using the 0.01 factor applied to acute (96Hr-LC50) toxicity values for sensitive life stages to see how these derived chronic values compared to the actual chronic values taken from scientific literature. The comparison of values from the two approaches showed reasonable agreement for some sensitive species, particularly with respect to the adverse effect on photosynthetic activity of phytoplankton. The approach of using the 0.01 application factor with LC50 (acute) data in lieu of actual chronic toxicity data was consistent with national EPA guidance at the time. The department did not state the duration of exposure associated with the chronic criterion of 10 ug/l TAH and has applied the value as an instantaneous, never-to-be-exceeded limit.

The literature the Department reviewed included 60 articles written by 44 different authors dating from 1982 to 1974. New literature available since 1982 needs to be evaluated to update the scientific basis for selecting a TAH criterion.

One purpose of the Triennial Review is to evaluate existing criteria in light of current scientific findings. It is important that the TAH criterion is based on defensible, good

science and includes a determination that current research supports the criterion developed.

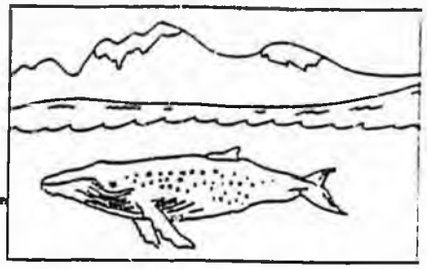
Triennial Response commentors have brought out some of the above points and indicated that the literature the Department reviewed to determine the 10 ppb criterion was based on longer term exposure studies and not acute or short-term toxicity tests that would lead to never-to-be-exceeded limits.

Since 1979, EPA has developed the two-number criterion approach emphasizing the acute (1-hour average) criterion and the chronic (4-day average) criterion. The Department has adopted some LOEL criteria based on studies with up to 27 day averages. It is recognized by the Water Quality Standards group that duration of exposure used to develop the criteria, whether acute or chronic, is an integral part of the application of criteria to permits and in subsequent compliance monitoring.

**Discussion**

The Water Quality Standards group wants to begin the process of evaluating the the existing TAH criterion of 10 ppb and determine whether there is a need to revisit this criterion. Therefore, we solicit your input to the questions on the following page.

KW/WQM



**#5 Water Quality Standard Questionnaire/February 1992**

Respondent's Name _____

Agency or Company _____

1. Should the total aromatic hydrocarbon criterion be reassessed in light of the proposed deletion of the 0.01 LC50 provision, or because of new scientific information?

Yes ☐ No ☐

Please include relevant literature or data.

2. Should there be **clarification** language in the water quality standards that clearly states 10 ppb is a chronic criterion and for compliance monitoring should not be applied as an "instantaneous" never-to-be-exceeded limit?

Yes ☐ No ☐

An alternative would be to apply the number as an average over a period of time (ie. 4-day average).

A) If your answer is yes, specify clarification language you would like to see.

_____
_____
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THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. If you need more space please add attached pages. If you have further questions, feel free to call Katy Wilkinson at 465-5302.

## #6 WATER QUALITY STANDARD QUESTIONNAIRE/FEBRUARY 1992

Topic: TOTAL HYDROCARBON STANDARD

The total hydrocarbons (TH) criterion is a companion to the total aromatic hydrocarbons (TAH) criterion. The current water quality criterion for total hydrocarbons to protect the growth and propagation of fish, shellfish, and wildlife use for fresh and marine waters is as follows:

> **Total hydrocarbons in the water column shall not exceed 15 ug/l, or 0.01 of the lowest measured continuous flow 96 hour LC50 for life stages of species identified by the department as the most sensitive, biologically important species in a particular location, whichever concentration is less.**

When DEC adopted the 15 ppb TH limit in 1979, it was stated, "as the field and laboratory data base for TAH expands, it is anticipated that the TH standard will be revised or possibly dropped." In fact, historically, the Department has infrequently used the TH standard in NPDES permits, relying on the TAH standard in the vast majority of cases. A problem exists in that current wording of the WQS implies that both TAH and TH limits need to be applied.

In this Triennial Water Quality Standards revision, the Department is proposing to delete the 0.01 LC50 provision because it is based on acute (LC50) rather than chronic measurement, and because the application factor of 0.01 is scientifically outdated (See Questionnaire #4). The DEC Water Quality Standards group is reviewing alternatives to replace this provision, including the possibility of a provision for a "no observed effects concentration" (NOEC) approach to be required at the discretion of the Department.

Due to a variety of reasons, including the proposed deletion of the 0.01 LC50 provision, a review of the TH criterion is warranted.

### Background Information

An explanation of the origin of the TH criterion is given in the following statement by DEC employee Bill Lamoreaux dated June 1988.

> **Total hydrocarbon (TH) concentrations in the water soluble phase are generally proportional to total aromatic hydrocarbons (TAH) concentrations in the same test solution (Anderson in Wolf, 1977; Rice, Short and Karinen in Wolf, 1977). This toxicity ratio (TH:TAH) is roughly 1.5 to 1 for crude oil using various fish species as test organisms. Given that the TAH criterion is 10 ppb and applying this average ratio, an allowable level of 15 ppb (ug/l) total hydrocarbons (using infrared analyses) was adopted for the aquatic environment.**

So the TH criterion is developed directly from the criterion of TAH of 10 ppb. The TAH criterion is based partly on the application of the 0.01 factor and partly on a literature review (See Questionnaire #5).

In addition, the LC50 test procedure is based on laboratory measurement of the water soluble petroleum hydrocarbon fraction, excluding whole oil droplets or oily particles. The few permits that incorporate TH have used a method that measures "total" petroleum hydrocarbons which includes the droplet/particle fraction. It has been found that the TH to TAH ratio is highly variable, depending on the type of hydrocarbon, length of exposure, etc.. In one Alaskan case, using the total petroleum hydrocarbon method, it was found that the actual ratio of TH to TAH exceeded 560 to 1. This obviously skews results greatly compared to measuring only the water soluble fraction.

A key point here is that to require a total hydrocarbon measurement and match it against a criterion that only takes into account the water soluble fraction of petroleum hydrocarbons is analytically inconsistent. The Water Quality Standards group in recent months has worked to achieve sample preparation consistency with the numeric criteria for toxic compounds (See 1991 Alaska Water Quality Standards Workbook. Table 1).

Additionally, the analytical method often "defines" the pollutant. In the definition section of the Water Quality Standards under "total hydrocarbons", method 503B is cited to measure total hydrocarbons. This method actually defines the parameter "oil and grease" and was primarily developed to provide a crude screening analysis to determine approximate amounts of oils and greases in sewage treatment facilities. Given the technological advances made in hydrocarbon analytical techniques, the WQS group is considering more appropriate analytical methods to define the pollutants in question, including oil and grease and petroleum hydrocarbons. It is planned to form a technical advisory group to re-evaluate analytical methods required to meet the WQS.

Triennial Response commentors noted the following additional concerns.

> "TH itself is a nonspecific criterion that is not useful as a water quality criterion. It does not differentiate between nontoxic and toxic materials such as aromatic hydrocarbons (BETX), and is therefore very imprecise."
>
> "..no other states that regulate oil and grease or total hydrocarbons have water quality standards in the ppb range. Four of the five states that have receiving water quality criteria for oil and grease have a 10 ppm standard, and the fifth has a 1 ppm standard. A number of states also include oil and grease effluent limitations that range from 10-75 ppm, with 15 ppm being the most common. Alaska's 15 ppb TH standard is orders of a magnitude more restrictive than any other state standard." (See Attached table provided by the commentor)

Please review the questions on the following page and respond as best as you can.

KV/WQM

## #6 WATER QUALITY STANDARD QUESTIONNAIRE/FEBRUARY 1992

Respondent's Name _____

Agency or Company _____

1. Should the Total Hydrocarbon criterion of 15 ppb be retained as a measure of the water soluble fraction of petroleum?

Yes ☐ No ☐

2. Should the total hydrocarbon criterion be revised with clear identification of the method of analysis to define what is meant by total hydrocarbons?

Yes ☐ No ☐

3. Should the total hydrocarbon criterion be omitted because it is duplicative of the TAH criterion or because it is based on the 1.5 to 1 TH:TAH toxicity ratio?

Yes ☐ No ☐

If you have further comments or suggestions please write them below.

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**THANK YOU FOR YOUR TIME AND EXPERTISE**

Please fold this page and mail. If you have further questions feel free to call Katy Wilkinson at 465-5302.

TABLE 1

## Survey of State Water Quality Standards for Total Hydrocarbons

| STATE | Total Hydrocarbons/ Oil & Grease Standard[2] | Permit or Receiving Water Limitation | Authority | Source[1] |
|---|---|---|---|---|
| Alaska | 15 µg/l or 0.01 of the lowest measured cont. flow 96 hr. $LC_{50}$ for life stages of most sensitive species | Receiving | 18 Alaska Admin. Code §70.020 (1989) | BNA |
| Alabama | Narrative | Receiving | Ala. Water Imp. Comm., Tit. II, § IV. 2 (1982) | BNA |
| Arizona | Narrative | Receiving | Ariz. Surface Water Quality Standards, Arizona Admin. Rules & Reg., Title 18, Chap. 11, Art. 1, § R9-21-204 C. (1989 | BNA |
| Arkansas | Narrative with Numerical Guideline: 10 mg/l av. or 15 mg/l max. when discharged to surface waters (Effluent lmt) | Receiving | Reg. No.2, Surface Water Standards for Ark., § 6 (J) (1988) | BNA |
| California | Ocean Discharges: (Effluent lmt) Numerical: 25 mg/l monthly 40 mg/l weekly 75 mg/l maximum (applies only to publicly owned treatment works & industrial discharges for which no limitations have been set in FWPCA) | Permit | Water Quality Control Plan for Ocean Waters of Ca., Chap. IIB.1, Chap. IV, Table A, Ca. State Water Resources Control Board (1978) | EPA 1982 |
| Colorado | Numerical: 10 mg/l max. plus no visible sheen (Effluent lmt.) | Permit | Col. Water Quality Control Regs., § 10.1.4, Code of Col. Regs., Title 5, Chap. 1002, Art. 3 (1990) | BNA |
| | Narrative | Receiving | Col. Water Quality Standards for Surface Waters, Code of Col. Regs., Title 5, Chap. 1002, § 3.1.11 (1989) | BNA |
| Connecticut | Narrative | Receiving | Dept. of Environmental Protection, Water Compliance Unit Water Quality Standards, III. 3. (1987) | BNA |

TABLE 1

1. The information in this table is a compilation of Oil and Grease standards reported in State Water Laws, Environmental Reporter. (BNA) (Vols. 1-5) -- designated herein as BNA. Unless otherwise stated, those values not contained in the BNA Reporter are derived from an earlier EPA compilation, A Compilation of Water Quality Standards for Marine Waters, E.P.A. (1982) -- designated herein as EPA (1982). All states with numerical standards are included. Not all states with narrative standards are listed. If a state is not listed, it has a narrative standard.

2. Numerical standards are expressed as $\mu$g/l or mg/l:
   $\mu$g/l = micrograms per liter or parts per billion (ppb)
   mg/l = milligrams per liter or parts per million (ppm)

TABLE 1 (cont'd)

| | | | | |
|---|---|---|---|---|
| Delaware | (1) Narrative | Receiving | Del. Surface Water Quality Standards, § 4 (a)(i), Del. Dept. Nat. Resources & Env. Control (1990) | BNA |
| | (2) Numerical: (Effluent Lmt) | Permit | Del.River Basin Comm. Water Quality Regs., Admin. Manual, Pt. III, § 3.10.40.b. (1991) | BNA |

Oil and Grease:

1. Oil Storage Terminal Runoff: 15 mg/l max. av. where precipitation not greater than 2"/hr or 4 1/2" in 24 hrs.; or max. runoff of 80 gal./min. over 24 hrs. Determined from samples that are representative of actual discharge.
2. Industrial Wastewater Discharges: EPA effluent standards for industrial category in question.

| | | | | |
|---|---|---|---|---|
| District of Columbia | Narrative | Receiving | D.C. Water Quality Standards, Municipal Regs, Title 21, Chap. 11, § 1102 (1987) | BNA |
| Florida | Narrative/Numerical: 5.0 mg/l plus no undissolved oil, or visible oil defined as iridescence | Receiving | Fla. Water Quality Standards, Title 17, Dept. of Env. Reg., § 17-302.510.(3)(k) (1990) | BNA |
| Georgia | Narrative | Receiving | Ga. Water Quality Control Regs & Standards, Title 391, Chap. 3, Rule 6, § 391-3-6.03(5)(b) (1991) | BNA |
| Hawaii | Narrative | Receiving | Hawaii Water Quality Standards, Title 11, Chapter 54, § 11-54-04 (a)(2) (1990) | BNA |
| Idaho | Narrative | Receiving | Idaho Water Quality Standards, Idaho Dept. of Health & Welfare, Div. of Env. Regs., Title 1, Chap. 2, § 01.2200.04 (1990) | BNA |
| Indiana | Grand Calumet River & Indiana Harbor Ship Canal: 10.0 mg/l plus no film or coating of banks | Receiving | Indiana Water Quality Standards, Ind. Admin. Code, 327 IAC 2-8-5(8) (1990) | BNA |
| Louisiana | Narrative | Receiving | La. Admin. Code, Title 33, Part IX, Chap. 11 (1989) | BNA |

TABLE 1 (cont'd)

| | | | | |
|---|---|---|---|---|
| Maine | Narrative/Numerical (Effluent lmt) | Permit | Maine Water Quality Regs., Chapter 588 (1989) | BNA |

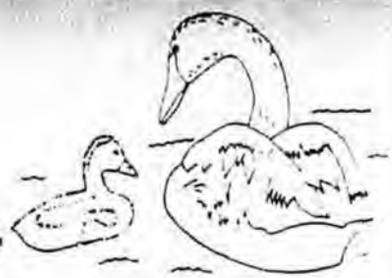
Chapter 588 Waste Discharge License by Rule Standards
5. Waste Discharge Activities
8. Petroleum Storage & Transfer Facilities
1. Applicability. This subsection is applicable to discharges of treated stormwater runoff from existing petroleum storage and transfer facilities including marketing and pipeline terminals and marketing bulk plant.
2. Effluent Limitations & Conditions (Stormwater runoff only)
(c) The effluent from the oil/water separator shall not exceed 15 mg/l oil and grease based on an arithmetic average of 4 grab samples as measured by methodology 503A -- Standard Methods for the Examination of Water and Wastewater.
(d) The effluent shall not contain a visible oil sheen, foam or floating solids at any time.

| | | | | |
|---|---|---|---|---|
| Maryland | Narrative | Receiving | Md. Water Pollution Control Regs., Title 26, (1990) | BNA |
| Massachusetts | Narrative (Surface Waters) | Receiving | Mass. Surface Water Quality Standards, Title 314 Chapter 4 (1990) | BNA |
| | Numerical: (Groundwater) 15 mg/l max., Class I & II groundwater (Effluent lmt) | Permit | Mass. Groundwater Discharge Permit Regs., Title 314, Chapter 5, § 5.10(3)(a)5. (1990) | BNA |
| Mississippi | Narrative | Receiving | Miss. Water Quality Criteria for Intrastate, Interstate, & Coastal Waters (1985) | BNA |
| Nebraska | 10 mg/l | Receiving | Nebraska Water Quality Standards, Dept. of Env. Control, Title 117, Chap. 4, § 003.01D (1990) | BNA |
| New Hampshire | Narrative | Receiving | N.H. Water Quality Standards N.H. Code of Admin Rules, Env-Ws 432.03(a)(5) (1990) | BNA |
| New Jersey | Narrative | Receiving | N.J. Surface & Groundwater Water Quality Standards, N.J. A.C. Title 7, Chap. 9 §§ 7:9-4.14(c)4., 7:9-6.6(c) 29 (1989) | BNA |
| New York | Narrative | Receiving | N.Y. Water Classifications & Quality Standards, N.Y. Code, Title 6, Chap. V., Pt. 609, § 701.20 Item 1 (1988) | BNA |
| No. Carolina | Narrative | Receiving | No. Car. Water Quality Standards, No. Car. Admin Code, Title 15A, Chap. 2, Subchap. 2B §§ .0211(b)(F), .0212(b)(F) (1990) | BNA |
| Oregon | Narrative | Receiving | Oregon Water Quality Standards Ore. Admin. Rules, Chap. 340 (1990) | BNA |
| Rhode Island | Narrative | Receiving | R.I. Water Quality Standards, R.I. Water Quality Regs., § 6.32 (1988) | BNA |

TABLE 1 (cont'd)

| | | | | | |
|---|---|---|---|---|---|
| South Carolina | | Narrative | Receiving | So. Car. Water Classification Standards, So. Car. Code of Regs., Chap. 61 § E.(2)(b) (1990) | BNA |
| South Dakota | | 10 mg/l or a visible sheen or film | Receiving | So. Dak. Water Quality Standards, So. Dak. Admin. Code, Title 74, Art. 74:03:02:29 (1987) | BNA |
| Tennessee | (1) | Narrative | Receiving | Tenn. Water Quality Criteria Tenn. Rules & Regs., Chap. 1200-4, Rule 3 (1983) | BNA |
| | (2) | Effluent Lmt: Industrial Wastewater Treatment Plants 30 mg/l daily max plus no visible or floating oil or grease | Permit | Tenn. Effluent Lmts and Standards, Tenn. Water Quality Control Bd., Chap. 1200-4-5.03 (1977) | BNA |
| Texas | | Narrative | Receiving | Texas Water Quality Standards Tex. Admin. Code, Title 31, § 307.4 (1988) | BNA |
| Virginia | (1) | Narrative (Surface Waters) | Receiving | Va. Water Quality Standards VR680-21-01.2B. (1990) | BNA |
| | (2) | Numerical: (Groundwater) 1 mg/l | Receiving | Va. Water Quality Standards VR680-21-04.3 (1990) | BNA |
| Washington | | Narrative | Receiving | WAC 173-201-045 (1988) | BNA |
| Wyoming | | Effluent lmt for "produced water"* 10 mg/l max. in any single properly preserved grab sample | Permit | Wyo. Effluent Guidelines for Oil and Gas, Wyo. Dept. of Env. Quality, Chap. VII, § 4.e. (1978) | BNA |
| Guam | | Narrative | Receiving | Guam Water Quality Standards § II B. 10 (1982) | EPA 1982 |
| Puerto Rico | | Narrative | Receiving | Puerto Rico Env. Qual. Bd., Water Quality Standards Regs, Article 3, § 3.1.1 (1987) | BNA |
| Tr. Territories of the Pacific | | Narrative | Receiving | Marine & Freshwater Quality Standard Regs, Title 63, Chap. 13, Subchap. VII, Pt. 6, § (A) (1), (9) | EPA 1983 |
| Virgin Islands | | Narrative | Receiving | Water Quality Standards for Coastal Waters of the Virgin Islands, Chap. 7 | EPA 1982 |

* Underground water which surfaces through oil and/or gas wells and which is usually disposed of by reinjection, discharge to complete containment ponds or, after treatment for removal of oil, discharged to surface waters of the State.



## #7 WATER QUALITY STANDARD QUESTIONNAIRE/MARCH 1992

TOPIC: REVIEW OF THE CYANIDE STANDARD AND IT'S APPLICATION TO THE SURFACE AND GROUNDWATERS OF THE STATE

The purpose of this questionnaire is to clarify how aquatic life criteria and human health criteria for **noncarcinogens** are applied to protect fresh waters, marine waters and groundwaters of the State. The criteria for cyanide are used as an illustration.

The numeric criteria for cyanide are adopted by reference in the Water Quality Standards (WQS) under the parameter, "Toxic and Other Deleterious Organic and Inorganic Substances" (Section 18 AAC 70.020). The applicable numeric criteria can be found in Table 1 of the Workbook or the Excerpts. The numeric criteria for cyanide include the criterion for freshwaters and the criterion for marine waters. The freshwater criterion also applies to groundwaters. Additionally, there is a narrative criterion applicable to groundwaters under the marine industrial use.

The State's cyanide criterion for fresh waters is EPA's aquatic life, chronic criterion of **5.2 ug/l (4-day average, measured as free cyanide)**. The criterion for marine waters is EPA's aquatic life, acute criterion of **1.0 ug/l (1-hour average, measured as free cyanide)**. There is no chronic criterion for saltwater available so the acute criterion of 1 ug/l is applied. The WQS human health criterion of **200 ug/l** is EPA's recommended criterion, and is derived from the US Public Health Service Drinking Water Standards.

Section 18 AAC 70.050. CLASSIFICATION OF STATE WATERS states what classes or designated uses apply to fresh, marine and groundwaters of the state. The fresh waters and marine waters of the State are protected for all designated uses unless they have been reclassified. Groundwaters are protected for the four, freshwater water supply uses and the marine industrial use.

According to the WQS, section 18 AAC 70.030, if a waterbody is protected for more than one designated use, the most stringent water quality criteria for all the designated uses will apply. This means that for both fresh waters and groundwaters the aquatic life criterion of 5.2 ug/l (4-day average, measured as free cyanide) is the applicable criterion because it is more stringent than the 200 ug/l human health criterion. Likewise, the marine aquatic life criterion of 1.0 ug/l is the applicable criterion because it is more stringent than the human health criterion of 200 ug/l.

The department is reviewing the possibility of applying the human health criterion of 200 ug/l to the groundwaters of the state. The question has been raised as to why aquatic life criteria should apply to groundwaters, since groundwaters contain essentially no aquatic life. Of course, there often is exchange between surface and groundwaters. One proposal is to apply the aquatic life criterion of 5.2 ug/l (4-day average, measured as free cyanide) at any point of groundwater discharge to the surface (measured just prior to mixing with the surface waters).

For some compounds, other than cyanide, the human health criterion may be **more stringent** than the aquatic life criteria for the same compound. If human health criteria are to be directly applied to the groundwaters then there may be cases when the criteria would be lower than the aquatic life.

**The Cyanide Criteria For Alaska's Surface Waters**

The cyanide criterion of **5.2 ug/l (4-day average, measured as free cyanide)** applies to all the fresh, surface waters of the state unless waterbodies have been reclassified.

Also, for marine water, the cyanide criterion of **1 ug/l (1-hour average, measured as free cyanide)** applies to all the marine waters of the state unless waterbodies have been reclassified.

**The Cyanide Criteria For Alaska's Groundwaters**

The groundwaters of the state are not protected for all uses. However, they are protected for all freshwater water supply uses. They are not protected for water recreation or growth and propagation of fish. To reiterate, a key issue of this questionnaire is that although groundwaters are not protected for the growth and propagation of fish use, the aquatic life criterion is currently applied to protect the water supply uses, including drinking water.

So, the cyanide freshwater chronic criterion of **5.2 ug/l (4-day average, measured as free cyanide)** applies to the four **water supply** uses for groundwater.

Presently groundwaters are also protected for the marine industrial use. The marine narrative criterion states that, "substances shall not be present which pose hazards to worker contact." This criterion is identical to that for the freshwater industrial use.

This is somewhat perplexing to the Water Quality Standards group. It is not clear in the standards why this use is protected for groundwater. One proposal is to delete this provision for groundwater from the WQS as it could be a typographical error.

Given this information as background please answer the questions on the following page as best as you can.

KW/WQM

## #7 WATER QUALITY STANDARD QUESTIONNAIRE/MARCH 1992

Respondent's Name _____

Agency or Company _____

1. Retain the current application of the aquatic life criterion of 5.2 ug/l (4-day average, measured as free cyanide) to the groundwaters of the state.

Yes ☐ No ☐

2. Apply the human health criterion of 200 ug/l for free cyanide to groundwaters.

Yes ☐ No ☐

a) If your answer to #2 is yes, then apply the aquatic life criterion of 5.2 ug/l at the point of discharge of groundwaters to surface waters (measured just prior to mixing with the surface waters).

Yes ☐ No ☐

b) If your answer to #2 is yes then do you believe this procedure of applying human health criteria to protect human health for groundwater is applicable to other compounds other than cyanide, even where the human health criterion may be lower than the aquatic life criterion?

Yes ☐ No ☐

3. Delete the provision that groundwaters are protected for the marine industrial use.

Yes ☐ No ☐

a) If your answer to the above question is no, please explain in what circumstance that groundwaters should be protected for the industrial use in marine water. Note that groundwaters are also protected for the freshwater industrial use.

_____

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THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. If you have further questions feel free to call Katy Wilkinson at 465-5302.

## #8 WATER QUALITY STANDARD QUESTIONNAIRE/MARCH 1992

Topic: SEDIMENT STANDARD (Not applicable to groundwater supplies)

The purpose of this questionnaire is to propose some language to clarify the sediment standard. The need for this clarification has been brought up by Triennial Response commentors and confirmed by the Water Quality Standards group.

**Background Information**

The applicable criterion for any waterbody is the most stringent criterion for all the designated uses. The most stringent water quality criterion for sediment in freshwater is as follows:

> **No increase in concentration of sediment, including settleable solids, above natural conditions (See Note 15).**
>
> **Note 15.** Volumetric measurements of settleable solids must be determined according to the following procedure: fill an Imhoff cone to the one-liter mark with a thoroughly mixed sample. Settle for 45 minutes; gently stir sides of cone with a rod or by spinning; settle 15 minutes longer, and record volume of settleable matter in the cone as milliliters per liter. If the settled matter contains pockets of liquid between large settled particles, estimate volume of these and subtract from volume of settled matter.

The most stringent water quality criterion for sediment in marine water is as follows:

> **No measureable increase in concentrations above natural conditions.**

The definition in 18 AAC 70.110 (37) states that sediment means "solid material of organic or mineral origin that is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and organic material such as humus."

**Analytical Method Review**

The sediment parameter has been carried over from several previous revisions without clear identification of what exactly is to be measured and hence, regulated. In 1985 an amendment was made to the sediment standard to clarify that sediment in the form of settleable solids is to be measured by the Imhoff cone method.

The WQS definition of sediment is clear enough in itself; however, as was discussed in Questionnaire #6, the parameter is "defined" by the analytical method prescribed. The term "sediment" can be taken to mean several different parameters as defined by distinctly different analytical methods. Solid material suspended in water can be measured by direct methods (e.g., methods that directly measure the total suspended solids) and by indirect methods (e.g., use of turbidity to determine the level of suspended solids). Solid material that is deposited from water is typically measured by a direct method (Imhoff cone) to determine "settleable solids."

The sediment standard for freshwater is intended only to regulate measureable settleable solids as is defined by the method cited in Note 15. No other analytical method is cited that would define any other parameter required for measurement (e.g., total suspended solids). The WQS group is considering deleting the term "sediment" as too general for the WQS regulation.

We propose to delete the definition for "sediment" and replace it with a definition for "settleable solids" as measured by the volumetric Imhoff cone method 2540 F described in the 17th edition of Standard Methods for the Examination of Water and Wastewater, p. 2-78 (See Attachment).

The WQS group also is considering deleting "sediment" from the freshwater criterion, leaving "settleable solids." "Settleable solids" likewise would be added to the marine criterion.

Further, in the 1985 amendments to the WQS, the word "measured" was deleted from the freshwater criterion for sediment. The reasoning for this is not clear. The WQS group is considering reinstating the word "measured" as it is used in the marine criterion for sediment. In summary, the freshwater sediment criterion would be clarified as follows:

> **No measureable increase in settleable solids above natural conditions. Settleable solids are defined by the volumetric Imhoff cone method described in Note 15, p. 21.**

The marine sediment standard would be clarified to read as follows:

> **No measureable increase in settleable solids above natural conditions. Settleable solids are defined by the volumetric Imhoff cone method described in Note 15, p. 21.**

**Total Suspended Solids Versus Turbidity**

In 1985 and more recently, Triennial Response commentors have suggested that the WQS also incorporate total suspended solids in addition to turbidity and settleable solids. However, the accepted techniques for measuring suspended solids (Method 2540 D, See Attachment) are time consuming and expensive, and require special laboratory equipment (e.g., drying oven, sensitive analytical balance). NPDES permits require measurements to be taken by the discharger. To regulate industry, it is necessary to have methods of measurement that are cost-effective and can be performed by the operator on-site. The Department has found that, if required methods are unnecessarily difficult, even agency chemists will not use them routinely. The Department therefore believes that requiring measurement of total suspended solids is not practicable in many situations.

Although turbidity and suspended solids are not synonymous, they are related, and turbidity can be used to help define the level of suspended solids (Peterson and others, 1985). The Department maintains that the turbidity levels, measured on-site by a nephelometer, provide the best practical means to regulate solids in suspension.

KW/WQM

## #8 WATER QUALITY STANDARD QUESTIONNAIRE/MARCH 1992

Respondent's Name _____

Agency or Company _____

1. Should the term "sediment" be removed leaving the term "settleable solids", as defined by the Imhoff cone method, in the freshwater criterion?

Yes ☐ No ☐

2. Likewise, should the term "settleable solids" be added to the marine criterion?

Yes ☐ No ☐

3. Review again the following clarification language for the freshwater sediment criterion. Add changes or comments in the space provided below.

**No measureable increase in settleable solids above natural conditions. Settleable solids are defined by the volumetric Imhoff cone method described in Note 15, p. 21.**

_____
_____
_____
_____
_____

4. Please add any other comments or describe what you feel the sediment standard issues are.

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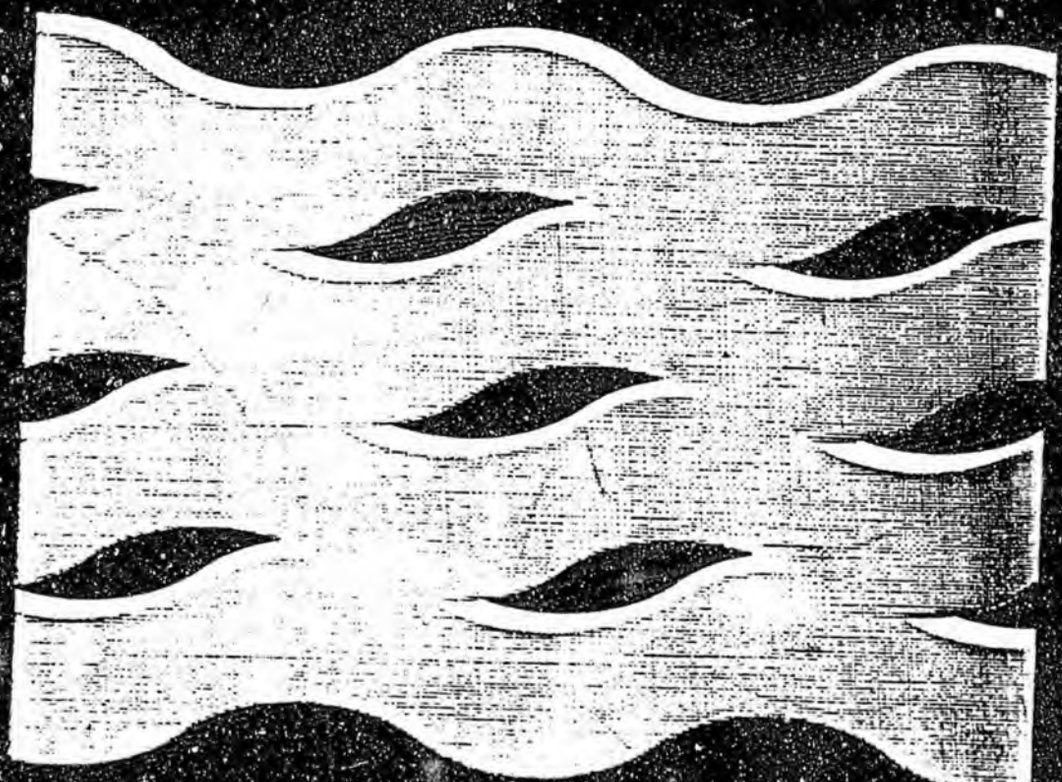
THANK YOU FOR YOUR TIME AND EXPERTISE

Please fold this page and mail. If you have further questions, feel free to call Katy Wilkinson at 465-5302.

# STANDARD METHODS

## FOR THE EXAMINATION OF WATER AND WASTEWATER



1989
17th EDITION

EDITED BY
LENORE S. CLESCERI
ARNOLD E. GREENBERG
R. RHODES TRUSSELL

# 2540 F. Settleable Solids

## 1. General Discussion

Settleable solids in surface and saline waters as well as domestic and industrial wastes may be determined and reported on either a volume (mL/L) or a weight (mg/L) basis.

## 2. Apparatus

The volumetric test requires only an Imhoff cone. The gravimetric test requires all the apparatus listed in Section 2540D.2 and a glass vessel with a minimum diameter of 9 cm.

## 3. Procedure

*a. Volumetric:* Fill an Imhoff cone to the 1-L mark with a well-mixed sample. Settle for 45 min, gently stir sides of cone with a rod or by spinning, settle 15 min longer, and record volume of settleable solids in the cone as milliliters per liter. If the settled matter contains pockets of liquid between large settled particles, estimate volume of these and subtract from volume of settled solids. The practical lower limit of measurement depends on sample composition and generally is in the range of 0.1 to 1.0 mL/L. Where a separation of settleable and floating materials occurs, do not estimate the floating material as settleable matter.

*b. Gravimetric:*

1) Determine total suspended solids of well-mixed sample (Section 2540D).

2) Pour a well-mixed sample into a glass vessel of not less than 9 cm diam using not less than 1 L and sufficient to give a depth of 20 cm. Alternatively use a glass vessel of greater diameter and a larger volume of sample. Let stand quiescent for 1 h and, without disturbing the settled or floating material, siphon 250 mL from center of container at a point halfway between the surface of the settled material and the liquid surface. Determine total suspended solids (milligrams per liter) of this supernatant liquor (Section 2540D). These are the nonsettleable solids.

## 4. Calculation

$$\text{mg settleable solids/L} = \text{mg total suspended solids/L} - \text{mg nonsettleable solids/L}$$

## 5. Precision and Bias

Precision and bias data are not now available.

## 6. Bibliography

FISCHER, A.J. & G.E. SYMONS. 1944. The determination of settleable sewage solids by weight. *Water Sewage Works* 91:37.

# 2540 D. Total Suspended Solids Dried at 103–105°C

## 1. General Discussion

*a. Principle:* A well-mixed sample is filtered through a weighed standard glass-fiber filter and the residue retained on the filter is dried to a constant weight at 103 to 105°C. The increase in weight of the filter represents the total suspended solids. If the suspended material clogs the filter and prolongs filtration, the difference between the total solids and the total dissolved solids may provide an estimate of the total suspended solids.

*b. Interferences:* Exclude large floating particles or submerged agglomerates of nonhomogeneous materials from the sample if it is determined that their inclusion is not desired in the final result. Because excessive residue on the filter may form a water-entrapping crust, limit the sample size to that yielding no more than 200 mg residue. For samples high in dissolved solids thoroughly wash the filter to ensure removal of the dissolved material. Prolonged filtration times resulting from filter clogging may produce high results owing to excessive solids capture on the clogged filter.

## 2. Apparatus

Apparatus listed in Sections 2540B.2 and 2540C.2 is required, except for evaporating dishes, steam bath, and 180°C drying oven. In addition:

*Planchet,** aluminum or stainless steel, 65-mm diam.

## 3. Procedure

*a. Preparation of glass-fiber filter disk:* Insert disk with wrinkled side up in filtration apparatus. Apply vacuum and wash disk with three successive 20-mL portions of distilled water. Continue suction to remove all traces of water, and discard washings. Remove filter from filtration apparatus and transfer to an aluminum or stainless steel planchet as a support. Alternatively remove crucible and filter combination if a Gooch crucible is used. Dry in an oven at 103 to 105°C for 1 h. If volatile solids are to be measured, ignite at 550 ± 50°C for 15 min in a muffle furnace. Cool in desiccator to balance temperature and weigh. Repeat cycle of drying or igniting, cooling, desiccating, and weighing until a constant weight is obtained or until weight loss is less than 0.5 mg between successive weighings. Store in desiccator until needed. Weigh immediately before use.

*b. Selection of filter and sample sizes:* See Section 2540C.3*c*. For nonhomogeneous samples such as raw wastewater, use a large filter to permit filtering a representative sample.

*c. Sample analysis:* Assemble filtering apparatus and filter and begin suction. Wet filter with a small volume of distilled water to seat it. Filter a measured volume of well-mixed sample through the glass fiber filter. Wash with three successive 10-mL volumes of distilled water, allowing complete drainage between washings and continue suction for about 3 min after filtration is complete. Carefully remove filter from filtration apparatus and transfer to an aluminum or stainless steel planchet as a support. Alternatively, remove the crucible and filter

*Available from New England Nuclear, Boston, Mass., or equivalent.

## 4. Calculation

$$\text{mg total suspended solids/L} = \frac{(A - B) \times 1000}{\text{sample volume, mL}}$$

where:

$A$ = weight of filter + dried residue, mg, and
$B$ = weight of filter, mg.

## 5. Precision

The standard deviation was 5.2 mg/L (coefficient of variation 33%) at 15 mg/L, 24 mg/L (10%) at 242 mg/L, and 13 mg/L (0.76%) at 1707 mg/L in studies by two analysts of four sets of 10 determinations each.

Single-laboratory duplicate analyses of 50 samples of water and wastewater were made with a standard deviation of differences of 2.8 mg/L.

## 6. Bibliography


DEGEN, J. & F.E. NUSSBERGER. 1956. Notes on the determination of suspended solids. *Sewage Ind. Wastes* 28:237.

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NUSBAUM, I. 1958. New method for determination of suspended solids. *Sewage Ind. Wastes* 30:1066.

SMITH, A.L. & A.E. GREENBERG. 1963. Evaluation of methods for determining suspended solids in wastewater. *J. Water Pollut. Control Fed.* 35:940.

WYCKOFF, B.M. 1964. Rapid solids determination using glass fiber filters. *Water Sewage Works* 111:277.

combination from the crucible adapter if a Gooch crucible is used. Dry for at least 1 h at 103 to 105°C in an oven, cool in a desiccator to balance temperature, and weigh. Repeat the cycle of drying, cooling, desiccating, and weighing until a constant weight is obtained or until the weight loss is less than 4% of the previous weight or 0.5 mg, whichever is less.

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT. 1975. A Preliminary Review of Analytical Methods for the Determination of Suspended Solids in Paper Industry Effluents for Compliance with EPA-NPDES Permit Terms. Spec. Rep. No. 75-01. National Council of the Paper Industry for Air & Stream Improvement, New York, N.Y.

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT. 1977.

TABLE 1

**SUMMARY OF PROPOSED WATER QUALITY STANDARDS REVISIONS**

**UNDER THE STATE'S TRIENNIAL REVIEW PROCESS**

| Parameter | Basis for Proposed Revision: Address ambiguity/ clarify standards | New standard;address human health criteria in National Toxics Rule | Revise 2/ existing criteria |
|---|---|---|---|
| 1. Dioxin | | x | |
| 2. Mixing zones | x | | |
| 3. Color for marine waters 1/ | | | x |
| 4. Chronic toxicity protocols | x | | x |
| 5. Arsenic, chloroform, cyanide | | x | |
| 6. Total hydrocarbons 2/ | x | | |
| 7. Sediment | x | | |
| 8. Fecal coliform bacteria | | | x |
| 9. Other Human health 3/ criteria for carcinogens | | x | |
| 10. Update aquatic life 3/ criteria since 1985 | | x | |

1/ Color criterion for marine waters inadvertently includes drinking water criterion.
2/ Standards are scientifically unsupported or do not reflect accepted methods.
3/ These revisions will be completed separately in fall 1992 after the expedited regulation process.

## ALASKA WATER QUALITY STANDARDS

## REVIEW AND REVISION PROCESS

### PHASE 1

(EXPEDITED REVISION PROCESS)

| | |
|---|---|
| May 4 | Department of Environmental Conservation expedites sub-set of standards under |
| June 30 | revision |
| July 1 | Draft water quality standards go out for public review and |
| July 31 | hearings |
| Aug 1 | Responsiveness summary drafted and public input factored into |
| Aug 14 | draft water quality standards |
| Aug 15 | DEC Commissioner adopts final water quality standards revisions |
| Aug 15 | Attorney General reviews and certifies water quality standards |
| Aug 31 | revisions |
| Sept 1 | Lt. Governor signs revised water quality standards |
| Sept 4 | EPA receives Alaska's revised water quality standards for review and approval |

**ALASKA WATER QUALITY STANDARDS**

**REVIEW AND REVISION PROCESS**

**PHASE 2**

(LONG-TERM PROCEDURES)

EPA/DEC Memorandum of Agreement on NPDES Process

* Formal Yearly Meetings
* NPDES Permit scheduling Identified
* Problem and Controversies Identification Process

DEC In-State Action Process
(Based on results of yearly EPA NPDES meeting)

Issues and Topic Specific Questionnaires
Distributed to DEC In-House Work Group
and the Department's External
Water Quality Standards Help Group
(Public Participation Process)

If Determined Necessary,
Working Advisory Groups Formed to Evaluate Specific
Scientific, Technological, and Economic Issues
(Public Participation Process)

Input from Participatory Process
Folded into Ongoing Alaska Water
Quality Standards Review, Revision, and
Modernization Process

Draft WQS Published and Sent
Out for Public Review

DEC Commissioner Approval

Attorney General Certification

Lt. Governor Approval

Submission to EPA for Review and Approval

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[WH-FRL-4029-2]

## Amendments to the Water Quality Standards Regulation To Establish the Numeric Criteria for Priority Toxic Pollutants Necessary to Bring All States Into Compliance With Section 303(c)(2)(B)

**AGENCY:** Environmental Protection Agency.

**ACTION:** Proposed rule.

**SUMMARY:** This proposed rulemaking would promulgate the chemical-specific, numeric criteria for priority toxic pollutants necessary to bring all States into compliance with the requirements of section 303(c)(2)(B) of the Clean Water Act (CWA). States which have been determined by EPA to fully comply with section 303(c)(2)(B) requirements would not be affected by today's proposed rulemaking.

The proposed rulemaking addresses several situations. For a few States EPA would promulgate only a limited number of criteria because the Agency previously identified, in disapproval letters to such States, the specific priority toxic pollutants that require new or revised criteria. For these States, EPA would promulgate Federal criteria only for the priority toxic pollutants which require new or revised criteria. In the vast majority of States, EPA would promulgate, at a minimum, broadly applicable Federal criteria for all priority toxic pollutants for which EPA has issued section 304(a) water quality criteria guidance and that are not the subject of approved State criteria.

For those priority toxic pollutants included in today's proposed rulemaking where the section 304(a) criteria recommendation is based on carcinogenicity, the proposed criteria are based on an incremental one in one million cancer risk level (i.e., $10^{-6}$).

The primary focus of this rule is the inclusion of the water quality criteria for pollutant(s) in State standards as necessary to support water quality-based control programs. The Agency is accepting comment on the criteria proposed in today's rule. However, Congress has established a very ambitious schedule for the promulgation of the final criteria. The statutory deadline in section 303(c)(4) clearly indicates that Congress intended the Agency to move very expeditiously when Federal action is warranted. The Agency believes that the limited time available for promulgation of the regulation can be used most efficiently and effectively by addressing those issues that have not already come before the Agency.

**DATES:** All written comments received on or before December 19, 1991, will be considered in the preparation of any final rulemaking.

A public hearing will be held on December 19, 1991, in Washington, DC, beginning at 9 a.m. The hearing officer reserves the right to limit oral testimony to 10 minutes, if necessary.

**ADDRESSES:** Comments, in quadruplicate, on this proposed rule should be addressed to William R. Diamond, Director, Standards and Applied Science Division (WH-585), Office of Science and Technology, 401 M Street, SW., Washington, DC 20460 (Telephone: 202-260-1315). The public may inspect the administrative record for this rulemaking, including documentation supporting the aquatic life and human health criteria, and all comments received on this proposed rule at EPA's Public Information Reference Unit, EPA Library, room 2904, Waterside Mall, 401 M Street, SW., Washington, DC 20460 (Telephone: 202-260-5926) on weekdays during the Agency's normal business hours of 8 a.m. to 4:30 p.m. Each of EPA's ten Regional offices will also have copies for public inspection and copying of the administrative records for the States in that Region. These records will be available in the Water Management Divisions of each respective Regional office. A reasonable fee will be charged for photocopies.

The public hearing will be held in the EPA auditorium, 401 M Street, SW., Washington, DC.

**FOR FURTHER INFORMATION CONTACT:** David K. Sabock or R. Kent Ballentine, Telephone 202-260-1315.

**SUPPLEMENTARY INFORMATION:**

This preamble is organized according to the following outline:



## A. Introduction and Overview

### *1. Introduction*

This section of the preamble introduces the topics which are addressed subsequently and provides a brief overview of EPA's basis and rationale for proposing to promulgate Federal criteria for priority toxic pollutants. Section B of this preamble presents a description of the evolution of the Federal Government's efforts to control toxic pollutants beginning with a discussion of the authorities in the Federal Water Pollution Control Act Amendments of 1972. Also described in some detail is the development of the water quality standards review and revision process which provides for establishing both narrative goals and enforceable numeric requirements for controlling toxic pollutants. This discussion includes the recent changes enacted in the 1987 Clean Water Act Amendments which are the basis for this proposed rulemaking. Section C summarizes State efforts since 1987 to comply with the requirements of Section 303(c)(2)(B). Section D describes EPA's procedure for determining whether a State has fully complied with Section 303(c)(2)(B). Section E sets out the rationale and approach for developing today's proposed rulemaking, including a discussion of EPA's legal basis. Section F describes the development of the criteria included in today's proposed rulemaking. Section G summarizes the provisions of the proposed rule and Section H highlights certain issues

raised by the proposal for public comment. Sections I, J, and K address the requirements of Executive Order 12291, the Regulatory Flexibility Act, and the Paperwork Reduction Act, respectively. Section L provides a list of subjects covered in today's proposed rulemaking.

*2. Overview*

Today's proposed rulemaking to establish Federal toxics criteria for States is important for a number of environmental, programmatic and legal reasons.

First, control of toxic pollutants in surface waters is an important priority to achieve the Clean Water Act's goals and objectives. The most recent National Water Quality Inventory indicates that one-third of monitored river miles, lake acres, and coastal waters have elevated levels of toxics. Forty-seven States and Territories have reported elevated levels of toxic pollutants in fish tissues. States have issued a total of 586 fishing advisories and 135 bans, attributed mostly to industrial discharges and land disposal.

The absence of State water quality standards for toxic pollutants undermines EPA's overall toxic control efforts to address these problems. Without clearly established water quality goals, the effectiveness of many of EPA's water programs is jeopardized. Permitting, enforcement, coastal water quality improvement, fish tissue quality protection, certain nonpoint source controls, drinking water quality protection, and ecological protection all depend to a significant extent on complete and adequate water quality standards. Numeric criteria for toxics are essential to the process of controlling toxics because they allow States and EPA to evaluate the adequacy of existing and potential control measures to protect aquatic ecosystems and human health. Formally adopted standards form the legal basis for including water quality-based effluent limitations in NPDES permits to control toxic pollutant discharges. The critical importance of controlling toxic pollutants has been recognized by Congress and is reflected, in part, by the addition of section 303(c)(2)(B) to the Act. Congressional impatience with the pace of State toxics control programs is well documented in the legislative history of the 1987 CWA amendments. In order to protect human health, aquatic ecosystems, and successfully implement toxics controls, EPA believes that all actions which are available to the Agency must be taken to ensure that all necessary numeric criteria for priority toxic pollutants are established in a timely manner.

Second, as States and EPA continue the transition from an era of primarily technology-based controls to an era in which technology-based controls are integrated with water quality-based controls, it is important that EPA ensures timely compliance with CWA requirements. An active Federal role is essential to assist States in getting in place complete toxics criteria as part of their pollution control programs. While most States recognize the need for enforceable water quality standards for toxic pollutants, their recent adoption efforts have often been stymied by a variety of factors including limited resources, competing environmental priorities, and difficult scientific, policy and legal challenges. Although many water quality criteria for toxic pollutants have been available since 1980 and the water quality standards regulation has required State adoption of numeric criteria for toxic pollutants since 1983 (see 40 CFR 131.11), a preliminary assessment of the water quality standards for all States in February of 1990 showed that only six States had established fully acceptable criteria for toxic pollutants. This rate of toxics criteria adoption is contrary to the CWA requirements and is a reflection of the difficulties faced by States. EPA should exercise its CWA authorities to assist States in such circumstances.

EPA's proposed action will also help restore equity among the States. The CWA is designed to ensure all waters are sufficiently clean to protect public health and the environment. The CWA allows some flexibility and differences among States in their adopted and approved water quality standards, but it was not designed to reward inaction and inability to meet statutory requirements.

Although most States have made some progress toward satisfying CWA requirements, many appear to have failed to fully comply with section 303(c)(2)(B). The CWA assigns EPA the legal responsibility to promulgate standards where necessary to meet the requirements of the Act. Where States have not satisfied the CWA requirement to adopt water quality standards for toxic pollutants, which was re-emphasized by Congress in 1987, it is imperative that EPA take action.

EPA's ability to oversee State standards-setting activities and to correct deficiencies in State water quality standards is critical to the effective implementation of section 303(c)(2)(B). This proposed rulemaking is a necessary and important component of EPA's implementation of section 303(c)(2)(B) as well as EPA's overall efforts to control toxic pollutants in surface waters.

B. Statutory and Regulatory Background

*1. Pre-Water Quality Act Amendments of 1987 (Pub. L. 100-4)*

Section 303(c) of the 1972 Federal Water Pollution Control Act Amendments (FWPCA) (33 U.S.C. 1313(c)) established the statutory basis for the current water quality standards program. It completed the transition from the previously established program of water quality standards for interstate waters to one requiring standards for all surface waters of the United States.

Although the major innovation of the 1972 FWPCA was technology-based controls, Congress maintained the concept of water quality standards both as a mechanism to establish goals for the Nation's waters and as a regulatory requirement when standardized technology controls for point source discharges and/or nonpoint source controls were inadequate. In recent years these so-called water quality-based controls have received new emphasis by Congress and EPA in the continuing quest to enhance and maintain water quality to protect the public health and welfare.

Briefly stated, the key elements of section 303(c) are:

(a) A water quality standard is defined as the designated beneficial uses of a water segment and the water quality criteria necessary to support those uses;

(b) The minimum beneficial uses to be considered by States in establishing water quality standards are specified as public water supplies, propagation of fish and wildlife, recreation, agricultural uses, industrial uses and navigation;

(c) A requirement that State standards must protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act;

(d) A requirement that States must review their standards at least once each three year period using a process that includes public participation;

(e) The process for EPA review of State standards which may ultimately result in the promulgation of a superseding Federal rule in cases where a State's standards are not consistent with the applicable requirements of the CWA, or in situations where the Agency determines Federal standards are necessary to meet the requirements of the Act.

Another major innovation in the 1972 FWPCA was the establishment of the

National Pollutant Discharge Elimination System (NPDES) which requires point source dischargers to obtain a permit before legally discharging to the waters of the United States. In addition to the permit limits established on the basis of technology (e.g. effluent limitations guidelines), the Act requires dischargers to meet instream water quality standards. (See section 301(b)(1)(C), 33 U.S.C. 1311(b)(1)(C)).

Thus water quality standards serve a dual function under the Clean Water Act regulatory scheme. Standards establish narrative and numeric definitions and quantification of the Act's goals and policies (see section 101, 33 U.S.C. 1251) which provide a basis for identifying impaired waters. Water quality standards also establish regulatory requirements which are translated into specific discharge requirements. In order to fulfill this critical function, adopted State criteria must contain sufficient parametric coverage to protect both human health and aquatic life.

In its initial efforts to control toxic pollutants, the FWPCA, pursuant to section 307, required EPA to designate a list of toxic pollutants and to establish toxic pollutant effluent standards based on a formal rulemaking record. Such rulemaking required formal hearings, including cross-examination of witnesses. EPA struggled with this unwieldy process and ultimately promulgated effluent standards for six toxic pollutants, pollutant families or mixtures. (See 40 CFR part 129.) Congress amended section 307 in the 1977 Clean Water Act Amendments by endorsing the Agency's alternative procedure of regulating toxic pollutants by use of effluent limitationguidelines, by amending the procedure for establishing toxic pollutant effluent standards to provide for more flexibility in the hearing process for establishing a record, and by directing the Agency to include sixty-five specific pollutants or classes of pollutants on the toxic pollutant list. EPA published the required list on January 31, 1978 (43 FR 4109). This toxic pollutant list was the basis on which EPA's efforts on criteria development for toxics was focused.

During planning efforts to develop effluent limitation guidelines and water quality criteria, the list of sixty-five toxic pollutants was judged too broad as some of the pollutants were, in fact, general families or classes of organic compounds consisting of many individual chemicals. EPA selected key chemicals of concern within the 65 families of pollutants and identified a more specific list of 129 priority toxic pollutants. Three volatile chemicals were removed from the list (see 46 FR 2266, January 8, 1981; 46 FR 10723, February 4, 1981) so that at present there are 126 priority toxic pollutants. This list is published as Appendix A to 40 CFR part 423.

Another critical section of the 1972 FWPCA was section 304(a) (33 U.S.C. 1314(a)). Section 304(a)(1) provides, in pertinent part, that EPA

> • • • shall develop and publish • • • criteria for water quality accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, • • • and (C) on the effects of pollutants on biological community diversity, productivity, and stability, • • •

In order to avoid confusion, it must be recognized that the Clean Water Act uses the term "criteria" in two separate ways. In section 303(c), which is discussed above, the term is part of the definition of a water quality standard. That is, a water quality standard is comprised of designated uses and the criteria necessary to protect those uses. Thus, States are required to adopt regulations or statutes which contain legally achievable criteria. However, in section 304(a), the term criteria is used in a scientific sense and EPA develops recommendations which States consider in adopting regulatory criteria.

In response to this legislative mandate and an earlier similar statutory requirement, EPA and a predecessor agency have produced a series of water quality criteria documents. Early Federal efforts were Water Quality Criteria (1968 "Green Book") and Quality Criteria for Water (1976 "Red Book"). EPA also sponsored a contract effort with the National Academy of Science—National Academy of Engineering which resulted in Water Quality Criteria, 1972 (1973 "Blue Book"). These early efforts were premised on the use of literature reviews and the collective scientific judgment of Agency and advisory panels. However, when faced with the list of 65 toxic pollutants and the need to develop criteria for human health as well as aquatic life, the Agency determined that new procedures were necessary. Continued reliance solely on existing scientific literature was now inadequate, since for many pollutants essential information was not available. EPA scientists developed formal methodologies for establishing scientifically defensible criteria. These were subjected to review by the Agency's Science Advisory Board and the public. This effort culminated on November 28, 1980, when the Agency published criteria development guidelines for aquatic life and for human health, along with criteria for 64 toxic pollutants. (See 45 FR 79318.) Since that initial publication, the aquatic life methodology was slightly amended (50 FR 30784, July 29, 1985) and additional criteria were proposed for public comment and finalized as Agency criteria guidance. EPA summarized the available criteria information in Quality Criteria for Water 1986 (1986 "Gold Book") which is updated from time-to-time. However, the individual criteria documents, as updated, are the official guidance documents.

EPA's criteria documents provide a comprehensive toxicological evaluation of each chemical. For toxic pollutants, the documents tabulate the relevant acute and chronic toxicity information for aquatic life and derive the criteria maximum concentrations (acute criteria) and criteria continuous concentrations (chronic criteria) which the Agency recommends to protect aquatic life resources. For human health criteria, the document provides the appropriate reference doses, and if appropriate the carcinogenic slope factors, and derives recommended criteria. The details of this process are described more fully in a following part of this preamble.

Programmatically, EPA's initial efforts were aimed at converting a program focused on interstate waters into one addressing all interstate and intrastate surface waters of the United States. Guidance was aimed at the inclusion of traditional water quality parameters to protect aquatic life (e.g., pH, temperature, dissolved oxygen and a narrative "free from toxicity" provision), recreation (e.g., bacteriological criteria) and general aesthetics (e.g., narrative "free from nuisance" provisions). EPA also required State adoption of an antidegradation policy to maintain existing high quality or ecologically unique waters as well as maintain improvements in water quality as they occur.

The initial water quality standards regulation was actually a part of EPA's water quality management regulations implementing section 303(e) (33 U.S.C. 1313(e)) of the Act. It was not comprehensive and did not address toxics or any other criteria specifically. Rather, it simply required States to adopt appropriate water quality criteria necessary to support designated uses. (See 40 CFR 130.17 as promulgated in 40 FR 55334, November 28, 1975).

After several years of effort and faced with increasing public and Congressional concerns about toxic pollutants, EPA realized that proceeding under section 307 of the Act would not comprehensively address in a timely manner the control of toxics through either toxic pollutant effluent standards or effluent limitations guidelines because these controls are only applicable to specific types of discharges. EPA sought a broader, more generally applicable mechanism and decided to vigorously pursue the alternative approach of EPA issuance of scientific water quality criteria documents which States could use to adopt enforceable water quality standards. These in turn could be used as the basis for establishing State and EPA permit discharge limits pursuant to section 301(b)(1)(C) which requires NPDES permits to contain

> * * * any more stringent limitation, including those necessary to meet water quality standards * * *, or required to implement any applicable water quality standard established pursuant to this Act.

Thus, the adoption by States of appropriate toxics criteria applicable to their surface waters, such as those recommended by EPA in its criteria documents, would be translated by regulatory agencies into point source permit limits. Through the use of water quality standards, all discharges of toxics are subject to permit limits and not just those discharged by particular industrial categories. In order to facilitate this process, the Agency amended the water quality standards regulation to explicitly address toxic criteria requirements in State standards. The culmination of this effort was the promulgation of the present water quality standards regulation on November 8, 1983 (40 CFR part 131, 48 FR 51400).

The current water quality standards regulation (40 CFR part 131) is much more comprehensive than its predecessor. The regulation addresses in detail both the beneficial use component and the criteria component of a water quality standard. Section 131.11 of the regulation requires States to review available information and,

> * * * to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated water use or where the levels of toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use.

The regulation provided that either or both numeric and narrative criteria may be appropriately used in water quality standards.

EPA's water quality standards emphasis since the early 1980's reflected the increasing importance placed on controlling toxic pollutants. States were strongly encouraged to adopt criteria in their standards for the priority toxic pollutants, especially where EPA had published criteria guidance under Section 304(a) of the Act.

Under the statutory scheme, during the 3-year triennial review period following EPA's 1980 publication of water quality criteria for the protection of human health and aquatic life, States should have reviewed those criteria and adopted standards for many priority toxic pollutants. In fact, State response to EPA's criteria publication and toxics initiative was disappointing. A few States adopted large numbers of numeric toxics criteria, although primarily for the protection of aquatic life. Most other States adopted few or no water quality criteria for priority toxic pollutants. Some relied on a narrative "free from toxicity" criterion, and so-called "action levels" for toxic pollutants or occasionally calculated site-specific criteria. Few States addressed the protection of human health by adopting numeric human health criteria.

In support of the November, 1983, water quality standards rulemaking, EPA issued program guidance entitled, Water Quality Standards Handbook (December 1983) simultaneously with the publication of the final rule. The foreword to that guidance noted EPA's two-fold water quality based approach to controlling toxics: chemical specific numeric criteria and biological testing in whole effluents or ambient waters to comply with narrative "no toxics in toxic amounts" standards. More detailed programmatic guidance on the application of biological testing was provided in the Technical Support Document for Water Quality Based Toxics Control (TSD) (EPA 440/4-85-032, September 1985). This document provided the needed information to convert chemical specific and biologically based criteria into water quality standards for ambient receiving waters and permit limits for discharges to those waters. The TSD focused on the use of bioassay testing of effluents (so-called whole effluent testing or WET methods) to develop effluent limitations within discharge permits. Such effluent limits were designed to implement the "free from toxicity" narrative standards in State water quality standards. The TSD also focused on water quality standards. Procedures and policy were presented for appropriate design flows for EPA's section 304(a) acute and chronic criteria. EPA revised the TSD. (Technical Support Document for Water Quality-based Toxics Control, EPA 505/2-90-001, March 1991.) A Notice of Availability was published in the Federal Register on April 4, 1991 (56 FR 13827). All references in this Preamble are to the revised TSD.

The Water Quality Standards Handbook and the TSD are examples of EPA's efforts and assistance that were intended to help, encourage and support the States in adopting appropriate water quality standards for the protection of their waters against the deleterious effects of toxic pollutants. In some States, more and more numeric criteria for toxics were being included as well as more aggressive use of the "free from toxics" narratives in setting protective NPDES permit limits. However, by the time of Congressional consideration and action on the CWA reauthorization, most States had adopted few, if any, water quality standards for priority toxic pollutants.

State practices of developing case-by-case effluent limits using procedures that were not standardized in State regulations made it difficult to ascertain whether such procedures were consistently applied. The use of approaches to control toxicity that did not rely on the statewide adoption of numeric criteria for the priority toxic pollutants generated frustration in Congress. Senator Robert Stafford, first chairman and then ranking minority member of the authorizing committee, noted during the Senate debate:

> An important problem in this regard is that few States have numeric ambient criteria for toxic pollutants. The lack of ambient criteria (for toxic pollutants) make it impossible to calculate additional discharge limitations for toxics * * * It is vitally important that the water quality standards program operate in such a way that it supports the objectives of the Clean Water Act to restore and maintain the integrity of the Nation's Waters. (bracketed material added). A Legislative History of the Water Quality Act of 1987 (Pub. L. 100-4), Senate Print 100-144, USGPO, November 1988 at page 1324.

Other comments in the legislative history similarly note the Congressional perception that the States were failing to aggressively address toxics and that EPA was not using its oversight role to push the States to move more quickly and comprehensively. Thus Congress developed the water quality standards amendments to the Clean Water Act for reasons similar to those strongly stated during the Senate debate by a chief sponsor, Senator John Chaffee,

A cornerstone of the bill's new toxic pollution control requirements is the so called beyond-BAT program. * * * Adopting the beyond BAT provisions will assure that EPA continues to move forward rapidly on the program. * * * If we are going to repair the damage to those water bodies that have become highly degraded as a result of toxic substances, we are going to have to move forward expeditiously on this beyond-BAT program. The Nation cannot tolerate endless delays and negotiations between EPA and States on this program. Both entities must move aggressively in taking the necessary steps to make this program work within the time frame established by this Bill * * * Ibid. at page 1309.

This Congressional impatience with the pace of State and EPA progress and an appreciation that the lack of State standards for toxics undermined the effectiveness of the entire CWA-based scheme, resulted in the 1987 adoption of stringent new water quality standard provisions in the Water Quality Act amendments.

*2. The Water Quality Act Amendments of 1987 (Pub. L. 100–4)*

a. Description of the New Requirements

The 1987 Amendments to the Clean Water Act added section 303(c)(2)(B) which provides:

Whenever a State reviews water quality standards pursuant to paragraph (1) of this subsection, or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria for all toxic pollutants listed pursuant to section 307(a)(1) of this Act for which criteria have been published under section 304(a), the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State, as necessary to support such designated uses. Such criteria shall be specific numerical criteria for such toxic pollutants. Where such numerical criteria are not available, whenever a State reviews water quality standards pursuant to paragraph (1), or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria based on biological monitoring or assessment methods consistent with information published pursuant to section 304(a)(8). Nothing in this section shall be construed to limit or delay the use of effluent limitations or other permit conditions based on or involving biological monitoring or assessment methods or previously adopted numerical criteria.

b. EPA's Initial Implementing Actions for Sections 303(c) and 304(l)

This new requirement to the existing water quality standards review and revision process of section 303(c) did not change the existing procedural or timing provisions. For example, section 303(c)(1) still requires that States review their water quality standards at least once each 3 year period and transmit the results to EPA for review. EPA's oversight and promulgation authorities and statutory schedules in section 303(c)(4) were likewise unchanged. Rather, the provision required the States to place heavy emphasis on adopting numeric chemical-specific criteria for toxic pollutants (i.e., rather than just narrative approaches) during the next triennial review cycle. As discussed in the previous section, Congress was frustrated that States were not using the numerous section 304(a) criteria that EPA had developed, and was continuing to develop, to assist States in controlling the discharge of priority toxic pollutants. Congress therefore took an usual action: for the first time in the history of the Clean Water Act, it explicitly mandated that States adopt numeric criteria for specific toxic pollutants.

In response to this new Congressional mandate, EPA redoubled its efforts to promote and assist State adoption of water quality standards for priority toxic pollutants. EPA's efforts included the development and issuance of guidance to the States on acceptable implementation procedures for several new sections of the Act, including Sections 303(c)(2)(B) and 304(l).

The 1987 CWA Amendments added to, or amended, other CWA sections related to toxics control. Section 304(l) (33 U.S.C. 1314(l)) was an important corollary amendment because it required States to take actions to identify waters adversely affected by toxic pollutants, particularly those waters entirely or substantially impaired by point sources. Section 304(l) entitled "Individual Control Strategies for Toxic Pollutants," requires in part, that States identify and list waterbodies where the designated uses specified in the applicable water quality standards cannot reasonably be expected to be achieved because of point source discharge of toxic pollutants. For each segment so identified, the State is required to develop individual control strategies to reduce the discharge of toxics from point sources so that in conjunction with existing controls on point and nonpoint sources, water quality standards will be attained. To assist the States in identifying waters under section 304(l), EPA's guidance listed a number of potential sources of available data for States to review. States generally assembled data for a broad spectrum of pollutants, including the priority toxic pollutants, which could be useful in complying with sections 304(l) and 303(c)(2)(B). In fact, between February 1988 and October 1988, EPA assembled pollutant candidate lists for section 304(l) which were then transmitted to each jurisdiction. Thus, each State had a preliminary list of pollutants that had been identified as present in, or discharged to, surface waters. Such lists were limited by the quantity and distribution of available effluent and ambient monitoring data for priority toxic pollutants. This listing exercise further emphasized the need for water quality standards for toxic pollutants. Lack of standards increased the difficulty of identifying impaired waters. On the positive side, the data gathered in support of the 304(l) activity proved helpful in identifying those pollutants most obviously in need of water quality standards.

EPA, in devising guidance for section 303(c)(2)(B), attempted to provide the maximum flexibility in its options that not only complied with the express statutory language but also with the ultimate congressional objective: Prompt adoption of numeric toxics criteria. EPA believed that flexibility was important so that each State could comply with section 303(c)(2)(B), accommodate its existing water quality standards regulatory approach, and not violate the resource constraints specific to the State. These options are described in the next Section of this preamble. EPA's program guidance was issued in final form on December 12, 1988 but was not substantially different from earlier drafts available for review by the States. The availability of the guidance was published in a Federal Register notice on January 5, 1989 (54 FR 346).

3. EPA's Program Guidance for Section 303(c)(2)(B)

EPA's section 303(c)(2)(B) program guidance identified three options that could be used by a State to meet the requirement that the State adopt toxic pollutant criteria "* * * the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State, as necessary to support such designated uses."

*Option 1.* Adopt statewide numeric criteria in State Water Quality Standards for all section 307(a) toxic pollutants for which EPA has developed criteria guidance, regardless of whether the pollutants are known to be present.

This option is the most comprehensive approach to satisfy the statutory requirements because it would include all of the priority toxic pollutants for which EPA has prepared section 304(a)

criteria guidance for either or both aquatic life protection and human health protection. In addition to a simple adoption of EPA's section 304(a) guidance as standards, a State must select a risk level for those toxic pollutants which EPA believes are carcinogens (i.e., that cause, or may cause cancer in humans). EPA also recommended that States should supplement this comprehensive approach with a water quality standard variance and/or a site-specific criteria methodology to provide the opportunity for flexibility in applying criteria.

Many States found this option attractive because it ensured comprehensive coverage of the priority toxic pollutants with scientifically defensible criteria without the need to conduct a resource-intensive evaluation of the particular segments and pollutants requiring criteria or future prevalence of priority toxic pollutants in their waters. It was also determined this option would not be more costly to dischargers than the other options because permit limits would only be based on the regulation of the particular toxic pollutants in their discharges and not on the total listing in the water quality standards. Thus, actual permit limits should be the same under any of the options.

*Option 2.* Adopt chemical-specific numeric criteria for priority toxic pollutants that are the subject of EPA section 304(a) criteria guidance, where the State determines based on available information that the pollutants are present or discharged and can reasonably be expected to interfere with designated uses.

This option results in the adoption of numeric water quality standards for some subset of those pollutants for which EPA has issued section 304(a) criteria guidance based on a review of current information. To satisfy this option, the guidance recommended that States use the data gathered during the section 304(l) water quality assessments as a starting point to identify those water segments that need water quality standards for priority toxic pollutants. That data would be supplemented by a State and public review of other data sources to ensure sufficient breadth of coverage to meet the statutory objective. Among the available data to be reviewed were: (1) Ambient water monitoring data, including those for the water column, sediment, and aquatic life (e.g., fish tissue data); (2) NPDES permit applications and permittee self-monitoring reports; (3) effluent guideline development documents, many of which contain priority toxic pollutant scans; (4) pesticide and herbicide application information and other records of pesticide or herbicide inventories; (5) public water supply source monitoring data noting pollutants with maximum contaminant levels (MCLs); and (6) any other relevant information on toxic pollutants collected by Federal, State, industry, agencies, academic groups, or scientific organizations. EPA also recommended that States adopt a translator provision similar to that described in Option 3 but applicable to all chemicals causing toxicity, and not just priority toxic pollutants.

This Option 2 review resulted in a State proposing new or revised water quality standards and providing an opportunity for public review and comment on the pollutants, criteria, and water bodies included. Throughout this process, EPA's Regional Offices were available to assist States by providing additional guidance and technical assistance on applying EPA's recommended criteria to particular situations in the States.

*Option 3.* Adopt a procedure to be applied to a narrative water quality standard provision prohibiting toxicity in receiving waters. Such procedures would be used by the State in calculating derived numeric criteria which must be used for all purposes under section 303(c) of the CWA. At a minimum, such criteria need to be developed for section 307(a) toxic pollutants, as necessary to support designated uses, where these pollutants are discharged or present in the affected waters and could reasonably be expected to interfere with designated uses.

The combination of a narrative standard (e.g., "free from toxics in toxic amounts") and an approved translator mechanism as part of a State's water quality standards satisfies the requirements of section 303(c)(2)(B). As noted above, such a procedure is also a valuable supplement to either option 1 or 2. There are several regulatory and scientific requirements EPA's guidance specifies are essential to ensure acceptable scientific quality and full involvement of the public and EPA in this approach. Briefly stated these are:

- The procedure (i.e., narrative criterion and translator) must be used to calculate numeric water quality criteria;
- The State must demonstrate to EPA that the procedure results in numeric criteria that are sufficiently protective to meet the goals of the Act;
- The State must provide for full opportunity for public participation during the adoption of the procedure;
- The procedure must be formally adopted as a State rule and be mandatory in application; and
- The procedure must be submitted for review and approval by EPA as part of the State's water quality standards regulation.

Several States currently apply translators that have been approved by EPA. The scientific elements of a translator are similar to EPA's 304(a) criteria methodologies when applied on a site-specific basis. For example, aquatic criteria are developed using a sufficient number and diversity of aquatic species representative of the biological assemblage of a particular water body. Human health criteria focus on determining appropriate exposure conditions (e.g. amount of aquatic life consumed per person per day) rather than underlying pollutant toxicity. The results of the procedures are scientifically defensible criteria that are protective for the site's particular conditions. EPA review of translator procedures includes an evaluation of the scientific merit of the procedure using the Section 304(a) methodology as a guide.

Ideally, States adopting option 3 translator procedures should prepare a preliminary list of criteria and specify the waters the criteria apply to at the time of adoption. Although under option 3 the State retains flexibility to derive new criteria without revising the adopted standards, establishing this preliminary list of derived criteria at the time of the triennial review will assist the public in determining the scope of the adopted standards, and help ensure that the State ultimately complies with the requirement to establish criteria for all pollutants that can "reasonably be expected" to interfere with uses. EPA believes that States selecting solely option 3 should prepare an analysis similar to that required of option 2 States at the time of the triennial review.

EPA's December 1988 guidance also addressed the timing issue for State compliance with section 303(c)(2)(B). The statutory directive was clear: All State standards triennial reviews initiated after passage of the Act must include a consideration of numeric toxic criteria.

The structure of section 303(c) is to require States to review their water quality standards at least once each three year period. Section 303(c)(2)(B) instructs States to include reviews for toxics criteria whenever they initiate a triennial review. EPA initially looked at February 4, 1990, the 3-year anniversary of the 1987 CWA amendments, as a convenient point to index State

compliance. The April 1990 Federal Register notice used this index point for the preliminary assessment. However, some States were very nearly completing their State administrative processes for ongoing reviews when the 1987 amendments were enacted and could not legally amend those proceedings to address additional toxics criteria. Therefore, in the interest of fairness, and to provide such States a full 3-year review period, EPA's FY 1990 Agency Operating Guidance provided that "By the end of the FY 88–90 triennium, States should have completed adoption of numeric criteria to meet the section 303(c)(2)(B) requirements." (p. 48.) The FY 88–90 triennium ended on September 30, 1990.

Clean Water Act section 303(c) does not provide penalties for States that do not complete timely water quality standards reviews. In no previous case has the EPA Administrator found that State failure to complete a review within three years jeopardized the public health or welfare to such an extent the promulgation of Federal standards pursuant to section 303(c)(4)(B) was justified. The pre-1987 CWA never mandated State adoption of priority toxic pollutants or other specific criteria. EPA relied on its water quality standards regulation (40 CFR 131.11) and its criteria and program guidance to the States on appropriate parametric coverage in State water quality standards, including toxic pollutants. However, because of Congressional concern exhibited in the legislative history for the 1987 Clean Water Act amendments regarding undue delays by States and EPA, and because States have been explicitly required to adopt numeric criteria for appropriate priority toxic pollutants since 1983, the Agency in this proposed rulemaking is proceeding pursuant to section 303(c)(4)(B) and 40 CFR 131.22(b).

4. Revisions to the Water Quality Standards Regulation to Incorporate the Requirements of Section 303(c)(2)(B)

In a rulemaking separate from today's proposal, EPA intends to propose amendments to the Water Quality Standards Regulation to incorporate the requirements of section 303(c)(2)(B). EPA views the effects of that intended rulemaking to be prospective only. EPA's expected regulatory change would provide principally more consistency among the States in their approaches to adopting appropriate toxic and other criteria in future triennial reviews.

The current requirements for water quality criteria in State water quality standards are addressed in 40 CFR 131.11. EPA's intended rulemaking will propose amendments to this section and incorporate the three options described in its December 12, 1988 guidance. Of special concern are the specific requirements for the translator provision described as option 3.

The current regulation at 40 CFR part 131 in conjunction with the statutory language provides a clear and unambiguous basis and process for today's proposed Federal promulgation.

C. State Actions Pursuant to Section 303(c)(2)(B)

There has been substantial progress by many States in the adoption, and EPA approval, of water quality standards for toxic pollutants. For example, for freshwater aquatic life uses, the average number of priority toxic pollutants with criteria adopted has tripled from ten per State in 1986 to thirty per State on February 4, 1990. In addition, the number of States with at least some aquatic life criteria adopted has increased from thirty-three in April 1986 to forty-five as of February 4, 1990.

Furthermore, virtually all States have at least proposed new toxics criteria for priority toxic pollutants since section 303(c)(2)(B) was added to the CWA in February of 1987. Unfortunately, not all such State proposals address, in a comprehensive manner, the requirements of section 303(c)(2)(B). For example, some States have proposed to adopt criteria to protect aquatic life, but not human health; other States have proposed human health criteria which do not address major human exposure pathways. In addition, in some cases final adoption of proposed State toxics criteria which would be approvable by EPA has been substantially delayed due to controversial and difficult issues associated with the toxics criteria adoption process. For purposes of today's proposed rulemaking, it is EPA's judgment that only 35 States completed actions which fully satisfy the requirements of section 303(c)(2)(B).

The difficulties faced by States in adopting criteria for priority toxic pollutants are exemplified by recent State efforts to adopt criteria for the priority toxic pollutant 2,3,7,8–TCDD (dioxin). As is generally true of State section 303(c)(2)(B) efforts, State efforts to adopt numeric human health dioxin criteria have been slow and controversial, but in many respects impressive. For example, since 1987, a total of 34 States have adopted numeric human health criteria for dioxin which have been approved by EPA. In total, 38 States have adopted numeric human health criteria for dioxin. Twenty-five of these 38 States adopted criteria during calendar year 1991, showing that the pace of State actions to adopt dioxin criteria has accelerated substantially.

The progress which has been made by States in adopting dioxin criteria is particularly impressive in light of the substantial attention and controversy which has been focused on such actions. EPA, States, dischargers, environmental groups, and the public at large have been involved in discussions concerning the ambient level of protection that is protective of public health. In some States, the struggle to select an appropriate dioxin criterion has been the major impediment to successful completion of section 303(c)(2)(B) actions.

At issue are scientific questions specific to dioxin, such as determining the carcinogenic potency of the pollutant and the extent to which the pollutant tends to accumulate in fish tissues. Other issues are generic to EPA'S human health criteria, such as determining the rate at which humans consume fish and other forms of aquatic life, and the necessity of setting ambient criteria at levels which may not be detected by state-of-the-art laboratories. Most of these issues relate, directly or indirectly, to concerns expressed by dischargers regarding the cost of complying with water quality-based effluent limits for dioxin which, although variable from State to State, generally are based on State numeric water quality criteria that allow only minute quantities of dioxin per liter of water. For example, twelve States have adopted EPA's recommended ambient water column concentration of 0.013 picograms per liter.

Currently, a total of eleven States have proposed, or are expected to propose, numeric human health-based criteria for dioxin. These States could face the same issues, obstacles, and resource requirements that the 33 States which previously adopted criteria have faced.

In summary, States have devoted substantial resources, and have made substantial progress, in adopting new or revised numeric criteria for priority pollutants. In so doing they have addressed a number of significant and difficult issues. These issues and the attendant controversy has accounted, at least in part, for the fact that 22 jurisdictions still have not adopted numeric toxics criteria that fully comply with section 303(c)(2)(B). For a more detailed State-specific outline of actions taken in response to section 303(c)(2)(B), refer to part III of appendix 1, which itemizes State actions to adopt toxics criteria for States approved by EPA as

being in full compliance as well as States which EPA has not approved as being in full compliance with section 303(c)(2)(B).

D. Determining State Compliance With Section 303(c)(2)(B)

*1. EPA's Review of State Water Quality Standards for Toxics*

The EPA Administrator has delegated the responsibility and authority for review and approval or disapproval of all State water quality standards actions to the 10 EPA Regional Administrators (see 40 CFR 131.21). State section 303(c)(2)(B) actions are thus submitted to the appropriate EPA Regional Administrator for review and approval. This de-centralized EPA system for State water quality standards review and approval is guided by EPA Headquarter's Office of Water, which issues national policies and guidance to the States and Regions such as the annual Office of Water Operating Guidance and various technical operating guidance manuals.

For purposes of evaluating State compliance with CWA section 303(c)(2)(B), EPA relied on the language of section 303(c)(2)(B), the existing water quality standards regulation, and section 303(c)(2)(B) national guidance to provide the basis for EPA review. In some cases, individual Regions also used Regional policies and procedures in reviewing State section 303(c)(2)(B) actions. The flexibility provided by the national guidance, coupled with subtle differences in Regional policies and procedures, contributed to some differences in the approaches taken by States to satisfy section 303(c)(2)(B) requirements.

As discussed previously, EPA's final guidance on compliance with section 303(c)(2)(B) was developed to provide States with the necessary flexibility to allow State standards revisions that would complement the State's existing water quality standards program, fully comply with section 303(c)(2)(B), and not violate State-specific resource constraints. As guidance, it did not contain clearly defined limits on the range of acceptable approaches, but rather described EPA's recommendations on approaches States could use to satisfy the statutory requirements. Some innovative State approaches were expected as well as differences in terms of criteria coverage, stringency and application procedures.

Although the guidance provided for State flexibility, it was also consistent with existing water quality standards regulation requirements at 40 CFR 131.11 that explicitly require State criteria to be sufficient to protect designated uses. Such water quality criteria also must be based on sound scientific rationale and support the most sensitive use designated for a water body.

The most complicated EPA compliance determinations involve States that select EPA Options 2 or 3. Since most States use EPA's Section 304(a) criteria guidance, where States select Option 1, EPA normally is able to focus Agency efforts on verifying that all available EPA criteria are included, appropriate cancer risk levels are selected, and that sufficient application procedures are in place (e.g. laboratory analytical methods, mixing zones, flow condition, etc.).

However, for States using EPA's Option 2 or 3, substantially more EPA evaluation and judgment is required because the Agency must evaluate which priority pollutants and, in some cases, segments or designated uses, require numeric criteria. Under these options, the State must adopt or derive numeric criteria for priority toxic pollutants for which EPA has section 304(a) criteria, "* * * the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State * * *" The necessary justification and the ultimate coverage and acceptability of a State's actions vary State-to-State because of differences in the adequacy of available monitoring information, local water bodies use designations, the effluent and nonpoint source controls in place, and different approaches to the scientific basis for criteria.

In submitting criteria for the protection of human health, States are not limited to a 1 in 1 million risk level ($10^{-6}$). EPA generally regulates pollutants treated as carcinogens in the range of $10^{-6}$ to $10^{-4}$ for average exposed individuals. If a State selects a criterion that represents an upper bound risk level less protective than 1 in 100,000 (i.e., $10^{-5}$), however, the State will need to have substantial support in the record for this level. This support should focus on two distinct issues. First, the record must include documentation that the decision maker considered the public interest of the State in selecting the risk level, including documentation of public participation in the decision making process as required by the water quality standards regulation at 40 CFR 131.20(b). Second, the record must include an analysis showing that the risk level selected, when combined with other risk assessment variables, is a balanced and reasonable estimate of actual risk posed, based on the best and most representative information available. The importance of the estimated actual risk increases as the degree of conservatism in the selected risk level diminishes. EPA will carefully evaluate all assumptions used by a State if the State chooses to alter any one of the standard EPA assumption values.

Where States select Option 3, EPA reviews must also include an evaluation of the scientific defensibility of the translator procedure. EPA must also verify that a requirement to apply the translator whenever toxics may reasonably be expected to interfere with designated uses (e.g., where such toxics exist or are discharged) is included in the State's water quality standards. Satisfactory application procedures must also be developed by States selecting Option 3.

In general, each EPA Region made compliance decisions based on whatever information was available to the State at the time of the triennial review. For some States, information on the presence and discharge of priority toxic pollutants is extremely limited. Nevertheless, during the period of February 1988 to October 1990, to supplement State efforts, EPA assembled the available information and provided each State with various pollutant candidate lists in support of the section 304(l) and section 303(c)(2)(B) activities. These were based in part on computerized searches of existing Agency data bases.

Beginning in 1988, EPA provided States with candidate lists of priority toxic pollutants and water bodies in support of CWA section 304(l) implementation. These lists were developed because States were required to evaluate existing and readily available water-related data in order to comply with section 304(l), 40 CFR 130.10(d). A similar "strawman" analysis of priority pollutants potentially requiring adoption of numeric criteria under section 303(c)(2)(B) was furnished to most States in September or October of 1990 for their use in on-going and subsequent triennial reviews. The primary differences between the "strawman" analysis and the section 304(l) candidate lists were that the "strawman" analysis: (1) Organized the results by chemical rather than by water body, (2) included data for certain STORET monitoring stations that were not used in constructing the candidate lists, (3) included data from the Toxics Release Inventory database, and (4) did not include a number of data sources used in preparing the candidate lists (e.g., those, such as fish kill

information, that did not provide chemical specific information).

In its 1988 section 303(c)(2)(B) guidance, EPA urged States, at a minimum, to use the information gathered in support of section 304(l) requirements as a starting point for identifying which priority toxic pollutants require adoption of numeric criteria. EPA also encouraged States to consider the presence or potential construction of facilities that manufacture or use priority toxic pollutants as a strong indication of the need for toxics criteria. Similarly, EPA indicated to States that the presence of priority pollutants in ambient waters (including those in sediments or in aquatic life tissue) or in discharges from point or nonpoint sources also be considered as an indication that toxics criteria should be adopted. A limited amount of data on the effluent characteristics of NPDES discharges was readily available to States. States were also expected to take into account newer information as it became available, such as information in annual reports from the Toxic Chemical Release Inventory requirements of the Emergency Planning and Community Right-To-Know Act of 1986. (Title III, Pub. L. 99-499.)

In summary, EPA and the States had access to a variety of information, gathered in support of section 304(l), section 303(c)(2)(B), and section 305(b) activities. For some States, as noted above, such information for priority toxic pollutants is extremely limited. In the final analysis, the Regional Administrator made a judgment on a duly submitted State standards triennial review based on the State's record and the Region's independent knowledge of the facts and circumstances surrounding the State's actions. These actions, taken in consultation with the Office of Water, determined which State actions were sufficiently consistent with the coverage contemplated in the statute to justify approval. These approval actions include allowable variations among State water quality standards. EPA approval indicates that, based on the record, the State water quality standards met the requirements of the Act.

2. Determining Current Compliance Status

The following summarizes the process generally followed by the Agency in assessing compliance with section 303(c)(2)(B). As with other aspects of this rule, EPA invites comments on the compliance determination process.

A State was determined to be in full compliance with the requirements of section 303(c)(2)(B) if:

a. The State had submitted a water quality standards package for EPA review since enactment of the 1987 Clean Water Act amendments or was determined to be already in compliance, and,

b. The adopted State water quality standards are effective under State law and consistent with the CWA and EPA's implementing regulations (EPA's December 1988 guidance described three Options, any one, or a combination of which EPA suggested States could adopt for compliance with the CWA and EPA regulations), and

c. EPA has issued a formal approval determination to the State.

States meeting these criteria are not included in this proposed rulemaking.

States which adopted standards following Option 1 generally have been found to satisfy section 303(c)(2)(B). An exception exists for selected States which attempted to follow Option 1 by adopting all EPA section 304(a) criteria by reference. EPA has withheld approval for a few States which have adopted such references into their standards because the adopted standards did not specify application factors necessary to implement the criteria (e.g., a risk level for carcinogens). Other States have achieved full compliance following options 1, 2, 3, or some combination of these options.

As of the date of signature of today's proposal, the Agency has determined that 35 States and Territories are in full compliance with the requirements of section 303(c)(2)(B). Compliance status for all States and Territories is set forth in Table 1.

TABLE 1.—PRELIMINARY ASSESSMENT OF STATE COMPLIANCE WITH CWA SECTION 303(C)(2)(B)

| State | Is State in compliance with section 303(c)(2)(B)? |
|---|---|
| Alabama | Yes. |
| Alaska | No. |
| Arizona | No. |
| Arkansas | No. |
| California | No. |
| Colorado | No. |
| Connecticut | No. |
| Delaware | Yes. |
| Florida | No. |
| Georgia | Yes. |
| Hawaii | No. |
| Idaho | No. |
| Illinois | Yes. |
| Indiana | Yes. |
| Iowa | Yes. |
| Kansas | No. |
| Kentucky | Yes. |
| Louisiana | No. |
| Maine | Yes. |
| Maryland | Yes. |
| Massachusetts | Yes. |
| Michigan | No. |
| Minnesota | Yes. |
| Mississippi | Yes. |
| Missouri | Yes. |
| Montana | Yes. |
| Nebraska | Yes. |
| Nevada | No. |
| New Hampshire | No. |
| New Jersey | No. |
| New Mexico | Yes. |
| New York | Yes. |
| North Carolina | Yes. |
| North Dakota | Yes. |
| Ohio | Yes. |
| Oklahoma | Yes. |
| Oregon | Yes. |
| Pennsylvania | Yes. |
| Rhode Island | No. |
| South Carolina | Yes. |
| South Dakota | Yes. |
| Tennessee | Yes. |
| Texas | Yes. |
| Utah | Yes. |
| Vermont | No. |
| Virginia | No. |
| Washington | No. |
| West Virginia | Yes. |
| Wisconsin | Yes. |
| Wyoming | Yes. |
| American Samoa | Yes. |
| Commonwealth of the Northern Mariana Islands. | No. |
| District of Columbia | No. |
| Guam | Yes. |
| Puerto Rico | No. |
| Trust Territories | Yes. |
| Virgin Islands | Yes. |

Section III of appendix 1 provides a State-by-State summary of how compliance was achieved for the EPA-approved States, and what has been, and yet needs to be, accomplished in States included in this proposed rule.

### E. Rationale and Approach for Developing Today's Proposed Rulemaking

The addition of section 303(c)(2)(B) to the Clean Water Act was an unequivocal signal to the States that Congress wanted toxics criteria in the State's water quality standards. The legislative history notes that the "beyond BAT" program (i.e., controls necessary to comply with water quality standards that are more stringent than technology-based controls) was the cornerstone to the Act's toxic pollution control requirements.

The major innovation of the 1972 Clean Water Act Amendments was the concept of effluent limitation guidelines

which were to be incorporated into NPDES permits. In many cases, this strategy has succeeded in halting the decline in the quality of the Nation's waters and, often, has provided improvements. However, the effluent limitation guidelines for industrial discharges and the similar technology-based secondary treatment requirements for municipal discharges are not capable, by themselves, of ensuring that the fishable-swimmable goals of the Clean Water Act will be met.

The basic mechanism to accomplish this in the Act is water quality standards. States are required to periodically review and revise these standards to achieve the goals of the Act. In the 1987 CWA amendments, Congress focused on addressing toxics in several sections of the Act, but special attention was placed on the section 303 water quality standards program requirements. Congress intended that the adoption of numeric criteria for toxics would result in direct improvements in water quality by forcing, where necessary, effluent limits more stringent than those resulting from technology-based effluent limitations guidelines.

As the legislative history demonstrates, Congress was dissatisfied with the piecemeal, slow progress being made by States in setting standards for toxics. Congress reacted by legislating new requirements and deadlines directing the States to establish toxics criteria for pollutants addressed in EPA Section 304(a) criteria guidance, especially for those priority toxic pollutants that could reasonably be expected to interfere with designated uses. In today's action, EPA is exercising its authority under section 303(c)(4) to propose criteria where States have failed to act in a timely manner.

For those States not in compliance with section 303(c)(2)(B) four and one-half years after enactment, EPA now begins the process that will culminate in the promulgation of appropriate toxics criteria and the determination of the necessary parametric coverage and stringency of such criteria. While the previous section of this preamble explains EPA's approach to evaluating the adequacy of State actions in response to section 303(c)(2)(B), this section explains EPA's legal basis for issuing today's proposed rulemaking, discusses EPA's general approach for developing the proposed State-specific requirements in § 131.36(d).

In addition to the Congressional directive and the legal basis for this proposed action, there are a number of environmental and programmatic reasons why further delay in establishing water quality standards for toxic pollutants is no longer acceptable.

Prompt control of toxic pollutants in surface waters is critical to the success of a number of Clean Water Act programs and objectives, including permitting, enforcement, fish tissue quality protection, coastal water quality improvement, sediment contamination control, certain nonpoint source controls, pollution prevention planning, and ecological protection. The decade-long delay in State adoption of water quality standards for toxic pollutants has had a ripple effect throughout EPA's water programs. Without clearly established water quality goals, the effectiveness of many water programs is jeopardized.

Failure to take prompt action at this juncture would also undermine the continued viability of the current statutory scheme to establish standards. Continued delay subverts the entire concept of the triennial review cycle which is to combine current scientific information with the results of previous environmental control programs to direct continuing progress in enhancing water quality.

Finally, another reason to proceed expeditiously is to bring closure to this long-term effort and allow State attention and resources to be directed towards important new national program initiatives. Until standards for toxic pollutants are in place, neither EPA nor the States can fully focus on the emerging, ecologically based water quality activities such as wetlands criteria, biological criteria and sediment criteria.

### *b. Legal Basis*

Clean Water Act section 303(c) specifies that adoption of water quality standards is primarily the responsibility of the States. However, section 303(c) also describes a role for EPA of overseeing State actions to ensure compliance with CWA requirements. If the Agency's review of the State's standards finds flaws or omissions, then the Act authorizes EPA to initiate promulgation to correct the deficiencies (see section 303(c)(4)). The water quality standards promulgation authority has been used by EPA to issue final rules on nine separate occasions. These actions have addressed both insufficiently protective State criteria and/or designated uses and failure to adopt needed criteria. Thus, today's action is not unique, although it would affect more States and pollutants than previous actions taken by the Agency.

The Clean Water Act in section 303(c)(4) provides two bases for promulgation of Federal water quality standards. The first basis in paragraph (A) applies when a State submits new or revised standards that EPA determines are not consistent with the applicable requirements of the Act. If, after EPA's disapproval, the State does not promptly amend its rules so as to be consistent with the Act, EPA must promulgate appropriate Federal water quality standards for that State. The second basis for EPA's action is paragraph (B), which provides that EPA shall promptly initiate promulgation "* * * in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of this Act." EPA is relying on both section 303(c)(4)(A) and section 303(c)(4)(B) as the legal basis for this proposed rulemaking.

Section 303(c)(4)(A) supports today's action for several States. These States have submitted criteria for some number of priority toxic pollutants and EPA has disapproved the State's adopted standards. The basis for EPA's disapproval generally has been the lack of sufficient criteria or particular criteria that were insufficiently stringent. In these cases, EPA has, by letter to the State, noted the deficiencies and specified the need for corrective action. (See section III of appendix 1 for a summary description of each State's section 303(c)(2)(B) history.) Not having received an appropriate correction within the statutory time frame, EPA is today proposing the needed criteria. The action in today's proposal pursuant to section 303(c)(4)(A) may differ from those taken pursuant to section 303(c)(4)(B) by being limited to criteria for specific priority toxic pollutants, particular geographic areas, or particular designated uses.

Section 303(c)(4)(B) is the basis for EPA's proposed requirements for most States. For these States, the Administrator proposes criteria that would bring the States into compliance with the requirements of the CWA. In these cases, EPA is proposing, at a minimum, criteria for all priority toxic pollutants not addressed by approved State criteria. EPA is also proposing criteria for priority toxic pollutants where any previously-approved State criteria do not reflect current science contained in revised criteria documents and other guidance sufficient to fully protect all designated uses or human exposure pathways, or where such previously-approved State criteria are not applicable to all appropriate designated uses. EPA's action pursuant

to section 304(c)(4)(B) may include several situations.

In some cases, the State has failed to adopt and submit for approval any criteria for those priority toxic pollutants for which EPA has published criteria. This includes those States that have not submitted triennial reviews. In other cases, the State has adopted and EPA has approved criteria for either aquatic life or human health, but not both. In yet a third siuation, States have submitted some criteria but not all necessary criteria. Lastly, one State has submitted criteria that do not apply to all appropriate geographic sections of the waters of the State. (See section III of appendix 1.)

The use of section 303(c)(4)(B) requires a determination by the Administrator "* * *that a revised or new standard is necessary to meet the requirements of * * *" the Act. The Administrator's determination could be supported in different ways.

One approach would be for EPA to undertake a time-consuming effort to research and marshall data to demonstrate the need for promulgation for each criteria for each stream segment or waterbody in each State. This would include evidence for each section 307(a) priority toxic pollutant for which EPA has section 304(a) criteria and that there is a "discharge or presence" which could reasonably "be expected to interfere with" the designated use. This approach would not only impose an enormous administrative burden, but would be contrary to the statutory scheme and the compelling Congressional directive for swift action reflected in the 1987 addition of section 303(c)(2)(B) to the Act.

An approach that is more reasonable and consistent with Congressional intent focuses on the State's failure to complete the timely review and adoption of the necessary standards required by section 303(c)(2)(B) despite information that priority toxic pollutants may interfere with designated uses of the State's waters. This approach is consistent with the fact that in enacting section 303(c)(2)(B) Congress expressed its determination of the necessity for prompt adoption and implementation of water quality standards for toxic pollutants. Therefore, a State's failure to meet this fundamental 303(c)(2)(B) requirement of adopting appropriate standards constitutes a failure "to meet the requirements of the Act." That failure to act can be a basis for the Administrator's determination under section 303(c)(4)(B) that new or revised criteria are necessary to ensure designated uses are adequately protected. Here, this determination is buttressed by the existence of evidence of the discharge or presence of priority toxic pollutants in a State's waters for which the State has not adopted numeric water quality criteria. The Agency has compiled an impressive volume of information in the record for this rulemaking (See appendix 1) on the discharge or presence of toxic pollutants in State waters. This data supports the Administrator's proposed determination pursuant to section 303(c)(4)(B).

The Agency's choice to base the proposed determination on the second approach is supported by both the elicit language of the statutory provision and by the legislative history. Congress added subsection 303(c)(2)(B) to section 303 with full knowledge of the existing requirements in section 303(c)(1) for triennial water quality standards review and submission to EPA and in section 303(c)(4)(B) for EPA promulgation. There was a clear expectation that these provisions be used in concert to overcome the programmatic delay that many legislators criticized and achieve the Congressional objective of the rapid availability of enforceable water quality standards for toxic pollutants. As quoted earlier, chief Senate sponsors, including Senators Stafford, Chafee and others, wanted the provision to eliminate State and EPA delays and force aggressive action.

In normal circumstances, it might be argued that to exercise section 303(c)(4)(B) the Administrator might have the burden of marshalling conclusive evidence of "necessity" for Federally promulgated water quality standards. However, in adopting section 303(c)(2)(B), Congress made clear that the "normal" procedure had become inadequate. The specificity and deadline in section 303(c)(2)(B) were layered on top of a statutory scheme already designed to achieve the adoption of toxic water quality standards. Congressional action to adopt an essentially redundant provision was driven by their impatience with the lack of State progress. The new provision was essentially a Congressional "determination" of the necessity for new or revised comprehensive toxic water quality standards by States. In deference to the principle of State primacy, Congress, by linking section 303(c)(2)(B) to the section 303(c)(1) three-year review period, gave States a last chance to correct this deficiency on their own. However, this Congressional indulgence does not alter the fact that section 303(c)(2)(B) changed the nature of the CWA State/EPA water quality standard relationship. The new provision and its legislative background indicate that the Administrator's determination to invoke his section 303(c)(4)(B) authority in this circumstance can be met by a generic finding of inaction on the part of a State and without the need to develop data for individual stream segments. Otherwise, the Agency would face the heavy data gathering burden of justifying the need for each Federal criterion, the process could stretch for years and never be realized. To interpret the combination of subsections (c)(2)(B) and (c)(4) as an effective bar to prompt achievement of statutory objectives would be a perverse conclusion and render section 303(c)(2)(B) essentially meaningless.

A second strong argument against requiring EPA to shoulder a heavy burden to exercise section 303(c)(4)(B) authority is that it would invert the traditional statutory scheme of EPA as national overseer and States as the entity with the greatest local expertise. The CWA provides States the flexibility to tailor water quality standards to local conditions and needs based upon their wealth of first-hand experience, knowledge and data. However, this allowance for flexibility is based on an assumption of reasoned and timely State action, not an abdication of State responsibility by failure to act. EPA does not possess the local expertise or resources necessary to successfully tailor State water quality standards. Therefore, the fact that the CWA allows States flexibility in standards development does not impose an inappropriate burden on EPA in the exercise of its oversight promulgation responsibilities. A broad Federal promulgation based on a showing of State inaction coupled with basic information on the discharge and presence of toxic pollutants meets the statutory objective of having criteria in place that are protective of public health and the environment. Without local expertise to help accurately narrow this list of pollutants and segments requiring criteria, there is no assurance of comparable protection. Nothing in the overall statutory water quality standards scheme anticipates EPA would develop this expertise in lieu of the States. EPA's lack of familiarity with local conditions argues strongly for a simple "determination" test to trigger section 303(c)(4)(B) promulgations. It also supports the concept of an across-the-board rulemaking for all priority toxic pollutants with section 304(a) criteria.

A final major reason supporting a simple determination to trigger 303(c)(4)(B) action is that comprehensive

Federal promulgation imposes no undue or inappropriate burden on States or dischargers. It merely puts in place standards for toxic pollutants that are utilized in implementing Clean Water Act programs. Under this rulemaking, a State still retains the ability to adopt alternative water quality standards simply by completing its standards adoption process. Upon EPA approval of those standards, EPA would take actions to withdraw the Federally-promulgated criteria.

Federal promulgation of State water quality standards should be a course of last resort. It is symptomatic of something awry with the basic statutory scheme. Yet, when it is necessary to exercise this authority, as the evidence suggests is this case, there should be no undue impediments to its use. Section 303(c)(4) is replete with deadlines and Congressional directives for the Administrator to act "promptly" in these cases. The statute indicates that the Administrator of EPA, is to "* * * promptly prepare and publish proposed regulations setting forth a revised or new water quality standard * * *" and "* * * shall promulgate any revised or new standard * * * not later than 90 days after he published such proposed standards, unless prior to such promulgation, such State has adopted a revised or new standard which the Administrator determines to be in accordance with the Act." EPA intends to make every effort to meet the 90 day schedule. The adoption of section 303(c)(2)(B) reinforced this emphasis on expeditious actions. EPA has demonstrated extensive deference to State primacy and a willingness to provide broad flexibility in their adoption of State standards for toxics. However, to fulfill its statutory obligation requires that EPA's deference and flexibility cannot be unlimited.

For the reasons just discussed, EPA does not believe it is necessary to support the criteria proposed today on a pollutant specific, State-by-State, waterbody-by-waterbody basis. Nonetheless, over the course of the past several years in working with and assisting the States, the Agency has reviewed the readily-available data on the discharge and presence of priority toxic pollutants. While this data is not necessarily comprehensive, it constitutes a substantial record to support a *prima facie* case for the need for numeric criteria for most priority toxic pollutants with section 304(a) criteria guidance in most States. In the absence of final State actions to adopt criteria pursuant to either Option 2 or 3 which meet the requirements for EPA approval, this evidence strongly supports EPA's decision to propose, pursuant to Section 303(c)(4)(B), criteria for all priority toxic pollutants not fully addressed by State criteria. The EPA data supporting this assertion is discussed more fully in the next section.

*2. Approach for Developing Today's Proposed Rulemaking*

The proposed State-specific requirements in § 131.36(d) were developed using one of two approaches. In the formal review of the adopted standards for certain States, EPA has determined that specific numeric toxics criteria are lacking. For some, criteria were omitted from the State standards, even though in EPA's judgment, the pollutants can reasonably be expected to interfere with designated uses. In these cases where EPA has specifically identified deficiencies in a State submission, today's proposed rule would establish Federal criteria for that limited number of priority toxic pollutants necessary to correct the deficiency.

For the balance of the States, EPA proposes to apply, to all appropriate State waters, the section 304(a) criteria for all priority toxic pollutants which are not the subject of approved State criteria. EPA also proposes to promulgate Federal criteria for priority toxic pollutants where any previously-approved State criteria do not reflect current science contained in revised criteria documents and other guidance sufficient to fully protect all designated uses or human health exposure pathways, where such previously-approved State criteria do not protect against both acute and chronic aquatic life effects, or where such previously-approved State criteria are not applicable to all appropriate State designated uses. EPA encourages public comments regarding any data which demonstrate that specific priority pollutants or water bodies may not require Federal criteria to protect State designated uses.

Absent a State-by-State pollutant specific analysis to narrow the list, existing data sources strongly support a comprehensive rulemaking approach. Information in the rulemaking record from a number of sources indicates the discharge, potential discharge or presence of virtually all priority toxic pollutants in all States. The data available to EPA has been assembled into a "strawman" analysis designed to identify priority toxic pollutants that potentially require the adoption of numeric criteria. Information on pollutants discharged or present was identified by accessing various national data sources:

—Final section 304(1) short lists identifying toxic pollutants likely to impair designated uses;
—Water column, fish tissue and sediment observations in the Storage Retrieval (STORET) data base (i.e., where the pollutant was detected);
—The National Pollutant Discharge Elimination System's (NPDES) Permit Compliance System data base to identify those pollutants limited in direct dischargers' permits;
—Pollutants included on Form 2(c) permit applications which have been submitted by wastewater dischargers;
—Information on discharges to surface waters or POTWs from the Toxics Release Inventory required by the Emergency Planning and Community Right-To-Know Act of 1986 (title III, Pub. L. 99-499);
—Pollutants predicted to be in the effluent of NPDES dischargers based on industry-specific analyses conducted for the Clean Water Act effluent guideline program.

The extent of this data supports a conclusion that promulgation of Federal criteria for all priority toxic pollutants with section 304(a) criteria guidance documents is appropriate for those States that have not completed their standards adoption process. This conclusion is supported by several other factors.

First, many of the available data sources have limitations which argue against relying on them solely to identify all needed water quality criteria. For example, the section 304(l) short lists only identified water bodies where uses were impaired by point source discharges; State long lists did not generally identify pollutants causing use impairment by nonpoint sources. Other available data sources (i.e., NPDES permit limits) have a similar narrow scope because of their particular purposes. Even the value of those data bases designed to identify ambient water problems is restricted by the availability of monitoring data.

In many States, the quantity, spatial and temporal distribution, and pollutant coverage of monitoring data is severely limited. For example, the most recent Water Quality Inventory Report to Congress included an evaluation of use attainment for only one-third of all river miles and less than one-half of lake acres. Even for those waters where use attainment status was reported, many assessments were based on data which did not include the chemical-specific information necessary to identify the priority toxic pollutants which pose a threat to designated uses. After evaluating this data, EPA concluded that

it most likely understates the adverse presence or discharge of priority toxic pollutants.

Further evidence justifying a broad promulgation rulemaking can be found in the State actions to date in their standards adoption process. While many have not come to completion, the initial steps have led many States to develop or propose rulemaking packages with extensive pollutant coverage. The nature of these preliminary State determinations argues for a Federal promulgation of all section 304(a) criteria pollutants to ensure adequate public health and environmental protection against priority toxic pollutant insults.

EPA's strawman analysis for each State is described in greater detail in part III of appendix 1 and the complete record is available for public review.

The detailed assumptions and "rules" followed by EPA in writing the proposed § 131.36(d) requirements for all jurisdictions are listed below. Comment is invited on the details of these determinations.

(1) No criteria are proposed for States which have been fully approved by EPA as complying with the section 303(c)(2)(B) requirements.

(2) For States which have not been fully approved, if EPA has not previously determined which specific pollutants/criteria/waterbodies are lacking from a State's standards (i.e., as part of an approval/disapproval action only), all of the criteria in columns B, C, and D of the proposed § 131.36(b) matrix are proposed for statewide application to all appropriate designated uses, except as provided for elsewhere in these rules. That is, EPA proposes to bring the State into compliance with section 303(c)(2)(B) via an approach which is comparable to option 1 of the December 1988 national guidance for section 303(c)(2)(B).

(3) If EPA has previously determined which specific pollutants/criteria/waterbodies are needed to comply with CWA section 303(c)(2)(B) (i.e., as part of an approval/disapproval action only), the criteria in proposed section 131.36(b) are proposed for only those specific pollutants/criteria/waterbodies (i.e., EPA proposes to bring the State into compliance via an approach which is comparable to option 2 of the December 1988 national guidance for section 303(c)(2)(B)).

(4) For aquatic life, except as provided for elsewhere in these rules, all waters with designated aquatic life uses providing even minimal support to aquatic life are included in the proposed rule (i.e., fish survival, marginal aquatic life, etc.).

(5a) For human health, except as provided for elsewhere in these rules, all waters with designated uses providing for public water supply protection (and therefore a potential water consumption exposure route) or minimal aquatic life protection (and therefore a potential fish consumption exposure route) are included in the proposed rule.

(5b) Where a State has determined the specific aquatic life segments which provide a fish consumption exposure route (i.e., fish or other aquatic life are being caught and consumed) and EPA approved this determination as part of standards approval/disapproval action, the proposed rule includes the fish consumption (Column D(II)) criteria for only those aquatic life segments, except as provided for elsewhere in these rules. In making a determination that certain segments do not support a fish consumption exposure route, a State must have completed, and EPA approved, a use attainability analysis consistent with the provisions of 40 CFR 131.10(j). In the absence of such an approved State determination, EPA has proposed fish consumption criteria for all aquatic life segments.

(6) Uses/Classes other than those which support aquatic life or human health are not included in the proposed rulemaking (e.g., livestock watering, industrial water supply), unless they are defined in the State standards as also providing protection to aquatic life or human health (i.e., unless they are described as protecting multiple uses including aquatic life or human health). For example, if the State standards include a use such as industrial water supply, and in the narrative description of the use the State standards indicate that the use includes protection for resident aquatic life, then this use is included in the proposed rulemaking.

(7) For human health, the "water+fish" criteria in Column D(I) of § 131.36(b) are proposed for all waterbodies where public water supply and aquatic life uses are designated, except as provided for elsewhere in these rules (e.g., rule 9).

(8) If the State has public water supplies where aquatic life uses have not been designated, or public water supplies that have been determined not to provide a potential fish consumption exposure pathway, the "water only" criteria in Column D(I) of § 131.36(b) are proposed for such waterbodies, except as provided for elsewhere in these rules (e.g., rule 9).

(9) EPA is generally not proposing criteria for priority toxic pollutants for which a State has adopted criteria and received EPA approval. The exceptions to this general rule are described in rules 10 and 11.

(10) For priority toxic pollutants where the State has adopted human health criteria and received EPA approval, but such criteria do not fully satisfy section 303(c)(2)(B) requirements, the proposed rule includes human health criteria for such pollutants. For example, consider a case where a State has a water supply segment that poses an exposure risk to human health from both water and fish consumption. If the State has adopted, and received approval for, human health criteria based on water consumption only (e.g., Safe Drinking Water Act Maximum Contaminant Levels (MCLs)) which are less stringent than the "water+fish" criteria in Column D(I) of proposed § 131.36(b), the Column D(I) criteria are proposed for these water supply segments. The rationale for this is to ensure that both water and fish consumption exposure pathways are adequately addressed and human health is fully protected. If the State has adopted water consumption only criteria which are more stringent or equal to the Column D(I) criteria, the "water+fish" criteria in Column D(I) criteria are not proposed.

(11) For priority toxic pollutants where the State has adopted aquatic life criteria and previous to the 1987 CWA Amendments received EPA approval, but such criteria do not fully satisfy section 303(c)(2)(B) requirements; the proposed rule includes aquatic life criteria for such pollutants. For example, if the State has adopted not-to-be-exceeded aquatic life criteria which are less stringent than the 4-day average chronic aquatic life criteria in § 131.36(b) (i.e., in Columns B(II) and C(II)), the acute and chronic aquatic life criteria in Section 131.36(b) are proposed for those pollutants.

The rationale for this is that the State-adopted criteria do not protect resident aquatic life from both acute and chronic effects, and that Federal criteria are necessary to fully protect aquatic life designated uses. If the State has adopted not-to-be-exceeded aquatic life criteria which are more stringent or equal to the chronic aquatic life criteria in § 131.36(b), the acute and chronic aquatic life criteria in § 131.36(b) are not proposed for those pollutants.

(12) Under certain conditions discussed in rules 9, 10, and 11, criteria listed in § 131.36(b) are not proposed for specific pollutants; however, EPA made such exceptions only for pollutants for which criteria have been adopted by the State and approved by EPA, where such criteria are currently effective under State law the appropriate EPA Region

concluded that the State's criteria fully satisfy section 303(c)(2)(B) requirements.

*3. Approach for States That Fully Comply Subsequent to Issuance of Today's Proposed Rulemaking*

As discussed in prior sections of this preamble, the water quality standards program has been established with an emphasis on State primacy. Although this proposed rule has been developed to Federally promulgate toxics criteria for States, EPA prefers that States maintain primacy, revise their own standards, and achieve full compliance. EPA is hopeful that today's proposed rulemaking will provide additional impetus for non-complying States to adopt the criteria for priority toxic pollutants necessary to comply with section 303(c)(2)(B).

For States that achieve full compliance before publication of the final rulemaking, EPA will not include such States in the final rulemaking. At any point in the process prior to final promulgation, a State can ensure that it will not be affected by this action by adopting the necessary criteria pursuant to State law and receiving EPA approval. The content of the adopted standards must be within the boundaries of the several acceptable approaches described earlier in this preamble.

Following a final promulgation of this rule, removal of a State from the rule will require rulemaking by EPA according to the requirements of the Administrative Procedure Act (5 U.S.C. 551 *et seq.*). EPA will withdraw the Federal rule without a notice and comment rulemaking when the State adopts standards no less stringent than the Federal rule (i.e., standards which provide, at least, equivalent environmental protection). For example, see 51 FR 11580, April 4, 1986, which finalized EPA's removal of a Federal rule for the State of Mississippi.

However, if a State adopts standards for toxics which are less stringent than the Federal rule but, in the Agency's judgment, fully meet the requirements of the Act, EPA will propose to withdraw the rule with a notice of proposed rulemaking and provide for public participation. This procedure would be required for partial or complete removal of a State from this rulemaking. A State covered by the final rule could adopt the necessary criteria using any of the three options or combinations of those Options described in EPA's 1989 guidance.

EPA cautions States and the public that promulgation of a Federal rule removes most of the flexibility available to States for modifying their standards on a discharger-specific or stream-specific basis. For example, variances, site-specific criteria and schedules of compliance actions pursuant to State law for federally promulgated criteria are precluded. Each of these types of modifications would require Federal rulemaking on a case-by-case basis to change the Federal rule for that State.

F. Derivation of Proposed Criteria

*1. Sections 304(a) Criteria Process*

Under the authority of CWA section 304(a) EPA has developed methodologies and specific criteria to protect aquatic life and human health. These methodologies are intended to provide protection for all surface water on a national basis. As described below, there are site specific procedures for more precisely addressing site specific conditions for an individual water body. However, these site-specific criteria procedures are infrequently used because the section 304(a) criteria recommendations have proven themselves to be appropriate for the vast majority of water bodies. The methodologies have been subject to public review, as have the individual criteria documents. Additionally, the methodologies have been reviewed and approved by EPA's Science Advisory Board.

EPA incorporates by reference into the record of this proposed rulemaking the aquatic life methodology as described in "Appendix B—Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses" (45 FR 79341, November 28, 1980) as amended by "Summary of Revisions to Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (50 FR 30792, July 29, 1985). EPA also incorporates by reference into the record of this proposed rulemaking the human health methodology as described in "Appendix C—Guidelines and Methodology Used in the Preparation of Health Effects Assessment Chapters of the Consent Decree Water Criteria Documents" (45 FR 79347, November 28, 1980). EPA also recommends that the following be reviewed for information: "Appendix D—Response to Comments on Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses," (45 FR 79357, November 28, 1980); "Appendix E—Responses to Public Comments on the Human Health Effects Methodology for Deriving Ambient Water Quality Criteria" (45 FR 79368, November 28, 1980); and "Appendix B—Response to Comments on Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses" (50 FR 30793, July 29, 1985). EPA also is placing into the record the most current individual criteria documents for the priority toxic pollutants included in today's proposal.

The primary focus of this rule is the inclusion of the water quality criteria for pollutant(s) in State standards as necessary to support water quality-based control programs. The Agency is accepting comment on the criteria proposed in today's rule. However, Congress has established a very ambitious schedule for the promulgation of the final criteria. The statutory deadline in section 303(c)(4) clearly indicates that Congress intended the Agency to move very expeditiously when Federal action is warranted. The Agency believes that the limited time available for promulgation of the regulation can be used most efficiently and effectively by addressing those issues that have not already come before the Agency.

The methodology used to develop the criteria and the criteria themselves (to the extent not updated through IRIS) have previously undergone scientific peer review and public review and comment, and have been revised as appropriate. For the most part, this review occurred before Congress amended the Act in 1987, to require the inclusion of numeric criteria for certain toxic pollutants in State standards. Congress acted with full knowledge of the EPA process for developing criteria and the Agency's recommendations under section 304(a). EPA believes it is consistent with Congressional intent to rely in large part on existing criteria rather than engage in a time-consuming reevaluation of the underlying basis for water quality criteria. Accordingly, the Agency does not intend in this rulemaking to address the issues that have already been addressed by the Agency in response to previous comments. It is the Agency's belief that this approach will best achieve the purpose of moving forward in promulgating criteria for States not in compliance with section 303(c)(2)(B) so that environmental controls intended by Congress can be put into place to protect public health and welfare and enhance water quality.

It should be noted that the Agency is initiating a review of the basic guidelines for developing criteria and that comments received in this rulemaking may be of value in that effort as well. Future revisions to the criteria guidelines will be reviewed by

the Agency's Science Advisory Board and submitted to the public for review and comment following the same process that was used in issuing the existing methodological guidelines. Subsequent revisions of criteria documents and the issuance of any new criteria documents will also be subject to public review.

*2. Aquatic Life Criteria*

Aquatic life criteria may be expressed in numeric or narrative forms. EPA's guidelines describe an objective, internally consistent and appropriate way of deriving chemical-specific, numeric water quality criteria for the protection of the presence of, as well as the uses of, both fresh and marine water aquatic organisms.

An aquatic life criterion derived using EPA's section 304(a) method represents an estimate of the highest concentration of a pollutant in water that does not present a significant risk to aquatic organisms *per se* or to their use. EPA's guidelines are designed to derive criteria that protect aquatic communities by protecting most of the species and their uses most of the time, but not necessarily all of the species all of the time. Aquatic communities can tolerate some stress and occasional adverse effects on a few species so that total protection of all species all of the time is not necessary. EPA's guidelines attempt to provide a reasonable and adequate amount of protection with only a small possibility of substantial overprotection or underprotection. As discussed in detail below, there are several individual factors which may make the criteria somewhat overprotective or underprotective. Clearly, addressing them all is probably infeasible and, in any case, would make the criteria derivation process unduly resource intensive and time consuming. The approach EPA is using is believed to be as well balanced as possible, given the state of the science.

Numerical aquatic life criteria derived using EPA's most recent guidelines are expressed as short-term and long-term numbers, rather than one number, in order that the criteria more accurately reflect toxicological and practical realities. The combination of a criteria maximum concentration (CMC), a one-hour average acute limit, and a criteria continuous concentration (CCC), a four-day average concentration chronic limit, provide protection of aquatic life and its uses from acute and chronic toxicity to animals and plants, and from bioconcentration by aquatic organisms, without being as restrictive as a one-number criterion would have to be.

The two number criteria are intended to identify average pollutant concentrations which will produce water quality generally suited to maintenance of aquatic life and their uses while restricting the duration of excursions over the average so that total exposures will not cause unacceptable adverse effects. Merely specifying an average value over a time period is insufficient unless the time period is short, because excursions higher than the average can kill or cause substantial damage in short periods.

EPA's guidelines were developed on the assumption that the results of laboratory tests are generally useful for predicting what will happen in field situations. Certain ambient waters may have some capacity to bind pollutants and make them less bioavailable. The site-specific criteria process provides a means of addressing this effect (i.e., by allowing development and use of a "water effect ratio" that quantifies the difference in toxicity of a pollutant in site water versus the toxicity of the pollutant in the laboratory water used to develop the section 304(a) criteria recommendation). However, in the absence of such an approach, the criteria may be somewhat overprotective in some situations.

A minimum data set of eight specified families is required for criteria development (details are given in the methodology cited above). The eight specific families are intended to be representative of a wide spectrum of aquatic life. For this reason it is not necessary that the specific organisms tested be actually present in the water body. States may develop site-specific criteria using native species, provided that the broad spectrum represented by the eight families is maintained. All aquatic organisms and their common uses are meant to be considered, but not necessarily protected, if relevant data are available.

EPA's application of guidelines to develop the criteria matrix in the proposed rule is judged by the Agency to be applicable to all waters of the United States, and to all ecosystems. There are waters and ecosystems where site-specific criteria could be developed, as discussed below, but it is up to States to identify those waters and develop the appropriate site-specific criteria.

Fresh water and salt water (including both estuarine and marine waters) have different chemical compositions, and freshwater and saltwater species rarely inhabit the same water simultaneously. To provide additional accuracy, criteria developed recently are developed for fresh water and for salt water.

Assumptions which may make the criteria underprotective include the use of criteria on an individual basis, with no consideration of additive or synergistic effects, and the general lack of consideration of impacts on wildlife, due principally to a lack of data.

*3. Criteria for Human Health*

As with aquatic life, EPA's guidelines for human health criteria attempt to provide a reasonable and adequate amount of protection with only a small possibility of substantial overprotection or underprotection. EPA's section 304(a) criteria for human health are based on two types of biological endpoints:

(1) Carcinogenicity and (2) systemic toxicity (i.e., all other adverse effects other than cancer). Thus, there are two procedures for assessing these health effects: One for carcinogens and one for non-carcinogens.

EPA's guidelines assume that carcinogenicity is a "non-threshold phenomenon," that is, there are no "safe" or "no-effect levels" because even extremely small doses are assumed to cause a finite increase in the incidence of the response (i.e., cancer). Therefore, EPA's water quality criteria for carcinogens are presented as pollutant concentrations corresponding to increases in the risk of developing cancer.

For pollutants that do not manifest any apparent carcinogenic effects in animal studies (i.e., systemic toxicants), EPA assumes that the pollutant has a threshold below which no effects will be observed. This assumption is based on the premise that a physiological mechanism exists within living organisms to avoid or overcome the adverse effects of the pollutant below the threshold concentration.

The human health risks of a substance cannot be determined with any degree of confidence unless dose-response relationships are quantified. Therefore, a dose-response assessment is required before a criterion can be calculated. The dose-response assessment determines the quantitative relationships between the amount of exposure to a substance and the onset of toxic injury or disease. Data for determining dose-response relationships are typically derived from animal studies, or less frequently, from epidemiological studies in exposed populations.

The dose-response information needed for carcinogens is an estimate of the carcinogenic potency of the compound. Carcinogenic potency is defined here as a general term for a chemical's human cancer-causing potential. This term is often used loosely

to refer to the more specific carcinogenic or cancer slope factor which is defined as an estimate of carcinogenic potency derived from animal studies or epidemiological data of human exposure. It is based on extrapolation from test exposures of high dose levels over relatively short periods of time to more realistic low dose levels over a lifetime exposure period by use of linear extrapolation models. The cancer slope factor, q1*, is EPA's estimate of carcinogenic potency and is intended to be a conservative upper bound estimate (e.g. 95% upper bound confidence limit).

For non-carcinogens, EPA uses the reference dose (RfD) as the dose response parameter in calculating the criteria. The RfD was formerly referred to as an "Acceptable Daily Intake" or ADI. The RfD is useful as a reference point for gauging the potential effects of other doses. Doses that are less than the RfD are not likely to be associated with any health risks, and are therefore less likely to be of regulatory concern. As the frequency of exposures exceeding the RfD increases and as the size of the excess increases, the probability increases that adverse effects may be observed in a human population. Nonetheless, a clear conclusion cannot be categorically drawn that all doses below the RfD are "acceptable" and that all doses in excess of the RfD are "unacceptable." In extrapolating non-carcinogen animal test data to humans to derive an RfD, EPA divides a no-observed-effect dose observed in animal studies by an "uncertainty factor" which is based on professional judgment of toxicologists and typically ranges from 10 to 10,000.

For section 304(a) criteria development, EPA typically considers only exposures to a pollutant that occur through the ingestion of waters and contaminated fish and shellfish. Thus the criteria are based on an assessment of risks related to the surface water exposure route only.

The assumed exposure pathways in calculating the criteria are the consumption of 2 liters per day at the criteria concentration and the consumption of 6.5 grams per day of fish/shellfish contaminated at a level equal to the criteria concentration but multiplied by a "bioconcentration factor." The use of fish consumption as an exposure factor requires the quantification of pollutant residues in the edible portions of the ingested species. Bioconcentration factors (BCFs) are used to relate pollutant residues in aquatic organisms to the pollutant concentration in ambient waters. BCFs are quantified by various procedures depending on the lipid solubility of the pollutant. For lipid soluble pollutants, the average BCF is calculated from the weighted average percent lipids in the edible portions of fish/shellfish, which is about 3%; or it is calculated from theoretical considerations using the octanol/water partition coefficient. For non-lipid soluble compounds, the BCF is determined empirically. The assumed water consumption is taken from the National Academy of Sciences publication "Drinking Water and Health" (1977). The 6.5 grams per day contaminated fish consumption value is equivalent to the average per-capita consumption rate of all (contaminated and non-contaminated) freshwater and estuarine fish for the U.S. population.

EPA also assumes in calculating water quality criteria that the exposed individual is an average adult with body weight of 70 kilograms. The issue of concern is dose per kilogram of body weight. EPA assumes 6.5 grams per day of contaminated fish consumption and 2 liters per day of contaminated drinking water consumption for a 70 kilogram person in calculating the criteria. Persons of smaller body weight are expected to ingest less contaminated fish and water, so the dose per kilogram of body weight is generally expected to be roughly comparable. There may be subpopulations within a State, such as subsistence fishermen, who as a result of greater exposure to a contaminant, are at greater risk than the hypothetical 70 kilogram person eating 6.5 grams per day of maximally contaminated fish and shellfish and drinking 2 liters per day of maximally contaminated drinking water. (EPA is in part addressing the potential that highly exposed subpopulations exist by selecting a relatively stringent cancer risk level ($10^{-6}$) for use in deriving State-wide criteria for carcinogens. Individuals that ingest ten times more of a pollutant than is assumed in derivation of the criteria will be protected to a $10^{-5}$ level, which EPA has historically considered to be adequately protective. There may, nevertheless, be circumstances where site-specific numeric criteria that are more stringent than the State-wide criteria are necessary to adequately protect highly exposed subpopulations. Although EPA intends in this initial promulgation to focus on promulgation of appropriate State-wide criteria that will reduce risks to all exposed individuals, including highly exposed subpopulations, site specific criteria may be developed subsequently by EPA or the States where warranted to provide necessary additional protection.)

For non-carcinogens RfDs are developed based on pollutant concentrations that cause threshold effects. The RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime.

Criteria are calculated for individual chemicals with no consideration of additive, synergistic or antagonistic effects in mixtures. If the conditions within a State differ from the assumptions EPA used, the States have the option to perform the analyses for their conditions.

EPA has a process to develop a scientific consensus on oral reference doses and carcinogenic slope factors. Reference doses and slope factors are validated by two Agency work groups (i.e., one work group for each) which are composed of senior Agency scientists from all of the program offices and the Office of Research and Development. These work groups develop a consensus of Agency opinion for Rfds and slope factors which are then used throughout the Agency for consistent regulation and guidance development. EPA maintains an electronic data base which contains the official Agency consensus for Rfd's and slope factors which is known as the Integrated Risk Information System (IRIS). It is available for use through EPA's electronic mail system, and also available through the Public Health Network of the Public Health Foundation, and on the National Institutes of Health National Library of Medicine's TOXNET system. For the criteria included in today's proposal, EPA used the criteria recommendation from the appropriate section 304(a) criteria document. (The availability of EPA's criteria documents has been announced in various Federal Register notices. These documents are also placed in the record for today's proposed rule.) However, if the Agency has changed in IRIS any parameters used in criteria derivation since issuance of the criteria guidance document, EPA recalculated the criteria recommendation with the latest information. (This information is included in the record.) Thus, there may be differences between the original recommendation, and those in today's proposal, but today's proposal presents the Agency's most current section 304(a) criteria recommendation. The recalculated human health numbers are denoted by an "a" in the criteria matrix in subsection 131.36(b) of today's proposed rule.

In order to base its regulatory decisions on the best available science, EPA continuously updates its assessment of the risk from exposure to contaminants. On September 11, 1991, EPA's Office of Research and Development (ORD) began reassessing the scientific models and exposure scenarios used to predict the risks of biological effects from exposure to low levels of dioxin. This reassessment has the potential to alter the risk assessment for dioxin and accordingly the Agency's regulatory decisions related to dioxin. At this time, EPA is unable to say with any certainty what the degree or directions of any changes in risk estimates might be. This rulemaking includes a proposed Agency action with regard to dioxin that may be affected by the reassessment. The Agency will be carefully monitoring ORD's efforts in order to ensure that appropriate actions are taken during the course of this rulemaking to reflect any necessary changes resulting from the reassessment. If a final Agency action on this rulemaking occurs prior to completion of ORD's work, the Agency will consider revisiting that decision.

*4. Section 304(a) Human Health Criteria Excluded*

Today's proposal does not contain certain of the Section 304(a) criteria for priority toxic pollutants because those criteria were not based on toxicity. The basis for these particular criteria are organoleptic effects (e.g., taste and odor) which would make water and edible aquatic life unpalatable but not toxic. Because the basis for this proposed rulemaking is to protect the public health and aquatic life from toxicity consistent with the language in section 303(c)(2)(B), EPA is proposing criteria only for those priority toxic pollutants whose criteria recommendations are based on toxicity. The Section 304(a) human health criteria based on organoleptic effects for copper, zinc, 2,4-dimethylphenol, and 3-methyl-4-chlorophenol are excluded for this reason.

*5. Cancer Risk Level Proposed*

EPA's Section 304(a) criteria guidance documents for priority toxic pollutants which are based on carcinogenicity present concentrations for upper bound risk levels of 1 excess cancer per 100,000 people ($10^{-5}$), per 1,000,000 people ($10^{-6}$) and per 10,000,000 people ($10^{-7}$). However, the criteria documents do not recommend a particular risk factor as EPA policy.

In the April, 1990, Federal Register notice of preliminary assessment of State compliance, EPA announced the intention to include in the proposed rulemaking an incremental cancer risk level of one in a million ($10^{-6}$) for all priority toxic pollutants regulated as carcinogens. That cancer risk level is reflected in this proposed rule. The reasons supporting this decision are discussed below. However, EPA's Office of Water's guidance to the States has consistently reflected the Agency's policy of accepting cancer risk policies from the States in the range of $10^{-6}$ to $10^{-4}$. EPA reviews individual State policies as part of its water quality standards oversight function and determines if States have appropriately consulted its citizens and applied good science in adopting water quality criteria.

First, EPA's human health criteria have been developed based on a number of exposure assumptions. Many of these assumptions are based on the exposure for an average individual. For example, EPA's criteria assumes exposure of a 70 kilogram (154 pound) adult who consumes 2 liters (2.1 quarts) of water per day and 6.5 grams of fish per day (less than 7 ounces per month). These assumptions are based on approximate national averages, but considerably understate the exposure that would occur for certain segments of the population that have high fish consumption or depend on fish consumption for subsistence. Similarly, it would overstate the exposure of those who consume less fish than the National average amount. Therefore, although EPA would accept a lower State adopted risk level, in the range of $10^{-4}$ to $10^{-6}$, EPA has chosen a $10^{-6}$ risk level to protect the average exposed individual at a conservative incremental lifetime cancer risk.

A second strong reason is that a $10^{-6}$ risk level is consistent with what most States have selected, or are expected to select, as their risk level. A recent EPA status report on State compliance with section 303(c)(2)(B) found that 36 of the 57 States and Territories will select $10^{-6}$ as their risk level (12 States have selected or are expected to select $10^{-5}$ and 9 of the remaining States are undecided). EPA's proposal is therefore consistent with the majority of the States, does not contradict those States choosing a $10^{-6}$ risk level and does not preclude States from eventually choosing a risk level below $10^{-6}$.

Third, by selecting a risk level of $10^{-6}$ for the average exposed individual, some assurance is provided against the possibility that current section 304(a) criteria are not sufficiently stringent. The various parameters used in deriving the Section 304(a) criteria (e.g. cancer potency slopes, reference doses, bioaccumulation factors, etc.) are based on the state of present science. With additional research and experience, EPA may find that one or more of these factors understates the actual public risk. In addition, in many cases, EPA's criteria are based upon a single health effect. As the science evolves and available information expands, there is the potential that EPA will determine that other endpoints or effects are more sensitive than those currently considered. This risk level also reflects a recognition that certain factors are not considered in the current criteria methodology.

A proposed $10^{-6}$ risk level does not preclude State alternatives. If a State decides that a different risk level is more appropriate, it may avoid Federal promulgation by completing its standards adoption process in compliance with section 303(c)(2)(B). As discussed earlier, this would be the case both in advance of or subsequent to final promulgation.

*6. Applying EPA's Nationally Derived Criteria to State Waters*

To assist States in modifying EPA's water quality criteria, the Agency has provided guidance on developing site specific criteria for aquatic life and human health (see Water Quality Standards Handbook and the Guidelines for Deriving Numerical National Water Quality Criteria). This guidance can be used by the appropriate regulatory authority to develop alternative criteria. Where such criteria are more stringent than the criteria finally developed pursuant to this proposed rulemaking, section 510 of the Clean Water Act (33 U.S.C. 1370) provides authority for their implementation and enforcement in lieu of today's proposed criteria.

EPA's experience with such site-specific criteria has verified that the national criteria are generally protective and appropriate for direct use by the States.

**G. Description of the Proposed Rule**

EPA's final rule would establish a new § 131.36 in 40 CFR part 131 entitled, "Toxics Criteria for Those States Not Fully Complying With Clean Water Act section 303(c)(2)(B)."

*1. Scope*

Subsection (a), entitled "Scope", clarifies that this section is not a general promulgation of the section 304(a) criteria for priority toxic pollutants but is restricted to specific pollutants in specific States.

*2. EPA Criteria for Priority Toxic Pollutants*

Subsection (b) presents a matrix of the applicable EPA criteria for priority toxic pollutants. Section 303(c)(2)(B) of the Act addresses only pollutants listed as "toxic" pursuant to section 307(a) of the Act. As discussed earlier in this preamble, the section 307(a) list of toxics contains 65 compounds and families of compounds, which potentially include thousands of specific compounds. The Agency uses the list of 126 "priority toxic pollutants" for administrative purposes (see 40 CFR part 423, appendix A). Reference in this proposed rule to priority toxic pollutants, toxic pollutants, or toxics refers to the 126 priority toxic pollutants.

However, EPA has not developed both aquatic life and human health section 304(a) criteria for all of the 126 priority toxic pollutants. The matrix in paragraph (b) contains human health criteria in Column D for 102 priority toxic pollutants which are divided into criteria (Column I) for water consumption (i.e., 2 liters per day) and aquatic life consumption (i.e., 6.5 grams per day of aquatic organisms), and Column II for aquatic life consumption only. The term aquatic life includes fish and shellfish such as shrimp, clams, oysters and mussels. The total number of priority toxic pollutants with criteria proposed today differs from the total number of priority toxic pollutants with section 304(a) criteria because EPA has developed and is proposing chromium criteria for two valence states. Thus, although chromium is a single priority toxic pollutant, there are two criteria for chromium. See numbers 5a and 5b in proposed § 131.36(b).

The matrix contains aquatic life criteria for 30 priority pollutants. These are divided into freshwater criteria (Column B) and saltwater criteria (Column C). These columns are further divided into acute and chronic criteria. The aquatic life criteria are considered by EPA to be protective when applied under the conditions described in the section 304(a) criteria documents and in the "Technical Support Document for Water Quality-based Toxics Control." For example, waterbody uses should be protected if the criteria are not exceeded, on average, once every three year period. It should be noted that the criteria maximum concentrations (the acute criteria) are one-hour average concentrations and that the criteria continuous concentrations (the chronic criteria) are four-day averages. It should also be noted that for certain of the metals, the actual criteria are equations which are included as footnotes to the matrix. The toxicity of these metals are water hardness dependent. The values shown in the table are based on a hardness expressed as calcium carbonate of 100 mg/L. Finally, the criterion for pentachlorophenol is pH dependent. The equation is the actual criterion and is included as a footnote. The value shown in the matrix is for a pH of 7.8 units.

Several of the freshwater aquatic life criteria are incorporated into the matrix in the format used in the 1980 criteria methodology. This distinction is noted in footnote (g) to the table. EPA has not updated these criteria for various reasons. Footnote (g) describes an approximate method to translate these 1980 criteria to the equivalent criteria by the 1985 methodology. EPA could make this translation in a final rule and solicits public comment on which approach is better.

The matrix also includes toxicity-based human health criteria for copper, 2-chloroethylvinyl ether, 1,2-trans-dichloroethylene, 2-chlorophenol, acenaphthene, butylbenzyl phthalate, and N-nitrosodi-n-propylamine. The criteria for these substances are shown in parentheses and are *not* being proposed today but are included for informational purposes and as notice for consideration in all future State triennial reviews. Although sufficient information on these compounds was previously unavailable to calculate a section 304(a) criterion based on carcinogenicity or systemic toxicity, Agency-approved information in IRIS now allow calculation of these criteria using the EPA criteria guidelines. EPA has assembled another matrix which provides all of the factors used to calculate the proposed human health criteria. This supplementary matrix is included in the record for this proposal.

*3. Applicability*

Section 131.36(d) establishes the applicability of the criteria proposed for each included State. It provides that the criteria promulgated for each State supersede and/or complement any State criteria for that toxic pollutant. EPA believes it has not proposed to supersede any State criteria for priority toxic pollutants unless the State-adopted criteria are disapproved or otherwise insufficient. The approach followed by the Agency in preparing proposed § 131.36(d) is described in section E.2. and further rationale is provided in section E.3 of this preamble. EPA invites comment on the accuracy of the Agency's decisions to include or exclude particular priority toxic pollutant criteria.

EPA's principal purpose today is to propose the toxics criteria necessary to comply with section 303(c)(2)(B). However, in order for such criteria to achieve their intended purpose the implementation scheme must be such that the final results protect the public health and welfare. In section F of this preamble a discussion focused on the factors in EPA's assessment of criteria for carcinogens. For example, fish consumption rates, bioaccumulation factors, and cancer potency slopes were discussed. When any one of these factors is changed, the others must also be evaluated so that, on balance, resulting criteria are adequately protective.

Once an appropriate criterion is selected for either aquatic life or human health protection, then appropriate conditions for calculating water quality-based effluent limits for that chemical must be established in order to maintain the intended stringency and achieve the necessary toxics control. EPA has included in this proposal appropriate implementation factors necessary to maintain the level of protection intended. These proposals are included in subsection (c).

For example, most States have low flow values for streams and rivers which establish flow rates below which numeric criteria may be exceeded. These low flow values became design flows for sizing treatment plants and developing water quality-based effluent limits. Historically, these so-called "design" flows were selected for the purposes of waste load allocation analyses which focused on instream dissolved oxygen concentrations and protection of aquatic life. With the publication of the 1985 Technical Support Document for Water Quality Based Toxics Control (TSD), EPA introduced hydrologically and biologically based analyses for the protection of aquatic life and human health.[1] EPA recommended either of two methods for calculating acceptable low flows, the traditional hydrologic method developed by the U.S. Geological Survey and a biological based method developed by EPA. The

[1] These concepts have been expanded subsequently in guidance entitled "Technical Guidance Manual for Performing Wasteload Allocations, Book 6, Design Conditions," USEPA, Office of Water Regulations and Standards, Washington, DC (1985). These new developments are included in appendix D of the revised TSD. The discussion here is greatly simplified and is provided to support EPA's decision to propose baseline application values for instream flows and thereby maintain the intended stringency of the criteria for priority toxic pollutants.

results of either of these two methods may be used.

Some States have adopted specific low flow requirements for streams and rivers to protect designated uses against the effects of toxics. Generally these have followed the guidance in the TSD. However, EPA believes it is essential to include proposed design flows in today's proposed rule so that, where States have not yet adopted such design flows, the criteria proposed today would be implemented appropriately. Clearly, if the proposed criteria were implemented using inadequate design flows, the resulting toxics controls would not be fully effective, because the resulting ambient concentrations would exceed EPA's recommended levels.

In the case of aquatic life, more frequent violations than the once in 3 years assumed exceedences would result in diminished vitality of stream ecosystems characteristics by the loss of desired species such as sport fish. The low flow values proposed are:

| | |
|---|---|
| Aquatic Life: | |
| Acute criteria (CMC). | 1 Q 10 or 1 B 3. |
| Chronic criteria (CCC). | 7 Q 10 or 4 B 3 |
| Human Health: | |
| Non-carcinogens | 30 Q 5. |
| Carcinogens | harmonic mean flow. |

Where:

1 Q 10 is the lowest one day flow with an average recurrence frequency of once in 10 years determined hydrologically;

1 B 3 is biologically based and indicates an allowable exceedence of once every 3 years. It is determined by EPA's computerized method (DFLOW model);

7 Q 10 is the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically;

4 B 3 is biologically based and indicates an allowable exceedence for 4 consecutive days once every 3 years. It is determined by EPA's computerized method (DFLOW model);

30 Q 5 is the lowest average 30 consecutive day low flow with an average recurrence frequency of once in 5 years determined hydrologically; and

The harmonic mean flow is a long term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows.

EPA is proposing the harmonic mean flow to be applied with human health criteria. The concept of a harmonic mean is a standard statistical data analysis technique. EPA's model for human health effects assumes that such effects occur because of a long-term exposure to low concentration of a toxic pollutant. For example, two liters of water per day for seventy years. To estimate the concentrations of the toxic pollutant in those two liters per day by withdrawal from streams with a high daily variation in flow, EPA believes the harmonic mean flow is the correct statistic to use in computing such design flows rather than other averaging techniques.[2]

All waters, whether or not suitable for such hydrologic calculations but included in this proposed rule (including lakes, estuaries, and marine waters), must contain the criteria proposed today. Such attainment must occur at the end of the discharge pipe, unless the State has an EPA approved mixing zone regulation. If the State has an EPA approved mixing zone regulation, then the criteria would apply at the locations stated in that regulation. For example, the chronic criteria (CCC) must apply at the geographically defined boundary of the mixing zone. Discussion and guidance of these factors are included in the revised TSD in chapter 4.

EPA is aware that the criteria proposed today for some of the priority toxic pollutants are at concentrations less than EPA's current analytical detection limits. Detection limits have never been an acceptable basis for setting standards since they are not related to actual environmental impacts. The environmental impact of a pollutant is based on a scientific determination, not an arbitrary measuring technique which is subject to change. Setting the criteria at levels that reflect adequate protection tends to be a forcing mechanism to improve analytical detection methods. As the methods improve, limits closer to the actual criteria necessary to protect aquatic life and human health are measurable. The Agency does not believe it is appropriate to promulgate insufficiently protective criteria (e.g., criteria equal to the current analytical detection limits).

EPA does believe, however, that the use of analytical detection limits are appropriate for determining compliance with NPDES permit limits. This historical view of the role of detection limits was recently articulated in guidance for translating dioxin criteria into NPDES permit limits which is the principal method used for water quality standards enforcement.[3] This guidance presents a model for addressing toxic pollutants which have criteria recommendations less than current detection limits. This guidance is equally applicable to other priority toxic pollutants with criteria recommendations less than current detection limits. The guidance explains that detection limits may be used for purposes of determining compliance with permit limits, but not for purposes of establishing water quality criteria or permit limits. Because under the Clean Water Act analytical detection limits are appropriately used only in connection with NPDES permit limit compliance determinations. EPA has not considered analytical detection limits in deriving the criteria proposed today.

EPA has added provisions in paragraph (c)(3) to determine when fresh water or saltwater aquatic life criteria apply. The structure of the paragraph is to establish presumptively applicable rules and to allow for site-specific determinations where the rules are not consistent with actual field conditions. Because a distinct separation generally does not exist between fresh water and marine water aquatic communities, EPA is proposing the following: (1) The fresh water criteria apply at salinities of 1 part per thousand and below; (2) marine water criteria apply at 10 parts per thousand and above; and (3) at salinities between 1 and 10 parts per thousand the more stringent of the two apply unless EPA approves another site specific criterion for the pollutant. This proposed assignment of criteria for fresh, brackish and marine waters was developed in consultation with EPA's research laboratories at Duluth, Minnesota and Narragansett, Rhode Island. The Agency believes such an approach is consistent with field experience.

In paragraph (c)(4)(i) EPA has included a limitation on the amount of hardness that EPA can allow to antagonize the toxicity of certain metals (see footnote (e) in the criteria matrix in paragraph (b) of the rule). The data base used for the Section 304(a) criteria documents for metals do not include data supporting the extrapolation of the hardness effects on metal toxicity beyond a range of hardness of 25 mg/l to 400 mg/l (expressed as calcium carbonate). Thus, the aquatic life values for the CNC (acute) and CCC (chronic) criteria for these metals in waters with a hardness less than 25 mg/l, must nevertheless use 25 mg/l when calculating the criteria; and in waters with a hardness greater than 400 mg/l, must nevertheless use 400 mg/l when calculating the criteria.

[2] For a description of harmonic means see "Design Stream Flows Based on Harmonic Means," Lewis A. Rossman, J. of Hydraulics Engineering, Vol. 116, No. 7, July, 1990. This article is contained in the record for this proposal.

[3] Strategy for the Regulation of Discharges of PHDDs and PHDFs from Pulp and Paper Mills to Waters of the United States," memorandum from the Assistant Administrator for Water to the Regional Water Management Division Directors and NPDES State Directors, May 21, 1990.

Subsection (d) lists the States for which rules are being proposed. For each identified State, the water uses impacted (and in some cases the waters covered) and the criteria proposed are identified.

H. Specific Issues for Public Comment

As is the Agency's custom, EPA would like to request that particular public review be directed to the issues and alternatives presented in this section. Although the issues presented below are particularly notable and worthy of comment, EPA encourages public comment on any aspect of this proposed rule.

1. In section D of this preamble, EPA has presented a discussion of how EPA determines State compliance with section 303(c)(2)(9). The process described has been the Agency's general practice since the beginning of the water quality standards program, although the requirements specific to toxics criteria have evolved over the years. Briefly stated, EPA's ten Regional offices review the State-adopted standards to ascertain compliance with the Clean Water Act using the information developed by the State and other relevant and available data and information.

For compliance with section 303(c)(2)(B), EPA's focus in many cases was on the process the State used to assemble the criteria for those priority toxic pollutants which could reasonably be expected to interfere with the State's designated uses. For example, EPA's review of individual State water quality standards had to balance a need for national consistency with the need to implement the CWA scheme that provides for State primacy and State-specific approaches. If EPA had information on a toxic pollutant sufficient to satisfy the test that the pollutant can reasonably be expected to interfere with designated uses, and the State did not adopt sufficient, scientifically defensible criteria for that pollutant, EPA disapproved the State action as being inconsistent with Section 303(c)(2)(B). Alternative approaches could have had either a narrower focus on fewer priority toxic pollutants (for example, relying only on the results of the section 304(l) short list process) or might have been broader, (for example, requiring most States to adopt criteria for the complete list of priority toxic pollutants addressed in EPA section 304(a) criteria recommendations). EPA solicits comment on whether the Agency's traditional review process should have been changed.

2. EPA's approach and rationale for deciding which criteria to propose for a State is discussed in section E of this Preamble. Briefly stated, EPA either: (1) Proposed to promulgate Federal criteria for all priority toxic pollutants not acceptably addressed by approved State criteria (this approach is used for most States), or (2) proposed to promulgate Federal criteria only for specific priority pollutants for which State criteria are lacking or insufficient (this approach is used for only a few States). EPA could have used other approaches and solicits public comment. For example, EPA could have relied totally on the State's own determination pursuant to section 304(l) and 305(b), or entirely on an Option 1 approach of promulgating all Federal criteria for all State waters.

3. This proposed rulemaking includes proposed minimum implementation factors for the criteria, such as flow conditions. As proposed, these factors are dependent on existing State rules but subject to base values which are those used in developing the criteria. EPA's revised TSD explains more fully the details of these base values. EPA could rely entirely on existing State rules or establish the proposed Federal rules.

4. The conditions under which States will be removed from the rule, either before or after final promulgation, are described in section E.4 of this preamble. EPA could make the conditions for removing the applicability of the rule to a State more or less stringent. A difficult aspect of this issue is a definition of what the State must adopt for EPA to withdraw the applicability of its rule entirely. As currently stated, EPA's policy is that if the State's standards are judged to meet the requirements of the Act and thereby provide adequate environmental protection, EPA will withdraw the applicability of the Federal Rule as to that State. In the context of this proposal, the State would have to demonstrate that the criteria it adopted meet the statutory test of protecting the public health and would protect designated uses. State compliance could be by any one or a combination of the 3 options described in EPA's guidance. Once such a showing were made EPA would propose to withdraw the applicability of its rule entirely. However, if a State fails to make such a demonstration for all pollutants, partial withdrawals for certain pollutants could occur, leaving applicable parts of the Federal rule.

5. EPA must also decide whether it should pick a uniform cancer risk level of, for example, $10^{-6}$, for all States included in a final rule, or whether different risk levels for different States are appropriate. EPA today proposes the human health criteria at a cancer risk level of $10^{-6}$ because such a risk level is conservative for the general population and in the generally applied risk range. However, as noted in section F.5., EPA has approved human health risk levels of $10^{-5}$ in 10 States, and for some criteria and uses risk levels of $10^{-4}$. EPA's review of the explanations provided by the States supporting State-adopted risk levels of less than $10^{-5}$ focuses on public participation and the supportability of the risk factors included in the State's analysis.

While today's proposed action is predicated on a $10^{-6}$ risk level for carcinogens, another option that the public should consider in responding to this rule is the application of the proposed criteria at a $10^{-5}$ risk level. EPA's rationale for proposing at a $10^{-6}$ risk level was articulated earlier in the preamble. However, there are several arguments to support a less protective $10^{-5}$ level. The model used to calculate the criteria for carcinogens is a conservative one and has a very low probability of underestimating the potency of a carcinogen. As a result, a higher level of accepted risk as the endpoint for criteria calculations may be reasonable. For "Class C" carcinogens, i.e., those for which the data demonstrating oncogenicity in animal studies are most limited, a $10^{-5}$ risk level is closer to the criteria values calculated as Rfds (non-cancer endpoints of toxicity) for these chemicals. Use of RfDs reduces the likelihood that EPA is over-regulating chemicals of less definitive cancer potency. A $10^{-5}$ risk is within the range of accepted risks for other major EPA rulemakings which aim to protect the general public, such as national drinking water standards.

Similarly, EPA must decide what a State must adopt in the way of a risk level for EPA to withdraw a final rule. The question to be addressed is whether EPA can accept less stringent risk levels (applied statewide; by individual chemicals, or by geographical sub-area) than contained in EPA's final rule if such less stringent risk levels were adopted following State administrative procedures and adequately supported by the administrative record.

6. Today's proposed rulemaking includes an Agency proposal to establish criteria for only those EPA priority toxic pollutant criteria which are based on toxic effects. The Agency could include other section 304(a) priority toxic pollutant criteria

recommendations which are based on organoleptic (i.e., taste and odor) effects. The logic would be that the congressional reference to "toxic pollutants" in section 303(c)(2)(B) was the generic list of 126 priority toxic pollutants and EPA should include all such criteria developed for these pollutants rather than just those based on toxicity. Organoleptic effects cause taste and odor problems in drinking water which may increase treatment costs or the selection by the public of alternative but less protective sources of drinking water and may cause tainting or off flavors in fish flesh and other edible aquatic life reducing their marketability, thus diminishing the recreational and resource value of the water. EPA believes that because the Section 303(c)(2)(B) focuses on toxicity of the priority toxic pollutants, EPA's proposal should likewise focus on toxicity.

7. EPA also invites public comment on the merits of promulgating a translator procedure (that could support derivation of new or revised chemical-specific criteria for those priority toxic pollutants for which EPA has not issued section 304(a) criteria guidance) for States in this rule to enhance State and EPA implementation of section 303 (c)(2)(B). Such a procedure would supplement the specific numeric criteria included in this proposal. The rationale for, and specifics of, such an approach are described below.

As discussed in previous sections of this preamble, CWA section 303(c)(2)(B) represents a clear congressional mandate for State adoption of chemical-specific numeric criteria for priority toxic pollutants where EPA has issued section 304(a) criteria guidance. However, where no such criteria exist, section 303(c)(2)(B) went on to direct States that, " * * * Where such numerical criteria are not available, whenever a State reviews water quality standards * * * or revises or adopts new standards * * *, such State shall adopt criteria based on biological monitoring or assessment methods * * *."

EPA's December 1988 national guidance provided States with three options for satisfying the chemical-specific criteria requirements. Option 3 of the guidance allows States to adopt and apply translator procedures. As described in section B-3 of this preamble, such translator procedures are defined as the methods, equations, and protocols by which a State calculates derived chemical-specific numeric criteria for priority toxic pollutants to ensure that the State's narrative toxics criterion is fully satisfied.

There are several alternative approaches for establishing a translator procedure. All approaches would utilize EPA's criteria guidelines (i.e., for aquatic life and human health as described in section F.1. of this preamble) as the basis for deriving chemical-specific criteria. They could also require EPA to periodically issue an updated list of derived numeric criteria and notice the availability of the list in the Federal Register.

One alternative would be to promulgate a mechanism for State usage only for the pollutants where EPA has not issued a section 304 (a) criteria guidance document.

Another alternative would be to allow criteria revisions in specific situations where EPA determines that a revised criterion is necessary. For example, if EPA issued a final revised estimate of the cancer potency slope of a priority toxic pollutant (i.e., by adding it to IRIS), such cancer slopes would be available for use in deriving new human health criteria for that pollutant following the translator procedure. Another example would be situations where additional data on the toxicity of a pollutant to aquatic life becomes available such that the minimum database requirements in the EPA criteria guidelines are satisfied. In such situations, the data could be applied to the translator procedure to derive new or revised aquatic life criteria more rapidly than the current method of proposing for comment and then publishing a final section 304(a) recommendation for subsequent consideration by States. This alternative would apply to criteria for both aquatic life and human health protection and could apply to pollutants for which a section 304(a) criteria recommendation exists or to those pollutants where no such recommendation exists.

A third approach would limit the applicability of the translator procedure to the priority toxic pollutants for which numeric criteria are contained in today's proposed rulemaking. Under this alternative, criteria could not be derived for pollutants without a section 304(a) criteria recommendation using the translator procedure, even where: (1) Formal Agency estimates of the parameters necessary to support derivation are issued, or (2) the data necessary to satisfy the minimum database requirements become available.

A final alternative providing only limited flexibility would be to limit use of the translator procedure to human health criteria where the Agency issues a final revised risk assessment for the parameter in IRIS. Such IRIS estimates are subject to extensive intra-Agency review. This alternative would limit revisions to situations where EPA makes a formal determination that a revised human health risk assessment is appropriate.

The Agency invites public comment on the environmental, programmatic and legal aspects of including a promulgation of a criteria translator mechanism for each State in the final issuance of this rulemaking. Comment is also invited on the scope and details of such an approach as described above.

8. EPA solicits comment on the section 304(a) assessment methodology (cancer and non-cancer) used to derive human health criteria for section 307(a) priority toxic pollutants. This methodology is discussed in section F of the Preamble but is derived in the criteria methodology published in the Federal Register on November 26, 1980 (45 FR 79347). For example, EPA has included proposed criteria for 3 PAHs (acenaphthylene, benzo(ghi)perylene and phenanthrene). The included criteria treat these PAHs as carcinogens and are based on data for benzo(a)pyrene. The section 304(a) criteria methodology does not distinguish between classes of carcinogens and allows the use of closely related chemicals of similar structure to carry the same criteria recommendation. This methodology is basic to the development of the human health criteria proposed today.

## I. Executive Order 12291

Executive Order 12291 requires EPA and other agencies to perform regulatory impact analyses for major regulations. Major regulations are those that impose an annual cost to the economy of $100 million or more, or meet other criteria. This is a major regulation, however, a regulatory impact analyses has been waived by the Office of Management and Budget for this proposal for the reasons discussed below.

This rulemaking establishes a legal minimum standard where States have failed to comply with the statutory mandate to adopt numeric criteria for toxic pollutants. The impacts to dischargers are no different than what would occur if States had acted to adopt their own standards. There will be a cost to dischargers for complying with these proposed new standards as the standards are translated into specific NPDES permit limits for individual dischargers. However, for reasons discussed in more detail below, a meaningful cost estimate is difficult to

develop. The increased costs incurred will depend upon the type and amount of pollutants discharged and the extent to which additional treatment needs to be installed beyond that which is required to meet the generally applicable technology-based limit regulations. As discussed earlier in the Preamble, the control of toxic pollutants is expected to provide societal benefits by reducing risk to human health and to reduce ecological impacts on aquatic life.

The general impacts on point source dischargers, publicly owned treatment works (POTWs) and nonpoint sources may be described. By establishing new goals for a waterbody, the addition of criteria for toxic pollutants into State water quality standards will affect the wasteload allocations developed for each waterbody segment to the extent the pollutant is actually discharged into the stream. If the pollutant is not present in the wastestream, the addition of criteria has no impact. Revised wasteload allocations may result in adjustments to individual NPDES permit limits for point source dischargers which could result in increased incremental treatment costs required to meet the revised water quality standards. These costs will vary depending on the types of treatment involved, the number and kind of pollutant(s) being treated, and the controls necessary to meet the technologically based effluent limits for a given industry.

Compliance costs for indirect industrial dischargers will be reflected in increased incremental costs for POTWs assuming that industrial sources are the primary source of toxics discharged by POTWs and that the incremental treatment costs incurred by POTWs will be passed along to their industrial dischargers. Possible areas where the addition of criteria for toxic pollutants into State standards may have a cost impact include: (1) POTW expansion, (2) operational changes, and (3) increased operator training costs.

Increased costs may also be incurred by nonpoint sources of toxic pollutants to the extent that best management practices need to be modified to reflect the revised standards. Although there is no comparable Federal permit program for nonpoint sources as there is to control point source discharges, there are existing State regulatory programs to control nonpoint sources.

Monitoring programs to generate information on the existing quality of water and the kinds and amount of pollutants being discharged are likely to be affected by this proposed rulemaking. However, the addition of criteria for toxic pollutants into State standards does not require the State to engage in a program to monitor for all such pollutants unless there is some reasonable expectation that the pollutants are manufactured or actually used in the State with the likelihood that they will be discharged into surface waters.

While recognizing that the application of criteria for toxic pollutants will result in increased treatment costs and that such costs are appropriately considered in several areas of the standards to permits process, it is important to consider the difficulties and the large potential uncertainties involved in developing meaningful cost estimates for purposes of this proposed rulemaking. The development of compliance cost estimates would require numerous assumptions about pollutant loadings, impacts of technology-based regulations on loadings, combinations of pollutants handled by a given treatment approach, the costs of each treatment train and the variables for each pollutant in each waterbody in each State. There are many sources of uncertainty in making these assumptions, and the resulting estimates could contain such significant estimation errors that the figures would have questionable value.

This proposed rule including the above determination, has been reviewed by the Office of Management and Budget. Any written comments from OMB to EPA and any EPA response to those comments are included in the public record and are available for inspection.

### J. Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, Pub. L. 96-354) requires EPA to assess whether its regulations create a disproportionate effect on small entities. According to the provisions of the Act, EPA must prepare an initial regulatory flexibility analysis for all proposed regulations that have a significant impact on a substantial number of small entities. There will be a cost to dischargers for complying with these standards as they are translated into permit limits for individual dischargers. However, for the reasons discussed in the previous section, a meaningful estimate of the total cost or impact on small entities cannot be meaningfully computed.

This proposed regulation fills a regulatory void left by States not fully complying with the statute; thus, the impact on small entities is not different than what would have occurred if States had acted to adopt standards. In addition, the water quality standards regulation provides several means (such as adjusting designated uses, setting site-specific criteria, or granting variances) to consider costs and adjust standards to account for the impacts on dischargers.

### K. Paperwork Reduction Act

The information collection requirements associated with this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* An Information Collection Request (ICR) document has been prepared by EPA (ICR No. 0988.04) and a copy may be obtained from Sandy Farmer, Information Policy Branch; EPA; 401 M St., SW. (PM-223Y); Washington, DC 20460 or by calling (202) 382-2740.

Public reporting burden for this collection of information is estimated to average 745 hours per respondent, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223Y, U.S. EPA, 401 M St., SW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs; Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer for EPA." The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

### List of Subjects

Water quality standards, Toxic pollutants.

Dated: November 6, 1991.

William K. Reilly,

*Administrator.*

For the reasons set out in the preamble, part 131 of title 40 of the Code of Federal Regulations is proposed to be amended as follows:

## PART 131—WATER QUALITY STANDARDS

1. The authority citation for part 131 continues to read as follows:

Authority: Clean Water Act, Pub. L. 92-500, as amended; 33 U.S.C. 1251 *et seq.*

2. Section 131.36 is added to subpart D to read as follows:

**§ 131.36 Toxics criteria for those states not complying with Clean Water Act section 303(c)(2)(B)**

(a) *Scope.* This section is not a general promulgation of the section 304(a) criteria for priority toxic pollutants but is restricted to specific pollutants in specific States.

(b) *EPA's Section 304(a) Criteria for Priority Toxic Pollutants*

| A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|
| | | Freshwater | | Saltwater | | Human health ($10^{-6}$ risk for carcinogens) | |
| (#) Compound | CAS No. | Criterion maximum concentration d (µg/L) B1 | Criterion continuous concentration d (µg/L) B2 | Criterion maximum concentration d (µg/L) C1 | Criterion continuous concentration d (µg/L) C2 | For consumption of: Water and organisms (µg/L) D1 | For consumption of: Organisms only (µg/L) D2 |
| 1 Antimony | 7440360 | | | | | 14 a | 4300 a |
| 2 Arsenic | 7440382 | 360 | 190 | 69 | 36 | 0.018 bc | 0.14 bc |
| 3 Beryllium | 7440417 | | | | | 0.0077 ac | 0.13 ac |
| 4 Cadmium | 7440439 | 3.9 e | 1.1 e | 43 | 9.3 | 16 | 170 aj |
| 5a Chromium (III) | 16065831 | 1700 e | 210 e | | | 33000 a | 670000 a |
| b Chromium (VI) | 18540299 | 16 | 11 | 1100 | 50 | 170 a | 3400 a |
| 6 Copper | 7440508 | 18 e | 12 e | 2.9 | 2.9 | (1300) b | |
| 7 Lead | 7439921 | 82 e | 3.2 e | 220 | 8.5 | 50 | |
| 8 Mercury | 7439976 | 2.4 | 0.012 i | 2.1 | 0.025 i | 0.14 | 0.15 |
| 9 Nickel | 7440020 | 1400 e | 160 e | 75 | 8.3 | 610 a | 4600 a |
| 10 Selenium | 7782492 | 20 | 5 | 300 | 71 | 100 b | 6800 bj |
| 11 Silver | 7440224 | 4.1 e | | 2.3 | | 105 a | 65000 aj |
| 12 Thallium | 7440280 | | | | | 1.7 a | 6.3 a |
| 13 Zinc | 7440666 | 120 e | 110 e | 95 | 86 | | |
| 14 Cyanide | 57125 | 22 | 5.2 | 1 | 1 | 700 a | 220000 aj |
| 15 Asbestos | 1332214 | | | | | 7,000,000 fibers/L k | |
| 16 2,3,7,8-TCDD (Dioxin) | 1746016 | | | | | 0.000000013 c | 0.000000014 c |
| 17 Acrolein | 107028 | | | | | 320 | 780 |
| 18 Acrylonitrile | 107131 | | | | | 0.059 ac | 0.66 ac |
| 19 Benzene | 71432 | | | | | 1.2 ac | 71 ac |
| 20 Bromoform | 75252 | | | | | 4.3 ac | 360 ac |
| 21 Carbon Tetrachloride | 56235 | | | | | 0.25 ac | 4.4 ac |
| 22 Chlorobenzene | 108907 | | | | | 680 a | 21000 aj |
| 23 Chlorodibromomethane | 124481 | | | | | 0.41 ac | 34 ac |
| 24 Chloroethane | 75003 | | | | | | |
| 25 2-Chloroethylvinyl Ether | 110758 | | | | | | |
| 26 Chloroform | 67663 | | | | | 5.7 ac | 470 ac |
| 27 Dichlorobromomethane | 75274 | | | | | 0.27 ac | 22 ac |
| 28 1,1-Dichloroethane | 75343 | | | | | | |
| 29 1,2-Dichloroethane | 107062 | | | | | 0.38 ac | 99 ac |
| 30 1,1-Dichloroethylene | 75354 | | | | | 0.057 ac | 3.2 ac |
| 31 1,2-Dichloropropane | 78875 | | | | | (0.52) kc | (39) kc |
| 32 1,3-Dichloropropylene | 542756 | | | | | 10 a | 1700 a |
| 33 Ethylbenzene | 100414 | | | | | 3100 a | 29000 a |
| 34 Methyl Bromide | 74839 | | | | | 48 a | 4000 a |
| 35 Methyl Chloride | 74873 | | | | | 5.7 ac | 470 ac |
| 36 Methylene Chloride | 75092 | | | | | 4.7 ac | 1600 ac |
| 37 1,1,2,2-Tetrachloroethane | 79345 | | | | | 0.17 ac | 11 ac |
| 38 Tetrachloroethylene | 127184 | | | | | 0.8 c | 8.85 c |
| 39 Toluene | 108883 | | | | | 6800 a | 200000 a |
| 40 1,2-Trans-Dichloroethylene | 156605 | | | | | (700) a | (140000) a |
| 41 1,1,1-Trichloroethane | 71556 | | | | | 3100 a | (170000) a |
| 42 1,1,2-Trichloroethane | 79005 | | | | | 0.60 ac | 42 ac |
| 43 Trichloroethylene | 79016 | | | | | 2.7 c | 81 c |
| 44 Vinyl Chloride | 75014 | | | | | 2 c | 525 c |
| 45 2-Chlorophenol | 95578 | | | | | (120) a | (400) a |
| 46 2,4-Dichlorophenol | 120832 | | | | | 93 a | 790 aj |
| 47 2,4-Dimethylphenol | 105679 | | | | | (540) a | (2300) a |
| 48 2-Methyl-4,6-Dinitrophenol | 534521 | | | | | 13.4 | 765 |
| 49 2,4-Dinitrophenol | 51285 | | | | | 70 a | 14000 a |
| 50 2-Nitrophenol | 88755 | | | | | | |
| 51 4-Nitrophenol | 100027 | | | | | | |
| 52 3-Methyl-4-Chlorophenol | 59507 | | | | | | |
| 53 Pentachlorophenol | 87865 | 20 f | 13 f | 13 | 7.9 | 0.28 ac | 8.2 acj |
| 54 Phenol | 108952 | | | | | 21000 a | 4600000 a |
| 55 2,4,6-Trichlorophenol | 88062 | | | | | 2.1 ac | 6.5 ac |
| 56 Acenaphthene | 83329 | | | | | (1200) a | (2700) a |
| 57 Acenaphthylene | 208968 | | | | | 0.0028 c | 0.031 c |
| 58 Anthracene | 120127 | | | | | 9600 a | 110000 a |
| 59 Benzidine | 92875 | | | | | 0.00012 ac | 0.00054 ac |
| 60 Benzo(a)Anthracene | 56553 | | | | | 0.0028 c | 0.031 c |
| 61 Benzo(a)Pyrene | 50328 | | | | | 0.0028 c | 0.031 c |
| 62 Benzo(b)Fluoranthene | 205992 | | | | | 0.0028 c | 0.031 c |

| A | | B | | C | | D | |
|---|---|---|---|---|---|---|---|
| | | Freshwater | | Saltwater | | Human health (10⁻⁶ risk for carcinogens) | |
| (#) Compound | CAS No. | Criterion maximum concentration d (µg/L) E1 | Criterion continuous concentration d (µg/L) E2 | Criterion maximum concentration d (µg/L) C1 | Criterion continuous concentration d (µg/L) C2 | For consumption of: Water and organisms (µg/L) D1 | For consumption of: Organisms only (µg/L) D2 |
| 63 Benzo(ghi)Perylene | 191242 | | | | | 0.0028 c | 0.031 c |
| 64 Benzo(k)Fluoranthene | 207089 | | | | | 0.0028 c | 0.031 c |
| 65 Bis(2-Chloroethoxy)Methane | 111911 | | | | | | |
| 66 Bis(2-Chloroethyl)Ether | 111444 | | | | | 0.031 ac | 1.4 ac |
| 67 Bis(2-Chloroisopropyl)Ether | 108601 | | | | | 1400 a | 170000 a |
| 68 Bis(2-Ethylhexyl)Phthalate | 117817 | | | | | 1.8 ac | 5.9 ac |
| 69 4-Bromophenyl Phenyl Ether | 101553 | | | | | | |
| 70 Butylbenzyl Phthalate | 85687 | | | | | (3000) a | (5200) a |
| 71 2-Chloronaphthalene | 91587 | | | | | (1700) a | (4300) a |
| 72 4-Chlorophenyl Phenyl Ether | 7005723 | | | | | | |
| 73 Chrysene | 218019 | | | | | 0.0028 c | 0.031 c |
| 74 Dibenzo(a,h)Anthracene | 53703 | | | | | 0.0028 c | 0.031 c |
| 75 1,2-Dichlorobenzene | 95501 | | | | | 2700 a | 17000 a |
| 76 1,3-Dichlorobenzene | 541731 | | | | | 400 | 2600 |
| 77 1,4-Dichlorobenzene | 106467 | | | | | 400 | 2600 |
| 78 3,3'-Dichlorobenzidine | 91941 | | | | | 0.04 ac | 0.077 ac |
| 79 Diethyl Phthalate | 84662 | | | | | 23000 a | 120000 a |
| 80 Dimethyl Phthalate | 131113 | | | | | 313000 | 2900000 |
| 81 Di-n-Butyl Phthalate | 84742 | | | | | 2700 a | 12000 a |
| 82 2,4-Dinitrotoluene | 121142 | | | | | 0.11 c | 9.1 c |
| 83 2,6-Dinitrotoluene | 606202 | | | | | | |
| 84 Di-n-Octyl Phthalate | 117840 | | | | | | |
| 85 1,2-Diphenylhydrazine | 122667 | | | | | 0.040 ac | 0.54 ac |
| 86 Fluoranthene | 206440 | | | | | 300 a | 370 a |
| 87 Fluorene | 86737 | | | | | 1300 a | 14000 a |
| 88 Hexachlorobenzene | 118741 | | | | | 0.00075 ac | 0.00077 ac |
| 89 Hexachlorobutadiene | 87683 | | | | | 0.44 ac | 50 ac |
| 90 Hexachlorocyclopentadiene | 77474 | | | | | 240 a | 17000 aj |
| 91 Hexachloroethane | 67721 | | | | | 1.9 ac | 8.9 ac |
| 92 Indeno(1,2,3-cd)Pyrene | 193395 | | | | | 0.0028 c | 0.031 c |
| 93 Isophorone | 78591 | | | | | 8.4 ac | 600 ac |
| 94 Naphthalene | 91203 | | | | | | |
| 95 Nitrobenzene | 98953 | | | | | 17 a | 1900 aj |
| 96 N-Nitrosodimethylamine | 62759 | | | | | 0.00069 ac | 8.1 ac |
| 97 N-Nitrosodi-n-Propylamine | 621647 | | | | | (0.005) ac | (1.4) ac |
| 98 N-Nitrosodiphenylamine | 86306 | | | | | 5.0 ac | 16 ac |
| 99 Phenanthrene | 85016 | | | | | 0.0028 c | 0.031 c |
| 100 Pyrene | 129000 | | | | | 960 a | 11000 a |
| 101 1,2,4-Trichlorobenzene | 120821 | | | | | | |
| 102 Aldrin | 309002 | 3 g | | 1.3 g | | 0.00013 ac | 0.00014 ac |
| 103 alpha-BHC | 319846 | | | | | 0.0039 ac | 0.013 ac |
| 104 beta-BHC | 319857 | | | | | 0.014 ac | 0.046 ac |
| 105 gamma-BHC | 58899 | 2 g | 0.08 g | 0.16 g | | 0.019 c | 0.063 c |
| 106 delta-BHC | 319868 | | | | | | |
| 107 Chlordane | 57749 | 2.4 g | 0.0043 g | 0.09 g | 0.004 g | 0.00057 ac | 0.00059 ac |
| 108 4-4'-DDT | 50293 | 1.1 g | 0.001 g | 0.13 g | 0.001 g | 0.00059 ac | 0.00059 ac |
| 109 4,4'-DDE | 72559 | | | | | 0.00059 ac | 0.00059 ac |
| 110 4,4'-DDD | 72548 | | | | | 0.00083 ac | 0.00084 ac |
| 111 Dieldrin | 60571 | 2.5 g | 0.0019 g | 0.71 g | 0.0019 g | 0.00014 ac | 0.00014 ac |
| 112 alpha-Endosulfan | 959988 | 0.22 g | 0.056 g | 0.034 g | 0.0087 g | 0.93 a | 2.0 a |
| 113 beta-Endosulfan | 33213659 | 0.22 g | 0.056 g | 0.034 g | 0.0087 g | 0.93 a | 2.0 a |
| 114 Endosulfan Sulfate | 1031078 | | | | | 0.93 a | 2.0 a |
| 115 Endrin | 72208 | 0.18 g | 0.0023 g | 0.037 g | 0.0023 g | 0.76 a | 0.81 aj |
| 116 Endrin Aldehyde | 7421934 | | | | | 0.76 a | 0.81 aj |
| 117 Heptachlor | 76448 | 0.52 g | 0.0038 g | 0.053 g | 0.0036 g | 0.00021 ac | 0.00021 ac |
| 118 Heptachlor Epoxide | 1024573 | 0.52 g | 0.0038 g | 0.053 g | 0.0036 g | 0.00010 ac | 0.00011 ac |
| 119 PCB-1242 | 53469219 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 120 PCB-1254 | 11097691 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 121 PCB-1221 | 11104282 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 122 PCB-1232 | 11141165 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 123 PCB-1248 | 12672296 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 124 PCB-1260 | 11096825 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 125 PCB-1016 | 12674112 | | 0.014 g | | 0.03 g | 0.000044 ac | 0.000045 ac |
| 126 Toxaphene | 8001352 | 0.73 | 0.0002 | 0.21 | 0.0002 | 0.00073 ac | 0.00075 ac |
| Total No. of Criteria (h) = | | 24 | 29 | 33 | 27 | 103 | 102 |

Footnotes:

a. Criteria revised to reflect current agency $q_1^*$ or RfD, as contained in the Integrated Risk Information System (IRIS). The fish tissue bioconcentration factor (BCF) from the 1980 criteria documents was retained in all cases. Values in parentheses indicate that no health based criteria appeared in the 1980 documents. The criteria in parentheses are not being proposed today but are presented as notice for inclusion in future state triennial reviews.

b. EPA in the Office of Research and Development's Environmental Criteria and Assessment Office prepared draft updates of criteria documents for arsenic, copper and selenium which are used instead of IRIS for this rulemaking. Each document was entitled as an "Addendum" to the prior criteria documents. These documents are available in the record for this proceeding.

c. Criteria based on carcinogenicity ($10^{-6}$ risk).

d. Criteria Maximum Concentration = the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1-hour average) without deleterious effects.

Criteria Continuous Concentration = the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4-days) without deleterious effects.

ug/L = micrograms per liter

e. Freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/L), as follows (where exp represents the base e exponential function). (Values displayed above in the matrix correspond to a total hardness of 100 mg/L)

| | CMC = exp($m_a$[ln(hardness)] + $b_a$) | | CCC = exp($m_c$[ln(hardness)] + $b_c$) | |
|---|---|---|---|---|
| | $m_a$ | $b_a$ | $m_c$ | $b_c$ |
| Cadmium | 1.128 | −3.828 | 0.7852 | −3.490 |
| Copper | 0.9422 | −1.464 | 0.8545 | −1.465 |
| Chromium (III) | 0.8190 | 3.688 | 0.8190 | 1.561 |
| Lead | 1.273 | −1.460 | 1.273 | −4.705 |
| Nickel | 0.8460 | 3.3612 | 0.8460 | 1.1645 |
| Silver | 1.72 | −6.52 | | |
| Zinc | 0.8473 | 0.8604 | 0.8473 | 0.7614 |

f. Freshwater aquatic life criteria for pentachlorophenol are expressed as a function of pH, and are calculated as follows. (Values displayed above in the matrix correspond to a pH of 7.8.)

CMC = exp(1.005(pH) − 4.830) CCC = exp(1.005(pH) − 5.290)

g. Aquatic life criteria for these compounds were issued in 1980 utilizing the 1980 Guidelines for criteria development. The acute values shown are final acute values (FAV). According to the 1980 Guidelines, the acute values were intended to be interpreted as instantaneous maximum values, and the chronic values shown were interpreted as 24-hour average values. EPA has not updated these criteria pursuant to the 1985 Guidelines. However, as an approximation, dividing the final acute values in columns B1 and C1 by 2 yields a Criterion Maximum Concentration. No numeric changes are required for columns B2 and C2, and EPA suggests using these values directly as Criterion Continuous Concentration.

h. These totals simply sum the criteria in each column. For aquatic life, there are 30 priority toxic pollutants with some type of freshwater or saltwater, acute or chronic criteria proposed. For human health, there are 102 priority toxic pollutants with either "water + fish" or "fish only" criteria proposed. Note that these totals count chromium as one pollutant even though EPA has developed criteria based on two valence states. In the matrix, EPA has assigned numbers 5a and 5b to the proposed criteria for chromium to reflect the fact that the list of 126 priority toxic pollutants includes only a single listing for chromium. Criteria enclosed in parentheses are also *not* included in the totals.

i. Applies to methyl mercury.

j. No criteria for protection of human health from consumption of aquatic organisms (excluding water) was presented in the 1980 criteria document or in the 1986 Quality Criteria for Water. Nevertheless, the criterion value has not been placed in parentheses, because sufficient information was presented in the 1980 document to allow a calculation of a criterion, even though the results of such a calculation were not shown in the document.

k. The criterion for asbestos is the MCL (56 FR 3526, January 30, 1991). The criteria for 1,2-dichloropropane have been derived using MCL (56 FR 3526, January 30, 1991).

General notes:

(1) This chart lists all of EPA's priority toxic pollutants whether or not criteria recommendations are available. Blank spaces indicate the absence of criteria recommendations. Because of variations in chemical nomenclature systems, this listing of toxic pollutants does not duplicate the listing in appendix A of 40 CFR part 423. EPA has added the Chemical Abstracts Service (CAS) registry numbers, which provide a unique identification for each chemical.

(2) The following chemicals have organoleptic based criteria recommendations that are not included on this chart (for reasons which are discussed in the preamble): copper, zinc, chlorobenzene, 2-chlorophenol, 2,4-dichlorophenol, acenaphthene, 2,4-dimethylphenol, 3-methyl-4-chlorophenol, hexachlorocyclopentadiene, pentachlorophenol, phenol

(3) For purposes of this rulemaking, freshwater criteria apply at salinity levels equal to or less than 1 part per thousand (ppt); saltwater criteria apply at salinity levels equal to or greater than 10 ppt; for waters with salinity between 1 and 10 ppt, the applicable criteria are the more stringent of the freshwater or saltwater criteria.

(c) *Applicability.* (1) The criteria in paragraph (b) of this section apply to the States' designated uses cited in paragraph (d) of this section and supersede any criteria adopted by the State, except when State regulations contain criteria which are more stringent for a particular use in which case the State's criteria will continue to apply;

(2) The criteria established in this section are subject to the State's general rules of applicability in the same way and to the same extent as are the other numeric toxics criteria when applied to the same use classifications including mixing zones, and low flow values below which numeric standards can be exceeded in flowing fresh waters, but only if these State general policies have been reviewed and approved previously by EPA after November 8, 1983.

(i) For all waters with approved EPA mixing zone regulations or implementation procedures, the criteria apply at the appropriate locations within or at the boundary of the mixing zones; otherwise the criteria apply throughout the waterbody including at the end of any discharge pipe, canal or other discharge point.

(ii) A State shall not use a low flow value below which numeric standards can be exceeded that is less stringent than the following for waters suitable for the establishment of low flow return frequencies (i.e., streams and rivers):

Aquatic Life

acute criteria (CMC): 1 Q 10 or 1 B 3

chronic criteria (CCC): 7 Q 10 or 4 B 3

Human Health

non-carcinogens: 30 Q 5

carcinogens: harmonic mean flow

where:

CMC—criteria maximum concentration = the water quality criteria to protect against acute effects in aquatic life and is the highest instream concentration of a priority toxic pollutant consisting of a one-hour average not to be exceeded more than once every three years on the average.

CCC—criteria continuous concentration = the water quality criteria to protect against chronic effects in aquatic life is the highest instream concentration of a priority toxic pollutant consisting of a 4-day average not to be exceeded more than once every three years on the average.

1 Q 10 is the lowest one day flow with an average recurrence frequency of once in 10 years determined hydrologically;

1 B 3 is biologically based and indicates an allowable exceedence of once every 3 years. It is determined by EPA's computerized method (DFLOW model);

7 Q 10 is the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically;

4 B 3 is biologically based and indicates an allowable exceedence for 4 consecutive days once every 3 years. It is determined by EPA's computerized method (DFLOW model);

30 Q 5 is the lowest average 30 consecutive day low flow with an average recurrence frequency of once in 5 years determined hydrologically and, the harmonic mean flow is a long term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows.

(iii) If a State does not have such a low flow value for numeric standards compliance, then none shall apply and the criteria included in paragraph (d) of this section herein apply at all flows.

(3) The aquatic life criteria in the matrix in paragraph (b) of this section apply as follows:

(i) For waters in which the salinity is equal to or less than 1 part per thousand, the applicable criteria are the freshwater criteria in Column B.

(ii) For waters in which the salinity is equal to or greater than 10 parts per thousand, the applicable criteria are the saltwater criteria in Column C;

(iii) For waters in which the salinity is between 1 and 10 parts per thousand, the applicable criteria are the more stringent of the freshwater or saltwater criteria. However, the Regional Administrator may approve the use of alternative criteria if scientifically defensible information and data demonstrate that on a site-specific basis the biology of the waterbody is dominated by freshwater aquatic life and that freshwater criteria are more appropriate; or conversely, the biology of the waterbody is dominated by saltwater aquatic life and that saltwater criteria are more appropriate.

(4) Application of metals criteria. (i) For purposes of calculating freshwater aquatic life criteria for metals from the equations in footnote (e) to the criteria matrix in paragraph (b) of this section, the minimum hardness allowed for use in those equations shall not be less than 25 mg/l, as calcium carbonate, even if the actual ambient hardness is less than 25 mg/l as calcium carbonate. The maximum hardness value for use in those equations shall not exceed 400 mg/l as calcium carbonate, even if the actual ambient hardness is greater than 400 mg/l as calcium carbonate.

(ii) The hardness values used shall be consistent with the design discharge conditions established in paragraph (c)(2) of this section for flows and mixing zones.

(d) *Criteria for Specific Jurisdictions.*—(1) *Connecticut, Region 1*

(i) All waters assigned to the following use classifications in the "State of Connecticut Water Quality Standards" adopted pursuant to section 22a–426 of the Connecticut General Statutes are subject to the criteria in paragraph (d)(1)(ii) of this section, without exception:

II.5.(A)—Class AA Surface Waters
II.5.(B)—Class A and SA Surface Waters
II.5.(C)—Class B and SB Surface Waters

(ii) The following criteria from the matrix in paragraph (b) of this section apply to the use classifications identified in paragraph (d)(1)(i) of this section:

| Use classification | Applicable criteria |
|---|---|
| Class AA; Class A; Class B waters where water supply use is designated. | Each of these classifications is assigned the criteria in: Column B(I)—all. Column B(III)—all. Column D(II)—all. |
| Class B waters where water supply use is not designated. | This classification is assigned the criteria in: Column B(II)—all. Column B(III)—all. Column D(III). |
| Class SA; Class SB | Each of these classifications is assigned the criteria in: Column C(I)—all. Column C(II)—all. Column D (II)—all. |

(2) *New Hampshire, Region 1*

(i) All waters assigned to the following use classifications in the New Hampshire Revised Statutes Annotated Chapter 149:3 are subject to the criteria in paragraph (d)(2)(ii) of this section, without exception:

149:3.I Class A
149:3.II Class B
149:3.III Class C

(ii) The following criteria from the matrix in paragraph (b) of this section apply to the use classifications identified in paragraph (d)(a)(i) of this section:

| Use classification | Applicable criteria |
|---|---|
| Class A; Class B waters where water supply use is designated. | Each of these classifications is assigned the criteria in: Column D (I)—#16. Column D(II)—#16. |
| Class B waters where water supply use is not designated Class C. | |

(3) *Rhode Island, Region 1*

(i) All waters assigned to the following use classifications in the Water Quality Regulations for Water Pollution Control adopted under chapters 46–12, 42–17.1, and 42–35 of the General Laws of Rhode Island are subject to the criteria in paragraph d(3)(ii) of this section without exception:

6.21 Freshwater
Class A
Class B
Class C

6.22 Saltwater
Class SA
Class SB
Class SC

(ii) The following criteria from the matrix in paragraph (b) of this section apply to the use classifications identified in paragraph (d)(3)(i) of this section:

| Use classification | Applicable criteria |
|---|---|
| Class A; Class B waters where water supply use is designated. | These classifications are assigned the criteria in: Column D (I)—all. |
| Class B waters where water supply use is not designated Class C; Class SA; Class SB; Class SC. | Each of these classifications is assigned the criteria in: Column D (II)—all. |

(4) *Vermont, Region 1*

(i) All waters assigned to the following use classifications in the Vermont Water Quality Standards adopted under the authority of the Vermont Water Pollution Control Act (10 V.S.A., Chapter 47) are subject to the criteria in paragraph (d)(4)(ii) of this section, without exception:

Class A
Class B
Class C

(ii) The following criteria from the matrix in paragraph (b) of this section apply to the use classifications identified in paragraph (d)(4)(i) of this section:

| Use classification | Applicable criteria |
|---|---|
| Class A; Class B waters where water supply use is designated. | This classification is assigned the criteria in: Column B(I)—all. Column B(III)—all. Column D(I)—all. |
| Class B waters where water supply use is not designated; Class C. | These classifications are assigned the criteria in: Column B(II)—all. Column B(III)—all. Column D(II)—all. |

(5) *New Jersey, Region 2*

(i) All waters assigned to the following use classifications in the New Jersey Administrative Code (N.J.A.C.) 7:9–4.1 et seq., Surface Water Quality Standards, are subject to the criteria in paragraph (d)(5)(ii) of this section, without exception:

N.J.A.C. 7:9–4.12(c): Class FW2
N.J.A.C. 7:9–4.12(d): Class SE1
N.J.A.C. 7:9–4.12(e): Class SE2
N.J.A.C. 7:9–4.12(f): Class SE3
N.J.A.C. 7:9–4.12(g): Class SC

(ii) The following criteria from the matrix in paragraph (b) of this section apply to the use classifications identified in paragraph (d)(5)(i) of this section: