ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 131

[WH–FRL–5866–9]

RIN 2040–AC44

Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: This rule proposes for the State of California, numeric water quality criteria for priority toxic pollutants necessary to fulfill the requirements of section 303(c)(2)(B) of the Clean Water Act (CWA) in the State of California. This rule also proposes an authorizing compliance schedule provision.

EPA is proposing this rule based on the Administrator's determination that criteria are necessary in the State of California to meet the requirements of CWA section 303(c)(2)(B). This section of the CWA requires states to adopt numeric water quality criteria for priority toxic pollutants for which EPA has issued CWA section 304(a) criteria guidance and whose presence or discharge could reasonably be expected to interfere with designated uses. Priority toxic pollutants are identified in 40 CFR 131.36.

EPA is proposing this rule to fill a gap in California water quality standards that was created in 1994 when a State Court overturned the State's water quality control plans which contained water quality criteria for priority toxic pollutants for which EPA had issued CWA section 304(a) criteria guidance. Thus, the State of California is currently without numeric water quality criteria for many priority toxic pollutants as required by the CWA, necessitating this action by EPA.

When these proposed federal criteria take effect, they will create legally applicable water quality standards in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the CWA.

DATES: All written comments received on or before September 26, 1997 will be considered in the preparation of the final rule. A public hearing will be held on September 17, 1997, in San Francisco, California, and on September 18, 1997, in Los Angeles, California. Both oral and written comments will be accepted at the hearings.

ADDRESSES: Written comments should be addressed to Diane E. Frankel, P.E., Esq., California Toxics Rule Project Manager, U.S. Environmental Protection Agency, Region 9 (WTR–5), Water Management Division, 75 Hawthorne Street, San Francisco, California 94105.

Written comments are encouraged on paper or computer disk by mail. Faxed comments will not be accepted. For comments on paper, an original and two copies must be submitted. For computerized comments, Wordperfect or ASCII format must be used. Comments previously submitted for other **Federal Register** notices which are relevant to this notice must be resubmitted in their entirety to be considered for this proposed action.

A public hearing will be held at USEPA Region 9, 75 Hawthorne Street, San Francisco, California, 94105, from 1–5 p.m. on September 17, 1997. A public hearing will also be held at the Los Angeles Department of Water and Power, 111 North Hope Street, Los Angeles, California, 90012, from 1–5 p.m. on September 18, 1997.

The public may inspect the administrative record for this rulemaking, including documentation supporting the aquatic life and human health criteria, at the U.S. Environmental Protection Agency, Region 9, Water Management Division, 75 Hawthorne Street, San Francisco 94105 (telephone: 415–744–2125) on weekdays during the Agency's normal business hours of 8:00 a.m. to 4:30 p.m. A reasonable fee will be charged for photocopies.

FOR FURTHER INFORMATION CONTACT: Diane E. Frankel, P.E., Esq. or Philip Woods, U.S. Environmental Protection Agency, Region 9 (WTR–5), Water Management Division, 75 Hawthorne Street, San Francisco, California 94105, 415–744–2004 or 415–744–1997, respectively.

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Potentially Affected Entities: Citizens concerned with water quality in California may be interested in this rulemaking. Entities discharging pollutants to waters of the United States in California could be indirectly affected by this rulemaking since water quality criteria are used to create water quality standards which in turn are used in developing National Pollutant Discharge Elimination System (NPDES) permit limits. Categories and entities which may ultimately be indirectly affected include:

Category	Examples of potentially indirectly affected entities
Industry	Industries discharging pollutants to surface waters in California.
Municipalities	Publicly-owned treatment works discharging pollutants to surface waters in California.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding NPDES regulated entities likely to be indirectly affected by this action. This table lists the types of entities that EPA is now aware could potentially be indirectly affected by this action. If you have questions regarding this section consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

A. Introduction and Overview

1. Introduction

This section of the preamble introduces the topics which are addressed below and provides a brief overview of EPA's basis and rationale for proposing federal criteria for the State of California. Section B briefly describes the evolution of the efforts to control toxic pollutants; these efforts include the changes enacted in the 1987 CWA Amendments which are the basis for this rule. Section C summarizes California's efforts since 1987 to implement the requirements of CWA section 303(c)(2)(B) and describes EPA's procedure and actions for determining whether California has fully implemented CWA section 303(c)(2)(B). Section D provides the rationale and approach for developing the proposed rule, including a discussion of EPA's legal basis for this proposal. Section E describes the development of the criteria included in this rule. Section F summarizes the provisions of the proposed rule and discusses implementation issues. Sections G, H, I, J, K, and L briefly address the requirements of Executive Orders 12866 and 12875, the Unfunded Mandates Reform Act of 1995, the Regulatory Flexibility Act, the Paperwork Reduction Act, and the Endangered Species Act, respectively.

Since detailed information concerning many of the topics in this preamble was published previously in the **Federal Register** in preambles for other rulemakings, references are frequently made to those preambles. Those rulemakings include: Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants, 57 FR 60848, December 22, 1992 (referred to as the National Toxics Rule or NTR); and the NTR as amended by Administrative Stay of Federal Water Quality Criteria for Metals and Interim Final Rule, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance—Revision of Metals Criteria, 60 FR 22228, May 4, 1995 (referred to as the National Toxics Rule [NTR], as amended). The NTR, as amended, is codified at 40 CFR 131.36. A copy of the NTR, as amended, and its preambles are contained in the administrative record for this rulemaking.

2. Overview

This proposed rule would establish ambient water quality criteria for priority toxic pollutants in the State of California. The criteria in this proposal would supplement the water quality criteria promulgated for California in the NTR, as amended. In 1991, EPA approved a number of water quality criteria (discussed in section C, below), for the State of California. Since EPA had approved these criteria, it was not necessary to include them in the NTR. However, the EPA-approved criteria were subsequently invalidated in State litigation. Thus, this proposal contains criteria to fill the gap created by the State litigation.

This proposed rule does not change or supersede any criteria previously promulgated for the State of California in the NTR, as amended. Criteria which EPA promulgated for California in the NTR, as amended, are footnoted in the proposed table at 131.38(b)(1), so that when this proposed rule is promulgated, readers may see the criteria promulgated in the NTR, as amended, for California and the criteria promulgated through this rulemaking for California in the same table.

This proposed rule is not intended to apply to waters within Indian Country. EPA recognizes that there are possibly waters located wholly or partly in Indian Country that are included in the State's basin plans. EPA will work with the State and Tribes to identify any such waters and to seek comment from those entities on whether EPA should include those waters in the final rulemaking or take other actions to protect water quality in Indian Country. EPA also solicits comment from the public on this approach.

This rule is important for several environmental, programmatic and legal reasons. Control of toxic pollutants in surface waters is necessary to achieve the CWA's goals and objectives. Many of California's monitored river miles, lake acres, and estuarine waters have elevated levels of toxic pollutants. Recent studies on California water bodies indicate that elevated levels of toxic pollutants exist in fish tissue which result in fishing advisories or bans. These toxic pollutants can be attributed to, among other sources, industrial and municipal discharges.

Water quality standards for toxic pollutants are important to State and EPA efforts to address water quality problems. Clearly established water quality goals enhance the effectiveness of many of the State's and EPA's water programs including permitting, coastal water quality improvement, fish tissue quality protection, nonpoint source controls, drinking water quality protection, and ecological protection. Numeric criteria for toxic pollutants allow the State and EPA to evaluate the adequacy of existing and potential control measures to protect aquatic ecosystems and human health. Numeric criteria also provide a more precise basis for deriving water quality-based effluent limitations in National Pollutant Discharge Elimination System (NPDES) permits to control toxic pollutant discharges. Congress recognized these issues when it enacted section 303(c)(2)(B) to the CWA.

While California recognizes the need for applicable water quality standards for toxic pollutants, its adoption efforts have been stymied by a variety of factors. The Administrator has determined that it must exercise its CWA authorities to move forward the toxic control program, consistent with the CWA and with the State of California's water quality standards program.

EPA's 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/or the environment. The CWA allows some flexibility and differences among states in their adopted and approved water quality standards, but it should be implemented in a manner that ensures a level playing field among states. Although California has made important progress toward satisfying CWA requirements, it has not satisfied CWA section 303(c)(2)(B) by adopting water quality standards for toxic pollutants. This section was added to the CWA by Congress in 1987. The State of California is the only state in the Nation for which CWA section 303(c)(2)(B) remains substantially unimplemented after EPA's promulgation of the NTR in December of 1992. Section 303(c)(4) of the CWA authorizes the EPA Administrator to promulgate standards where necessary to meet the requirements of the Act. EPA has determined that this rule is a necessary and important component for the implementation of CWA section 303(c)(2)(B) in California.

EPA acknowledges that the State of California is working to satisfy CWA section 303(c)(2)(B). When the State formally adopts criteria consistent with its statutory requirements, as envisioned by Congress in the CWA, EPA will act to stay its rule. When any judicial

review of such State standards is complete and sustains the State standards, EPA will act to withdraw its rule.

B. Statutory and Regulatory Background

Section 303(c) of the 1972 Federal Water Pollution Control Act Amendments (FWPCA) established the statutory basis for the current water quality standards program. 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.

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 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 permits to include more stringent limits as necessary to meet instream water quality standards. See CWA section 301(b)(1)(C).

Water quality standards are comprised of designated uses, criteria to meet those uses, and an antidegradation policy. Water quality standards serve two main functions: they allow for assessment of water quality in a water body and they provide a basis for determining what effluent discharge limitations may be allowed in order to protect the designated uses of the water body.

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. 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 CWA Amendments by endorsing the Agency's alternative procedure of regulating toxic pollutants by use of technology-based effluent limitations guidelines for toxic pollutants, 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 focused its efforts on criteria development for toxic pollutants.

EPA selected key chemicals of concern within the sixty-five families of pollutants and identified a more specific list of 129 priority toxic pollutants. Two volatile chemicals and one water unstable chemical 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 appears in 40 CFR 131.36.

Another critical section of the 1972 FWPCA was section 304(a). CWA section 304(a)(1) provides, in part, that EPA develop and publish criteria guidance for water quality reflecting the latest scientific knowledge 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, and on the effects of pollutants on biological community diversity, productivity, etc.

In order to avoid confusion, it must be recognized that the CWA uses the term ''criteria'' in two separate ways. In CWA 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. The term ''criteria'' refers to the ambient component of the water quality standard contained in state or federal law. However, CWA section 304(a)(1) directs EPA to publish water quality ''criteria'' guidance which encompass scientific assessments of the health and ecological effects of various pollutants listed pursuant to CWA section 307(a)(1) and which are used to support development of ambient criteria as part of water quality standards. CWA section 304(a) criteria guidance are intended as guidance only and have no binding effect. States may consider these criteria guidance in adopting regulatory criteria.

To implement CWA section 304(a)(1), EPA initially produced a series of scientific water quality criteria guidance documents. EPA's most recently published criteria documents are summarized in one document entitled, Quality Criteria for Water 1986 (1986 ''Gold Book''). EPA has updated many of the criteria since publication of the 1986 Gold Book. EPA's criteria guidance (both the earlier documents and updates including those in the Agency's Integrated Risk Information System [IRIS]), provide a comprehensive toxicological evaluation of each chemical and the individual criteria recommendations, as updated, are the official guidance. For toxic pollutants, the recommendations 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 recommendations provide the appropriate reference doses, and if appropriate, the carcinogenic slope factors, and derives recommended criteria. The details of this process are discussed in a later part of this preamble.

Criteria documents, along with any more recent scientific data and information, may be used to interpret a state's narrative criterion pursuant to 40 CFR 122.44(d)(1)(vi), and serve to establish State and EPA permit discharge limits pursuant to CWA section 301(b)(1)(C) which requires NPDES permits to contain limitations required to implement any applicable water quality standard established in the CWA.

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 forward to that guidance noted EPA's two-fold water quality based approach to controlling toxic pollutants: chemical specific numeric criteria and biological testing in whole effluent 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 toxicity testing of effluent (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. In 1991, EPA revised and expanded the TSD. (*Technical Support Document for Water Quality-Based Toxics Control* (TSD), (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.

In 1987, Congress enacted stringent new water quality standard provisions in the Water Quality Act amendments. The 1987 Amendments to the CWA (P.L. 100–4) 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.

The addition of this new requirement to the existing water quality standards review and revision process of CWA section 303(c) did not change the existing procedural or timing provisions. CWA section 303(c)(1) still required that states review their water quality standards at least once each three year period and transmit the results to EPA for review. EPA's oversight and promulgation authorities and statutory schedules in CWA 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 (rather than narrative approaches) during the next triennial review. Congress was frustrated that states were not using the numerous CWA section 304(a) criteria guidance that EPA had and was continuing to develop, to assist states in controlling the discharge of priority toxic pollutants. Accordingly, Congress explicitly mandated that states adopt numeric criteria for toxic pollutants where the discharge or presence of such pollutants could reasonably be expected to interfere with such designated uses.

In response to this requirement, EPA strengthened its efforts to assist state adoption of water quality standards for priority toxic pollutants. This included developing and issuing guidance for states on acceptable implementation procedures for several new sections of the CWA, including sections 303(c)(2)(B) and 304(l). EPA, in devising guidance for CWA section 303(c)(2)(B), attempted to provide states the maximum flexibility that complied with the express statutory language but also with the overriding Congressional objective: Prompt adoption and implementation of numeric toxic pollutant criteria where necessary to protect designated uses. EPA believed that flexibility was important so that each state could satisfy CWA section 303(c)(2)(B) and to the extent possible, accommodate its existing water quality standards regulatory approach. EPA's program guidance was issued in final form on December 12, 1988 and the availability of the guidance was published in a **Federal Register** notice on January 5, 1989 (54 FR 346).

EPA's section 303(c)(2)(B) program guidance identified several 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.'' These options are fully discussed in the guidance and in the preamble to the National Toxics Rule (NTR) at 57 FR 60853. One option is for a state to adopt statewide numeric criteria for all section 307(a) toxic pollutants for which EPA has developed section 304(a) criteria guidance, regardless of whether the pollutants are known to be present. This option is the most comprehensive approach to satisfy the statutory requirement, and ensures comprehensive coverage of the priority toxic pollutants with scientifically defensible criteria. This option would not impose more effluent limits on dischargers than any other option, because permit limits would only be based on the regulation of the particular toxic pollutants in their discharge and not on the total listing in the water quality standards. Actual permit limits should be the same under any option.

EPA's December 1988 guidance also stated that all state standards triennial reviews initiated after passage of the amended CWA must include a consideration of numeric toxic criteria.

Beyond the increased Congressional and public concern about the relative importance of toxic pollutant controls, there was increased evidence of toxic pollution problems in our Nation's waters. In response, in 1992, EPA promulgated the NTR pursuant to CWA section 303(c)(4)(B) and 40 CFR 131.22(b) to rectify program deficiencies in 14 states, including the State of California. The State of California was included for specific pollutants and for specific water bodies which corresponded with EPA's disapproval in November 1991 of a portion of each of two statewide plans. EPA did not promulgate criteria for those portions of the statewide plans which it approved.

Today's action proposes to add priority toxic pollutant criteria applicable to inland surface waters, enclosed bays and estuaries within the State of California.

C. State of California Actions and Compliance Regarding Section 303(c)(2)(B) of the Clean Water Act (CWA)

1. California Regional Water Quality Control Board Basin Plans, and the Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP) of April 1991

The State of California regulates water quality through its State Water Resource Control Board (SWRCB) and through nine Regional Water Quality Control Boards (RWQCBs). Each of the nine RWQCBs represents a different geographic area; area boundaries are generally along watershed boundaries. Each RWQCB maintains a Basin Plan which contains the designated uses of the water bodies within its respective geographic area within California. These designated uses (or ''beneficial uses'' under State law) together with legally-adopted criteria (or ''objectives'' under State law), comprise water quality standards for the water bodies within each of the Basin areas. Each of the nine RWQCBs undergoes a triennial Basin Planning review process, in compliance with CWA section 303. The SWRCB provides assistance to the RWQCBs.

Most of the Basin Plans contain conventional pollutant objectives such as dissolved oxygen. None of the Basin Plans contains a comprehensive list of priority toxic pollutant criteria to satisfy CWA section 303(c)(2)(B). The nine RWQCBs and the SWRCB had intended that the priority toxic pollutant criteria contained in the three SWRCB statewide plans, the Inland Surface Water Plan (ISWP), the Enclosed Bay and Estuary

Plan (EBEP), and the Ocean Plan, apply to all Basins and satisfy CWA section 303(c)(2)(B).

On April 11, 1991, the SWRCB adopted two statewide water quality control plans, the ISWP and the EBEP. These statewide plans contained narrative and numeric water quality criteria for toxic pollutants, in part to satisfy CWA section 303(c)(2)(B). The water quality criteria contained in the SWRCB statewide plans, together with the designated uses in each of the Basin Plans, created a set of water quality standards for waters within for the State of California.

Specifically, the two plans established water quality criteria or objectives for all fresh waters, bays and estuaries in the State. The plans contained water quality criteria for some priority toxic pollutants, provisions relating to whole effluent toxicity, implementation procedures for point and nonpoint sources, and authorizing compliance schedule provisions. The plans also included special provisions affecting waters dominated by reclaimed water (labeled as Category (a) waters), and waters dominated by agricultural drainage and constructed agricultural drains (labeled as Category (b) and (c) waters, respectively).

2. EPA's Review of California Water Quality Standards for Priority Toxic Pollutants in the ISWP and EBEP, and the National Toxics Rule

The EPA Administrator has delegated the responsibility and authority for review and approval or disapproval of all new or revised state water quality standards to the EPA Regional Administrators (see 40 CFR 131.21). Thus, state actions under CWA section 303(c)(2)(B) are submitted to the appropriate EPA Regional Administrator for review and approval.

In mid-April 1991, the SWRCB submitted to EPA for review and approval the two statewide water quality control plans—the ISWP and the EBEP. On November 6, 1991, EPA Region 9 formally concluded its review of the SWRCB's plans. EPA approved the narrative water quality criterion and the toxicity criterion in each of the plans. EPA also approved the numeric water quality criteria contained in both plans, finding them to be consistent with the requirements of section 303(c)(2)(B) of the CWA and with EPA's national criteria guidance published pursuant to section 304(a) of the CWA.

EPA noted the lack of criteria for some pollutants, and found that, because of the omissions, the plans did not fully satisfy CWA section 303(c)(2)(B). The plans did not contain criteria for all listed pollutants for which EPA had published national criteria guidance. The ISWP contained human health criteria for only 65 pollutants, and the EBEP contained human health criteria for only 61 pollutants for which EPA had issued section 304(a) guidance criteria. Both the ISWP and EBEP contained aquatic life criteria for all pollutants except cyanide and chromium III (freshwater only) for which EPA has CWA section 304(a) criteria guidance. The SWRCB's administrative record stated that all priority pollutants with EPA criteria guidance were likely to be present in California waters. However, the SWRCB's record contained insufficient information to support a finding that the excluded pollutants were not reasonably expected to interfere with designated uses of the waters of the State.

Although EPA approved the statewide selenium objective in the ISWP and EBEP, EPA disapproved the criteria for the San Francisco Bay and Delta, because there was clear evidence that the criteria would not protect the designated fish and wildlife uses (the California Department of Health Services had issued waterfowl consumption advisories due to selenium concentrations, and scientific studies had documented selenium toxicity to fish and wildlife). EPA restated its commitment to object to National Pollutant Discharge Elimination System (NPDES) permits issued for San Francisco Bay that contained effluent limits based on an objective greater than 5 ppb (four day average) and 20 ppb (1 hour average), the freshwater criteria. EPA reaffirmed its disapproval of site-specific selenium criteria for portions of the San Joaquin River, Salt Slough, and Mud Slough. EPA also disapproved of the categorical deferrals and exemptions. These disapprovals included the disapproval of the State's deferral of water quality objectives to effluent dominated streams (Category a) and to streams dominated by agricultural drainage (Category b), and the disapproval of the exemption of water quality objectives to constructed agricultural drains (Category c). EPA found the definitions of the categories imprecise and overly broad which could have led to an incorrect interpretation.

Since EPA had disapproved portions of each of the California statewide plans which were necessary to satisfy CWA section 303(c)(2)(B), California was included in EPA's promulgation of the National Toxics Rule (NTR) (40 CFR 131.36, 57 FR 60848). EPA promulgated specific criteria for certain water bodies in California.

The NTR was amended, effective April 14, 1995, to stay certain metals criteria which had been promulgated as total recoverable; effective April 15, 1995, EPA promulgated interim final metals criteria as dissolved concentrations for those metals which had been stayed (Administrative Stay of Federal Water Quality Criteria for Metals and Interim Final Rule, Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance—Revision of Metals Criteria; 60 FR 22228, May 4, 1995 [the NTR, as amended]). The stay was in response to a lawsuit against EPA challenging, among other issues, metals criteria expressed as total recoverable concentrations. A partial Settlement Agreement required EPA to stay specific metals criteria in the NTR. EPA then promulgated certain metals criteria in the dissolved form through the use of conversion factors. These factors are listed in the NTR, as amended. A scientific discussion of these criteria is found in the next section.

Since certain criteria have already been promulgated for specific water bodies in the State of California in the NTR, as amended, they are not within the scope of today's proposed rule. However, for clarity in reading a comprehensive rule for the State of California, these criteria are incorporated in proposed 40 CFR 131.38(d)(2). Footnotes to the Table in proposed 40 CFR 131.38(b)(1) and proposed 40 CFR 131.38(d)(3) clarify which criteria (and for which specific water bodies) have been promulgated by the NTR, as amended, and are therefore excluded from this proposed rule. The appropriate (freshwater or saltwater) aquatic life criteria which were promulgated in the NTR, as amended, for all inland surface waters and enclosed bays and estuaries include: chromium III and cyanide. The appropriate (water and organism or organism only) human health criteria which were promulgated in the NTR, as amended, for all inland surface waters and enclosed bays and estuaries include: antimony; thallium; asbestos; acrolein; acrylonitrile; carbon tetrachloride; chlorobenzene; 1,2-dichloroethane; 1,1-dichloroethylene; 1,3-dichloropropylene; ethylbenzene; 1,1,2,2-tetrachloroethane; tetrachloroethylene; 1,1,2-trichloroethane; trichloroethylene; vinyl chloride; 2,4-dichlorophenol; 2-methyl-4,6-dinitrophenol; 2,4-dinitrophenol; benzidine; bis(2-chloroethyl)ether; bis(2-ethylhexyl)phthalate; 3,3-dichlorobenzidine; diethyl phthalate;

dimethyl phthalate; di-n-butyl phthalate; 2,4-dinitrotoluene; 1,2-diphenylhydrazine; hexachlorobutadiene; hexachlorocyclopentadiene; hexachloroethane; isophorone; nitrobenzene; n-nitrosodimethylamine; and n-nitrosodiphenylamine. Other pollutant criteria were promulgated in the NTR, as amended, for specific water bodies, but not all inland surface waters and enclosed bays and estuaries.

3. Status of Implementation of CWA Section 303(c)(2)(B)

Shortly after the SWRCB adopted the ISWP and EBEP, several dischargers filed suit against the State alleging that it had not adopted the two plans in compliance with State law. The plaintiffs in a consolidated case included: the County of Sacramento, Sacramento County Water Agency; Sacramento Regional County Sanitation District; the City of Sacramento; the City of Sunnyvale; the City of San Jose; the City of Stockton; and Simpson Paper Company.

The dischargers alleged that the State had not adopted the ISWP and EBEP in compliance with the California Administrative Procedures Act (Gov Code. Section 11340, *et seq.*), the California Environmental Quality Act (Pub. Re Code, Section 21000, *et seq.*), and the Porter-Cologne Act (Wat. Code, Section 13200, *et seq.*). The allegation that the State did not sufficiently consider economics when adopting water quality objectives, as allegedly required by Section 13241 of the Porter Cologne Act, was an important issue in the litigation.

In October of 1993, the Superior Court of California, County of Sacramento, issued a tentative decision in favor of the dischargers. In March of 1994, the Court issued a substantively similar final decision in favor of the dischargers. Final judgments from the Court in July of 1994 ordered the SWRCB to rescind the ISWP and EBEP. On September 22, 1994, the SWRCB formally rescinded the two statewide water quality control plans. The State is currently in the process of readopting water quality control plans for inland surface waters, enclosed bays and estuaries.

CWA section 303(c)(2)(B) was fully implemented in the State of California from December of 1992, when the NTR was promulgated, until September of 1994, when the SWRCB was required to rescind the ISWP and EBEP. The provisions for California in EPA's NTR together with the approved portions of California's ISWP and EBEP implemented the requirements of CWA section 303(c)(2)(B). However, since September of 1994, when the SWRCB rescinded the ISWP and EBEP, the requirements of section 303(c)(2)(B) have not been fully implemented in California.

The scope of today's rule is to re-establish criteria for the remaining priority toxic pollutants to meet the requirements of section 303(c)(2)(B) of the CWA. Pursuant to section 303(c)(4), the Administrator has determined that it is necessary to include in today's proposed action criteria for priority toxic pollutants, which are not covered by the NTR, as amended, or by the State through site-specific criteria, for waters of the United States in the State of California.

4. State-Adopted Site-Specific Priority Toxic Pollutant Criteria

The State has the discretion to develop site-specific criteria when appropriate e.g., when statewide criteria appear over- or under-protective of designated uses. Periodically, the State through its RWQCBs will adopt site-specific criteria for priority toxic pollutants within respective Basin Plans. These criteria are intended to be effective throughout the Basin or throughout a designated water body. Under California law, these criteria must be publicly reviewed and approved by the RWQCB, the SWRCB, and the State's Office of Administrative Law (OAL). Once this adoption process is complete, the criteria become State law.

These criteria must be submitted to the EPA Regional Administrator for review and approval under CWA section 303. These criteria are usually submitted to EPA as part of a RWQCB Basin Plan Amendment, after the Amendment has been adopted under the State's process and has become State law.

State-Adopted Site-Specific Criteria Under EPA Review: Basin Plan Updates: The State of California has recently reviewed and updated all of its RWQCB Basin Plans. All of these Basin Plans have completed the State review and adoption process and have been submitted to EPA for review and approval. Some of the Basin Plans contain site-specific criteria. In these cases, the State-adopted site-specific criteria are used for water quality programs.

EPA Region 9 intends to make a determination on all State-adopted, site-specific criteria that are currently under EPA review. If, after this proposal, but before promulgation of this final rule, EPA approves any State-adopted site-specific criteria, the EPA Administrator may make a finding in the final rule that it will be unnecessary to promulgate criteria for those site-specific pollutants and associated water bodies. If EPA disapproves any State-adopted site-specific criteria, today's proposed statewide criteria would apply for those pollutants and associated water bodies.

However, if EPA promulgates statewide federal criteria as proposed in this rule, prior to a decision on any State-adopted site-specific criteria, the more stringent of the two criteria would be used for water quality programs. Both federal and State water quality programs must be satisfied, and application of the more stringent of the two criteria would satisfy both.

Santa Ana River: EPA is currently reviewing State-adopted site-specific criteria for copper, cadmium and lead for portions of the Santa Ana River. These criteria are contained in the Santa Ana Region Basin Plan Amendments (RWQCB for the Santa Ana Region). EPA intends to complete its review and make a final determination on these site-specific criteria prior to the promulgation of this rule.

If EPA approves the State-adopted site-specific criteria, the EPA Administrator can make a finding in the final rule that it will be unnecessary to promulgate federal criteria for those site-specific pollutants and associated water bodies. If EPA disapproves the State-adopted site-specific criteria, today's proposed statewide criteria, when promulgated final, would apply for those pollutants and water bodies.

State-Adopted Site-Specific Criteria with EPA Approval: In several cases, the EPA Regional Administrator has reviewed and approved of State-adopted site-specific criteria within the State of California. Three of these cases are discussed below separately.

Unfortunately, EPA does not have a complete listing of all of the site-specific criteria that may remain in place as State law after the State court decision vacated the ISWP and the EBEP. Consequently, EPA is proposing these criteria for all waters, except for those discussed below in the preamble and cited in the regulatory text. If the State or another member of the public, as confirmed by the State, indicates in comments that there is a site-specific, State criterion that was approved by EPA and continues to be an appropriate value, EPA would amend the regulatory text of the final rule such that the otherwise applicable criteria would not apply in that instance.

Sacramento River: EPA has approved site-specific criteria for copper, cadmium and zinc in the Sacramento River, upstream of Hamilton City, in the

Central Valley Region (RWQCB for the Central Valley Region) of the State of California. EPA approved these site-specific criteria by letter dated August 7, 1985. Specifically, EPA approved for the Sacramento River (and tributaries) above Hamilton City, a copper criterion of 5.6 µg/l (maximum), a zinc criterion of 16 µg/l (maximum) and a cadmium criterion of 0.22 µg/l (maximum), all in the dissolved form using a hardness of 40 mg/l as $CaCO_3$. (These criteria were actually adopted by the State and approved by EPA as equations which vary with hardness.) These ''maximum'' criteria correspond to acute criteria in today's proposed rule. Therefore, federal acute criteria for copper, cadmium, and zinc for the Sacramento River (and tributaries) above Hamilton City are not necessary to protect the designated uses and are not included in the proposed rule. However, the EPA Administrator is making a finding that it is necessary to include *chronic* criteria for copper, cadmium and zinc for the Sacramento River (and tributaries) above Hamilton City, as part of the proposed statewide criteria in today's proposed rule.

San Joaquin River: Site-specific selenium criteria in portions of the San Joaquin River, in the Central Valley Region, are not included in this proposed rule because they either have been previously approved by EPA or promulgated by EPA as part of the NTR. EPA approved and disapproved State-adopted site-specific selenium criteria in portions of the San Joaquin River, in the Central Valley Region of the State of California (RWQCB for the Central Valley Region). EPA's determination on these site-specific criteria is contained in a letter dated April 13, 1990.

Specifically, EPA approved for the San Joaquin River, mouth of Merced River to Vernalis, an aquatic life selenium criterion of 12 µg/l (maximum with the understanding that the instantaneous maximum concentration may not exceed the objective more than once every three years). Today's proposed rule does not affect this federally-approved, State-adopted site-specific acute criterion, and it remains in effect for the San Joaquin River, mouth of Merced River to Vernalis. Therefore, an acute criterion for selenium in the San Joaquin River, mouth of Merced River to Vernalis is not necessary to protect the designated use and thus is not included in the proposed rule.

By letter dated April 13, 1990, EPA also approved for the San Joaquin River, mouth of Merced River to Vernalis, a State-adopted site-specific aquatic life selenium criterion of 5 µg/l (monthly mean); however, EPA disapproved a State-adopted site-specific selenium criterion of 8 µg/l (monthly mean—critical year only) for these waters. Subsequently, EPA promulgated a chronic selenium criterion of 5 µg/l (4 day average) for waters of the San Joaquin River from the mouth of the Merced River to Vernalis in the NTR. This chronic criterion applies to all water quality programs concerning the San Joaquin River, mouth of Merced River to Vernalis. Today's proposed rule does not affect the federally-promulgated chronic selenium criterion of 5 µg/l (4 day average) set forth in the NTR. This previously federally-promulgated criterion remains in effect for the San Joaquin River, mouth of Merced River to Vernalis.

Grassland Water District, San Luis National Wildlife Refuge, and Los Banos State Wildlife Refuge: EPA approved for the Grassland Water District, San Luis National Wildlife Refuge, and Los Banos State Wildlife Refuge, a State-adopted site-specific aquatic life selenium criterion of 2 µg/l (monthly mean) by letter dated April 13, 1990. This federally-approved, State-adopted site-specific chronic criterion remains in effect for the Grassland Water District, San Luis National Wildlife Refuge and Los Banos State Wildlife Refuge. Therefore it is not necessary to include in today's proposed rule, a chronic criterion for selenium for the Grassland Water District, San Luis National Wildlife Refuge and Los Banos State Wildlife Refuge.

D. Rationale and Approach for Developing the Proposed Rule

This section explains EPA's legal basis for today's proposed rule, and discusses EPA's general approach for developing the specific requirements for the State of California.

In addition to Congressional directive, there are a number of environmental and programmatic reasons why establishing water quality standards for toxic pollutants in California is important. Control of toxic pollutants in surface waters is critical to the success of a number of CWA programs and objectives, including permitting, fish tissue quality protection, coastal water quality improvement, sediment contamination control, certain nonpoint source controls, pollution prevention planning, and ecological protection.

1. Legal Basis

CWA section 303(c) specifies that adoption of water quality standards is primarily the responsibility of the states. However, CWA section 303(c) also describes a role for the federal government to oversee state actions to ensure compliance with CWA requirements. If EPA's review of the states' standards finds flaws or omissions, then the CWA authorizes EPA to correct the deficiencies (see CWA section 303(c)(4)). This water quality standards promulgation authority has been used by EPA to issue final rules on several separate occasions, including the NTR, as amended, which promulgated criteria similar to those included here for a number of states. 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.

The CWA 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 CWA. If, after EPA's disapproval, the state does not amend its rules so as to be consistent with the CWA, EPA is to promptly propose appropriate federal water quality standards for that state. The second basis for an EPA action is in 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 using section 303(c)(4)(B) as the legal basis for this proposed rule.

As stated in the preamble to the NTR, the Administrator's determination under CWA section 303(c)(4) that criteria are necessary to meet the requirements of the Act could be supported in several ways. EPA does not believe that it is necessary to support the criteria proposed today on a pollutant-specific, water body-by-water-body basis. For EPA to undertake an effort to conduct research and studies of each stream segment or water body across the State of California to demonstrate that for each toxic pollutant for which EPA has issued CWA section 304(a) criteria guidance there is a ''discharge or presence'' of that pollutant which could reasonably ''be expected to interfere with'' the designated use would impose an enormous administrative burden and would be contrary to the statutory directive for swift action manifested by the 1987 addition of section 303(c)(2)(B) to the CWA.

Consistent with EPA's approach in the NTR, EPA interprets section 303(c)(2)(B) of the CWA to allow EPA to act where the State has not succeeded in establishing numeric water quality standards for toxic pollutants. This

inaction can be the basis for the Administrator's determination under section 303(c)(4) that new or revised criteria are necessary to ensure designated uses are protected. Here, this determination is buttressed by the evidence in the record for the rule of the discharge or presence of priority toxic pollutants in the State's waters for which the State does not have numeric water quality criteria.

EPA's interpretation of section 303(c)(2)(B) is supported by the language of the provision, the statutory framework and purpose of section 303, and the legislative history. In adding section 303(c)(2)(B) to the CWA, Congress understood the existing requirements in section 303(c)(1) for triennial water quality standards review and submissions and in section 303(c)(4)(B) for promulgation. CWA section 303(c) includes numerous deadlines and section 303(c)(4) directs the Administrator to act ''promptly'' where the Administrator determines that a revised or new standard is necessary to meet the requirements of the Act. 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. The legislative history of the provision demonstrates that chief Senate sponsors, including Senators Stafford, Chaffee and others wanted the provision to eliminate State and EPA delays and force quick action. Thus, to interpret CWA section 303(c)(2)(B) and (c)(4) to require such a cumbersome pollutant specific effort on each stream segment would essentially render section 303(c)(2)(B) meaningless. The provision and its legislative background indicate that the Administrator's determination to invoke her section 303(c)(4)(B) authority can be met by a generic finding of inaction by the State without the need to develop pollutant specific data for individual stream segments.

This determination is supported by information in the rulemaking record showing the discharge or presence of priority toxic pollutants throughout the State. While this data is not necessarily complete, it constitutes a strong record supporting the need for numeric criteria for priority toxic pollutants with section 304(a) criteria guidance where the State does not have numeric criteria.

Today's proposed rule would not impose any undue or inappropriate burden on the State of California or its dischargers. It merely puts in place numeric criteria for toxic pollutants that are already utilized in other states in implementing CWA programs. Under this rulemaking, the State of California retains the ability to adopt alternative water quality criteria simply by completing its criteria adoption process. Upon EPA approval of those criteria, EPA will initiate action to stay the federally-promulgated criteria.

2. Approach for Developing the Proposed Rule

In summary, EPA developed the criteria proposed in today's rule as follows. Where EPA promulgated criteria for California in the NTR, as amended, EPA has not acted to amend the criteria in the NTR, as amended. Where criteria for California were not included in the NTR, as amended, EPA used section 304(a) national criteria guidance documents as a basis for the criteria proposed in this rule. EPA then determined whether new information since the development of the national criteria guidance documents warranted any changes. New information came from two sources. For human health criteria, new or revised risk reference doses and cancer potency factors on EPA's Integrated Risk Information System (IRIS) as of October 1996 form the basis for criteria values different from the national criteria guidance documents. For aquatic life criteria, updated data sets resulting in revised criteria maximum concentrations (CMCs) and criteria continuous concentrations (CCCs) formed the basis for differences from the national criteria guidance documents. Both of these types of changes are discussed in more detail in the following section. This revised information was used to develop the water quality criteria proposed here for the State of California.

E. Derivation of Criteria

1. Section 304(a) Criteria Guidance Process

Under CWA section 304(a), EPA has developed methodologies and specific criteria guidance to protect aquatic life and human health. These methodologies are intended to provide protection for all surface waters on a national basis. The methodologies have been subject to public review, as have the individual criteria guidance documents. Additionally, the methodologies have been reviewed and approved by EPA's Science Advisory Board (SAB) of external experts.

EPA has included in the record of this rule the aquatic life methodology as described in ''Appendix B—Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses'' to the ''Water Quality Criteria Documents; Availability'' (45 FR 79341, November 28, 1980) as amended by the ''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). (Note: Throughout the remainder of this preamble, this reference is described as the 1985 Guidelines. Any page number references are to the actual guidance document, not the notice of availability in the **Federal Register**. A copy of the 1985 Guidelines is available through the National Technical Information Service (PB85–227049), is in the administrative record for this rule, and is abstracted in Appendix A of Quality Criteria for Water, 1986.) EPA has also included in the administrative record of this rule 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). (Note: Throughout the remainder of this preamble, this reference is described as the Human Health Guidelines or the 1980 Guidelines.) EPA also recommends that the following be reviewed: ''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 placed into the administrative record for this rulemaking the most current individual criteria guidance for the priority toxic pollutants included in today's rule. (Note: All references to appendices are to the associated **Federal Register** publication.)

2. Aquatic Life Criteria

Aquatic life criteria may be expressed in numeric or narrative form. EPA's 1985 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 CWA section 304(a) method ''might be thought of as an estimate of the highest concentration of a substance in water which does not present a significant risk to the aquatic organisms

in the water and their uses.'' (45 FR 79341.) The term ''their uses'' refers to consumption by humans and wildlife (1985 Guidelines, page 48). 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 (1985 Guidelines, page 1). EPA's 1985 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. 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 1985 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 short-term concentration 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. (1985 Guidelines, pages 4, 5.) The terms CMC and CCC are the scientifically correct names for the two (acute and chronic) values of a criterion for a pollutant; however, this document will also refer to acute criterion and chronic criterion to which they are more commonly referred.

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.

A minimum data set of eight specified families is required for criteria development (details are given in the 1985 Guidelines, page 22). 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 (1985 Guidelines, page 4). There are waters and ecosystems where site-specific criteria could be developed, as discussed below, but the State should 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 are developed for fresh water and for salt water.

Limitations of the analyses which may make the criteria underprotective include the fact that data for all species are not available and therefore not considered; the analysis also applies to criteria on an individual basis with no consideration of additive or synergistic effects, and the analysis does not consider impacts on wildlife, due principally to a lack of data. Chemical toxicity is often related to certain receiving water characteristics (pH, hardness, etc.) of a water body. Adoption of some criteria without consideration of these parameters could result in the criteria being overprotective.

a. Freshwater Criteria

For this proposal, EPA updated freshwater aquatic life criteria contained in CWA section 304(a) criteria guidance first published in the early 1980's and later modified in the NTR, as amended, for the following eleven pollutants: arsenic, cadmium, chromium (VI), copper, mercury, dieldrin, endrin, lindane (gamma BHC), nickel, pentachlorophenol, and zinc. These updates are explained in a technical support document entitled, *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water,* (U.S. EPA–820–B–96–001, September 1996), available in the administrative record to this rulemaking; this document presents the derivation of each of the final CMCs and CCCs and the toxicity studies from which the updated freshwater criteria for the eleven pollutants were derived. The presentation of polychlorinated biphenyls (PCB) criteria in the criteria matrix for this proposal differs from that in the NTR, as amended; for this proposal, the criteria are expressed as a total of all aroclors, while for the NTR, as amended, the criteria are expressed for each aroclor. The mercury criteria also differ in this proposal due to the Agency's movement away from aquatic life criteria based on the Final Residue Value (FRV) procedure of the 1985 Guidance. Differences between the eleven CMCs and CCCs as contained in CWA section 304(a) criteria guidance documents and the CMCs and CCCs in this proposed rule can be attributed to one or more of the following reasons.

First, EPA derived and published CWA section 304(a) criteria guidance documents between 1980 and 1987. Some of the aquatic life criteria in this proposed rule were calculated using data published subsequent to the issuance of individual 304(a) criteria guidance documents or using other new information. The pollutants for which this applies are: arsenic, cadmium, chromium (VI), copper, mercury, dieldrin, endrin, lindane, nickel, pentachlorophenol, and zinc. The use of an updated database resulted in less restrictive acute and/or chronic criteria for cadmium and zinc as compared to the published criteria guidance documents. EPA believes that the differences between the proposed updated criteria and the national published criteria guidance documents are insignificant. However, EPA believes that it is appropriate to propose criteria in this rule based on the most recent data. The following table shows the differences between the proposed criteria for this rule and the 304(a) criteria guidance which were promulgated in the NTR, as amended. All values are in micrograms per liter or µg/l:

Compound	Proposed freshwater		NTR freshwater	
	CMC	CCC	CMC	CCC
Arsenic	[1,2] 340	[1,2] 150	[1,3] 360	[1,3] 190

Compound	Proposed freshwater		NTR freshwater	
	CMC	CCC	CMC	CCC
Cadmium	[1,2,4] 4.3	[1,2,4] 2.2	[1,5] 3.7	[1,5] 1.0
Chromium (VI)	[1,2] 16	[1,2] 11	[1,3] 15	[1,3] 10
Copper	[1,2,4] 13	[1,2,4] 9.0	[1,5] 17	[1,5] 11
Nickel	[1,2,4] 470	[1,2,4] 52	[1,5] 1400	[1,5] 160
Zinc	[1,2,4] 120	[1,2,4] 120	[1,5] 110	[1,5] 100
Pentachloro-phenol	[2,6] 19	[2,6] 15	[6] 20	[6] 13
Lindane (gamma-BHC)	[2] 0.95	.....	[7] 2	0.08
Dieldrin	[2] 0.24	[2] 0.056	[7] 2.5	0.0019
Endrin	[2] 0.086	[2] 0.036	[7] 0.18	0.0023
Mercury	[1,2,3] 1.4	[1,2,3] 0.77	[1,3] 2.1	0.012
PCBs	.....	[8,9] 0.014	.....	[8,10] 0.014
Mercury	[1,3] 1.8	[1,3] 0.94	[1,3] 1.8	0.025
PCBs	.....	[8,9] 0.03	.....	[8,10] 0.03

[1] These freshwater and saltwater criteria for metals are expressed in terms of the dissolved fraction of the metal in the water column, not the total recoverable fraction. Criterion values were calculated by using EPA's CWA 304(a) criteria guidance values (described in the total recoverable fraction) and then applying conversion factors as in the NTR, as amended, (60 FR 22228, May 4, 1995 and 40 CFR part 131).

[2] This criterion has been recalculated pursuant to *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water* (EPA–820–B–96–001, September 1996). See also the Great Lakes Water Quality Initiative (40 CFR Parts 9, 122, 123, 131, and 132; Final Water Quality Guidance for the Great Lakes System, Final Rule; 60 FR 15366, March 23, 1995) and *Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water* (EPA–820–B–95–004, March 1995).

[3] Criteria for these metals are expressed as a function of the water-effect ratio (WER) as defined in 40 CFR 131.36(c).

[4] These freshwater aquatic life criteria for metals are expressed as a function of total hardness (mg/l as $CaCO_3$) in the water body. The equations are provided in the proposed rule at 40 CFR 131.38(b)(2). Values displayed above and in the proposed rule matrix correspond to a total hardness of 100 mg/l as $CaCO_3$.

[5] Freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/l as $CaCO_3$), and as a function of the pollutant's water-effect ratio, WER, as defined in 40 CFR 131.36(c). The equations are provided in the NTR, as amended, and values above and in the rule matrix correspond to a total hardness of 100 mg/l as $CaCO_3$ and a water-effect ratio of 1.0.

[6] These 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).

[7] These aquatic life criteria for these pollutants were issued in 1980 utilizing the 1980 Guidelines for criteria development. The acute values shown are final acute values (FAV) which by the 1980 Guidelines are instantaneous values.

[8] The CAS numbers for the PCB compounds are 53469219, 11097691, 11104282, 11141165, 12672296, 11096825, and 12674112, respectively.

[9] This proposed criterion is the sum of all aroclors.

[10] This criterion was listed for each aroclor in the matrix at 40 CFR 131.36(b)(1).

Secondly, some of the 304(a) criteria guidance documents were derived using a methodology which preceded EPA's current methodology, the 1985 Guidelines (pages 16 and 17).

In this proposed rule, where sufficient data existed to use the 1985 Guidelines, EPA recalculated the criteria. The chemicals for which this applies are: dieldrin, endrin, and lindane (gamma BHC) (chronic criterion only). The NTR, as amended, however, did not update the 1980 criteria using the 1985 Guidelines.

Third, EPA has deleted some of the data used in deriving three criteria: specifically, the 1984 criterion for copper and the 1980 criteria for dieldrin and endrin, because under EPA's 1985 Guidelines, the toxicity testing procedure was unacceptable.

Fourth, in several of the 304(a) criteria guidance documents, the range of Species Mean Acute Values (SMAVs) or Species Mean Chronic Values (SMCVs) was greater than a factor of five for some genera. Because of this wide range, EPA set the Genus Mean Acute Values (GMAVs) or Genus Mean Chronic Values (GMCVs) for those genera equal to the lowest SMAV or SMCV for that genus in order to provide adequate protection to all tested species in the genus. The pollutants for which this applies are cadmium, copper and dieldrin.

In addition to the reasons cited earlier concerning differences between NTR, as amended, criteria and proposed CMCs for this rulemaking, several of the proposed CCCs are affected by a preference of using freshwater Acute-Chronic Ratios (ACRs). In some of the 304(a) criteria guidance documents, EPA had used saltwater ACRs in the calculation of freshwater Final Chronic Values (FCVs) when available. In updating criteria, EPA generally did not use saltwater ACRs when there were a sufficient number of acceptable freshwater ACRs to calculate a Final Acute-Chronic Ratio (FACR) because freshwater data is preferable for freshwater criteria. When there was an insufficient number of freshwater ACRs to calculate a FACR, EPA used saltwater ACRs with any acceptable freshwater ACRs. The pollutants for which this applies are: dieldrin, endrin and nickel. Removal of saltwater ACRs from the data sets had a minor effect on the resultant criteria.

Today's rule utilizes the Final Residue Value (FRV) procedure of the 1985 Guidelines for PCBs. The 1985 national methodology in the 1985 Guidelines indicates that the FRV is intended to prevent concentrations of pollutants in commercial or recreational aquatic species from affecting the marketability of those species or affecting wildlife that consume aquatic life. While in today's rule the FRV is used to calculate the chronic values for PCBs, EPA believes it may not be as protective as criteria derived from the Final Chronic Value (FCV). However, the use of the FRV in deriving the chronic values for PCBs represents EPA's best available scientific approach. The NTR, as amended, criteria for dieldrin, endrin, and mercury were based on FRVs calculated from FDA action levels. EPA now believes that the human health criteria proposed elsewhere in this notice will provide an appropriate level of protection to humans consuming freshwater fish and shellfish, but that use of the FDA action levels to protect aquatic life (fish and propagation of fish) is inappropriate. In this rule, EPA updated the chronic values for dieldrin, endrin and mercury based on Final Chronic Values (FCVs) calculated by dividing a Final Acute Value (FAV) by the Final Acute-Chronic Ratio (FACR).

The derivation of each of these criteria, and the toxicity studies upon

which they are based, are discussed in a technical support document entitled, *1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water* (EPA–820–B–96–001, September 1996). This document is available in the administrative record for this rulemaking.

b. Freshwater Acute Selenium Criterion

EPA is proposing a different freshwater acute aquatic life criterion for selenium in this proposed rule than was promulgated in the NTR, as amended. EPA's proposal here is consistent with EPA's recent (proposed) selenium criterion maximum concentration for the Water Quality Guidance for the Great Lakes System (61 FR 58444, November 14, 1996). This proposal takes into account data showing that selenium's two most prevalent oxidation states, selenite and selenate, present differing potentials for aquatic toxicity, as well as new data indicating that various forms of selenium are additive. Additivity increases the toxicity of mixtures of different forms of the pollutant. The new approach produces a different selenium acute criterion concentration, or CMC, depending upon the relative proportions of selenite, selenate, and other forms of selenium that are present. While these revisions may produce either a less or a more stringent acute criterion for selenium, depending on which form of the pollutant is predominant in a water body, the proposed freshwater acute criterion will protect aquatic life in fresh waters of the State of California.

Derivation of the Current Freshwater Criterion for Selenium: When EPA published a recommended freshwater aquatic life criterion for selenium in 1987, it considered both field data on chronic toxicity from Belews Lake in North Carolina and laboratory data showing chronic effects. A comparison of the data indicated that selenium was more toxic to aquatic life in the field than in standard laboratory toxicity tests. Consequently, to ensure that the criterion would protect aquatic life, EPA derived a chronic criterion, or a CCC, of 5 µg/l for total recoverable selenium from the field data. Because the Belews Lake study did not distinguish between selenite, selenate, and any other form of selenium, and because some forms of selenium can convert to other forms over time (U.S. EPA, 1987), EPA established a single CCC for selenium rather than a separate CCC for selenite and/or selenate.

EPA reasoned that acute effects would also be more severe in the field than in the laboratory. EPA, however, was not able to find any field studies assessing acute effects. Consequently, EPA back-calculated the CMC from the field-derived CCC for total selenium, arriving at a value of 19.98 µg/l, which it rounded to 20 µg/l. When EPA proposed and promulgated selenium criteria for the NTR, as amended, it used the same field-data approach and calculated a CMC of 20 µg/l and a CCC of 5 µg/l for all forms of selenium.

EPA noted that, had it concluded that laboratory data could serve as a basis for the selenium criteria, there were sufficient laboratory studies on acute effects to establish separate CMCs for both selenate and selenite. EPA calculated that a CMC for selenite (selenium IV) based on laboratory data might have been 185.9 µg/l, while a CMC for selenate (selenium VI) might have been 12.82 µg/l. As explained above, however, EPA chose to base the CMC on field data that did not differentiate between selenite and selenate.

EPA is proposing a different approach to that used in the NTR, amended, for the fresh waters of California covered by this proposed rule. EPA is proposing a new CMC for total selenium based on more recent studies which indicate that the toxicities of various forms of selenium are additive. EPA is proposing an equation that will allow calculation of a CMC for selenium based on the relative proportions of selenite, selenate and other selenium forms present in a specific water body. The toxicities for selenite and selenate used in this equation are based on the laboratory studies cited in the 1987 and 1995 selenium criteria documents, and are identical to the values calculated in those documents.

EPA continues to believe that the field data support a CCC of 5 µg/l for selenium. The chronic criterion addresses longer-term exposures to selenium under field conditions, including exposure through the food chain. EPA has no field data that can support different chronic criteria for different forms of selenium. Furthermore, EPA believes that current studies show that the various forms of selenium ''interconvert'' to other forms over these longer time frames, so that the relative proportions of the different forms change during the exposure period. A form that exhibits low toxicity at one point during the exposure period may convert to a different, more toxic form at a different point.

Selenium Chemistry: Selenium takes several forms in ambient waters which can significantly alter its toxicity to aquatic life, as shown below. Inorganic selenium has two oxidation states (i.e., selenium IV, or selenite, and selenium VI, or selenate), which can exist simultaneously in aerobic surface water at pH 6.5 to 9.0. Chemical conversion from one oxidation state to another often proceeds at such a slow rate in aerobic surface water that thermodynamic considerations do not determine the relative concentrations of the oxidation states. Although selenate (selenium VI) is thermodynamically favored in oxygenated alkaline water, substantial concentrations of both organoselenium (selenium minus II) and selenite (selenium IV) are not uncommon (Burton et al. 1980; Cutter and Bruland 1984; Measures and Burton 1978; North Carolina Department of Natural Resources and Community Development 1986; Robberecht and Van Gricken 1982; Takayanagi and Cossa 1985; Takayanagi and Wong 1984a,b: Uchida *et al.* 1980).

Various forms of organic selenium also occur in water (Besser *et al.* 1994; Cutter 1991). Toxicity data for some organic selenium forms are available and are compared below to toxicity data for selenite and selenate:

Compound	Zebrafish [a] (mg/l)	C. riparius [b, c, d] (mg/l)		Daphnia magnae [e] (mg/l)
Selenate	18.	16.2	10.5	2.84
Seleno-DL-cystine	12	.....	.....	2.01
Selenite	1.	7.95	14.6	0.55
Seleno-DL-methionine	0.1	.....	.....	0.31
Seleno-L-methionine	.....	5.78	6.88	.....

[a] 10-day LC50 (Niimi and LaHam 1976).
[b] 48-hr LC50 (Ingersoll et al. 1990).
[c] River Water.
[d] 48-hr LC50 (Maier et al. 1993).
[e] 48-hr LC50 (Maier et al. 1993).

Cutter (1991) described methods for measuring total recoverable and dissolved selenate, selenite, organoselenium, and selenium in water, and other information concerning the measurement of selenium in water has been published by Besser et al. (1994), McKeown and Marinas (1986), Pitts *et al.* (1994), and Takayanagi and Cosa (1985).

EPA believes that recent studies demonstrate the acute toxicities of selenate, selenite, and one form of organoselenium are additive; that is, these forms are more toxic together then they are separately (Hamilton and Buhl 1990; Maier et al. 1993). The studies demonstrated additivity by comparing the toxicities of mixtures to the toxicities of the separate toxicants. Thus, EPA believes that it would be appropriate to establish separate CMCs for selenate and selenite only in situations in which either selenate or selenite is the only form of selenium in the water column. When more than one form occurs in the water, additivity should be taken into account so that the CMC for selenium is a function of the toxicities and concentrations of the forms. EPA is proposing an equation that can be used to derive an appropriate criterion for total selenium based on the relative concentrations of selenite, selenate, and all other forms of selenium found in a particular water body.

Toxicity of Three Categories of Selenium: Selenium (IV). EPA is proposing to rely on the laboratory data contained in the 1987 and 1995 criteria documents to establish an acute toxicity of 185.9 µg/l for selenite.

Selenium (VI). EPA is proposing to rely on the laboratory data contained in the 1987 and 1995 criteria documents to establish an acute toxicity of 12.83 µg/l for selenate.

Other Forms of Selenium. EPA has not found and believes that sufficient toxicity data do not exist to allow derivation of CMCs for other selenium compounds. Nevertheless, as indicated in the previous table, the acute toxicity of such other forms of selenium appears to be significant with toxicity increasing by as much as 180 times depending on the form of selenium and the test organism. Toxicity tests conducted on the other forms of selenium indicate that they can be more toxic than selenate and selenite. Consequently, in order not to ignore the toxicity of these other forms of selenium, EPA is proposing to assume that half of the measured or derived concentration of ''other'' selenium forms is as toxic as selenate and half is as toxic as selenite. EPA believes this default assumption is more reasonable than assuming either that the entire quantity of ''other'' forms is as toxic as either selenate or selenite, or that it is not toxic. Such assumptions would be more likely to over-predict or under-predict the toxicity of this ''other forms'' category. EPA is also reluctant to compute any type of ''average'' from the toxicity data on ''other forms'' presented in the table above. These data are quite sparse. Moreover, they reflect only organic selenium forms, and the toxicities of other inorganic forms and compounds may be quite different.

Equation: Additive toxicity means that the concentrations of the different forms should be added together after adjusting for the relative toxicity of each. For a single toxicant the goal is for the concentration, c, to be less than or equal to the criterion, CMC; that is, the ratio $c/CMC \leq 1$. For additive toxicants the goal is for the sum of such ratios to be less than or equal to 1. Thus, for two forms of selenium with additive acute toxicities, the concentration of each form should be controlled such that:

$$\frac{C_1}{CMC_1} + \frac{C_2}{CMC_2} \leq 1$$

where c_1 is the concentration of selenite and other selenium assumed to have the toxicity of selenite, c_2 is the concentration and selenate and other selenium assumed to have the toxicity of selenate; and CMC_1 and CMC_2 are the CMCs for selenite and selenate respectively. A Criterion Maximum Concentration, CMC_{Se}, for the combined additive forms of selenium can then be calculated from the following equation, which is derived from the previous one:

$$CMC_{Se} = \frac{1}{\frac{f_1}{CMC_1} + \frac{f_2}{CMC_2}}$$

where f_1 and f_2 are the fractions of total selenium that are treated as selenite and selenate respectively (that is, $f_1=c_1/c_{Se}$ and $c_{Se}=c_1+c_2$), and $f_1+f_2=1$.

The above equations, when coupled with the assumption that half of the other selenium (including organoselenium) has the toxicity of selenite and half has the toxicity of selenate, behave as follows. If the concentrations of selenite and other selenium are zero ($c_1=0$) then the Criterion Maximum Concentration (CMC_{Se}) would be calculated to be 12.82 µg/l, the CMC of selenate. On the other hand, if the concentrations of selenate and other selenium are zero, then CMC_{Se} would be calculated to be 185.9 µg/l, the CMC of selenite. In determining compliance with this criterion, EPA expects that monitoring to determine speciation will be necessary.

EPA is requesting comment on the data and approach for deriving the proposed CMC for selenium applicable to California in this rulemaking. Specifically, EPA is requesting comment on the scientific basis for establishing the additivity of the toxicities of the various forms of selenium (selenate, selenite, and other selenium compounds). EPA also requests comments on the procedure used to account for the additivity of the various forms of selenium in the criterion derivation algorithm. If persons have filed comments on the November 1996 notice, cited above, that they wish to submit for this rulemaking, they should submit them as described above.

c. Dissolved Metals Criteria

In December of 1992, in the NTR, EPA promulgated water quality criteria for several states that had failed to meet the requirements of CWA section 303(c)(2)(B). Included among the water quality criteria promulgated were numeric criteria for the protection of aquatic life for 11 metals: arsenic,

cadmium, chromium (III), chromium (VI), copper, lead, mercury, nickel, selenium, silver and zinc. Criteria for two metals applied to the State of California: chromium III and selenium.

The Agency received extensive public comment during the development of the NTR regarding the most appropriate approach for expressing the metals criteria. The principal issue was the correlation between metals that are measured and metals that are bioavailable and toxic to aquatic life.

At the time of the NTR promulgation, Agency policy was to express metals criteria, as recommended in the section 304(a) criteria guidance documents, as total recoverable metal measurements. Agency guidance prior to the NTR promulgation indicated that metals criteria may be expressed either as total recoverable metal or dissolved metal. See *Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals,* U.S. EPA, May 1992 (notice of availability published at 57 FR 4041, June 5, 1992). Since the NTR covered a substantial number of water bodies of varying water quality, EPA selected what it considered a simple, conservative approach to implement the metals criteria, namely, the total recoverable method.

EPA continued to work with the states and other interested parties on the issue of metals bioavailability and toxicity. EPA held a workshop of invited experts on the issue and as a result of the consultations, the Agency issued a policy memorandum on October 1, 1993, entitled, Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria (the Metals Policy). The Metals Policy states:

> It is now the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of the metal in the water column than does total recoverable metal.

It further states:

> Until the scientific uncertainties are better resolved, a range of different risk management decisions can be justified. EPA recommends that State water quality standards be based on dissolved metal. EPA will also approve a State risk management decision to adopt standards based on total recoverable metal, if those standards are otherwise approvable as a matter of law.

The adoption of the Metals Policy did not change EPA's position that the existing total recoverable criteria published under section 304(a) of the CWA were scientifically defensible. EPA believed, and continues to believe, that when a state develops and adopts its standards, the state, in making its risk management decision, may want to consider sediment, food chain effects, and other fate-related issues and decide to adopt total recoverable or dissolved metals criteria.

In 1993, a number of parties brought lawsuits challenging the NTR metals criteria. See *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU), D.D.C.). The plaintiffs in those lawsuits wanted the permitting authorities in the NTR states to use criteria based on dissolved metal rather than total recoverable metal. After careful consideration, EPA concluded that it was in the public interest to revise the metals criteria promulgated in the NTR to reflect the Office of Water's new metals policy. On February 15, 1995, EPA and the plaintiffs filed a partial settlement agreement with the Court. Pursuant to the terms of the agreement, EPA agreed to issue an administrative stay of the numeric aquatic life water quality criteria (expressed as total recoverable metal) for: arsenic; cadmium, chromium (III); chromium (VI); copper; lead, mercury (acute only), nickel, selenium (saltwater only), silver, and zinc. The stay was effective April 14, 1995 (60 FR 22228, May 4, 1995), and was only intended to be in effect until EPA took action to amend the NTR by promulgating new metals criteria based on dissolved metal. EPA published an interim final amendment to the NTR effective April 15, 1995; this amendment promulgated new metals criteria for the metals listed in the stay (60 FR 22229, May 4, 1995).

The numeric criteria in the NTR, as amended, reflect the Office of Water's current policy with respect to metals. The 1995 NTR amendment promulgated dissolved metals criteria as substitutes for the total recoverable metals criteria subject to the EPA's administrative stay. The NTR promulgated freshwater chromium (III) criteria and freshwater selenium criteria for the State of California. However, since the amendments did not change the freshwater selenium criteria, only California's chromium (III) criteria were changed to the dissolved form through the NTR, as amended.

Since EPA's previous criteria guidance had been expressed as total recoverable metal, to express the criteria as dissolved, conversion factors were developed to account for the possible presence of particulate metal in the laboratory toxicity tests used to develop the total recoverable criteria. Initially, EPA included a set of recommended freshwater conversion factors with the Metals Policy. Based on additional laboratory evaluations that simulated the original toxicity tests, EPA refined the procedures used to develop freshwater conversion factors for aquatic life criteria. These new conversion factors were made available for public review and comment in the amendments to the NTR on May 4, 1995, at 60 FR 22229.

EPA also conducted saltwater laboratory simulation tests for the development of conversion factors for saltwater metals criteria. The saltwater tests results were first available in the amendments to the NTR on May 4, 1995. The conversion factors in this proposed rule and other technical reports are the same as those referenced in the May 4, 1995 amendments to the NTR and supersede the conversion factors in Attachment 2 of the Metals Policy.

Freshwater Criteria Conversion Factors: The freshwater conversion factors contained in today's proposed rule are contained in the *Derivation of Conversion Factors for the Calculation of Dissolved Freshwater Aquatic Life Criteria for Metals,* U.S. EPA, 1995, available in the administrative record for this rulemaking. This study did not include laboratory simulation tests for mercury or silver; therefore, the freshwater conversion factors for mercury and silver used today are from the Metals Policy, also in the record for this rule. These conversion factors are presented in 40 CFR 131.38(b)(2) of today's proposed rule.

The conversion factors for most freshwater metals were established as constant values. For cadmium and lead however, EPA found that water hardness mediated the conversion factor and should be taken into account when converting total recoverable cadmium and lead criteria to dissolved. 40 CFR 131.38(b)(2) of today's proposed rule presents the hardness-dependent conversion factors for cadmium and lead.

Saltwater Criteria Conversion Factors: Acute saltwater conversion factors were first promulgated in the amendments to the NTR, and are again being proposed in this rule. The data and the acute criteria conversion factors for salt water are contained in the *Derivation of Conversion Factors for the Calculation of Dissolved Saltwater Aquatic Life Criteria for Metals,* U.S. EPA, 1995. This summary report and its supporting data are available in the administrative record. Saltwater chronic conversion factors have not been developed separately and therefore are not available in today's proposed rule. Based on close similarities between the

freshwater acute and chronic conversion factors, EPA believes that, if calculated, the chronic saltwater conversion factors would be nearly the same as the acute saltwater factors. In the absence of these chronic conversion factors, the saltwater acute conversion factors would apply. Salt water simulation tests were not completed for mercury or silver, therefore, the conversion factors from the Metals Policy continue to apply. The saltwater conversion factors are presented in 40 CFR 131.38(b)(2) of today's proposed rule.

Calculation of Dissolved Metals Criteria: Metals criteria values in today's proposed rule in the matrix at 131.38(b)(1) are shown as dissolved metal. These criteria have been calculated in one of two ways. For freshwater metals criteria that are hardness-dependent, the dissolved metal criteria value is calculated separately for each hardness using the table at proposed 40 CFR 131.38(b)(2). The hardness-dependent freshwater values presented in the matrix at proposed 40 CFR 131.38(b)(1) have been calculated using a hardness of 100 mg/l as $CaCO_3$ for illustrative purposes only. Saltwater and freshwater metals criteria that are not hardness-dependent are calculated by taking the total recoverable criteria values (from EPA's national section 304(a) criteria guidance documents, as updated as described in section a. above) before rounding, and multiplying them by the appropriate conversion factors. The final dissolved metals criteria values, as they appear in the matrix at proposed 40 CFR 131.38(b)(1), are rounded to two significant figures.

Translators for Dissolved to Total Recoverable Metals Limits: EPA's National Pollutant Discharge Elimination System (NPDES) regulations require that limits for metals in permits be stated as total recoverable in most cases (see 40 CFR 122.45(c)) except when an effluent guideline specifies the limitation in another form of the metal, the approved analytical methods measure only dissolved metal, or the permit writer expresses a metal's limit in another form (e.g., dissolved, specific valence, or total) when required to carry out provisions of the CWA. This is because the chemical conditions in ambient waters frequently differ substantially from those in the effluent and there is no assurance that effluent particulate metals would not dissolve after discharge. The NPDES permit regulations do not require that water quality standards be expressed as total recoverable; rather, the regulations require permit writers to develop permit limits that are expressed in terms of metals concentrations and loadings that are measured using the total recoverable method. Expressing criteria as dissolved metal requires translation between different metal forms in the calculation of the permit limit so that a total recoverable permit limit can be established that will achieve water quality standards. Thus, it is important that permitting authorities and other authorities have the ability to translate between dissolved metal in ambient waters and total recoverable metal in effluent.

EPA has completed guidance on the use of translators to convert from dissolved metals criteria to total recoverable permit limits. The document, *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823–B–96–007, June 1996), is included in the administrative record for today's proposed rule. This technical guidance examines how to develop a metals translator which is defined as the fraction of total recoverable metal in the downstream water that is dissolved, i.e., the dissolved metal concentration divided by the total recoverable metal concentration. A translator may take one of three forms: (1) It may be assumed to be equivalent to the criteria guidance conversion factors; (2) it may be developed directly as the ratio of dissolved to total recoverable metal; and (3) it may be developed through the use of a partition coefficient that is functionally related to the number of metal binding sites on the adsorbent in the water column (e.g., concentrations of total suspended solids or TSS). This guidance document discusses these three forms of translators, as well as field study designs, data generation and analysis, and site-specific study plans to generate site-specific translators.

California Regional Water Quality Control Boards may use any of these methods in developing water quality-based permit limits to meet dissolved metals criteria. EPA encourages the State to adopt a statewide policy on the use of translators so that the most appropriate method or methods are used consistently within California.

d. Application of Metals Criteria

In selecting an approach for implementing the metals criteria, the principal issue is the correlation between metals that are measured and metals that are biologically available and toxic. In order to assure that the metals criteria are appropriate for the chemical conditions under which they are applied, EPA is providing for the adjustment of the criteria through application of the ''water-effect ratio'' procedure. EPA notes that performing the testing to use a site-specific water-effect ratio is optional on the part of the State.

In the NTR, as amended, EPA identified the water-effect ratio (WER) procedure as a method for optional site-specific criteria development for certain metals. The WER approach compares bioavailability and toxicity of a specific pollutant in receiving waters and in laboratory waters. A WER is an appropriate measure of the toxicity of a material obtained in a site water divided by the same measure of the toxicity of the same material obtained simultaneously in a laboratory dilution water.

On February 22, 1994, EPA issued *Interim Guidance on the Determination and Use of the Water-Effect Ratios for Metals* (EPA 823–B–94–001) now incorporated into the updated *Second Edition of the Water Quality Standards Handbook*, Appendix L. In accordance with the WER guidance and where application of the WER is deemed appropriate, EPA strongly encourages the application of the WER on a watershed or water body basis in California as opposed to application on a discharger-by-discharger basis. This approach is technically sound, an efficient use of resources, and allowable for NPDES permitting authorities.

The rule proposes that a default WER value of 1.0 will be assumed, if no site-specific WER will be determined. To use a WER other than the default of 1.0, the rule proposes that the WER must be determined as set forth in EPA's WER guidance or determined by another scientifically defensible method that has been adopted by the State as part of its water quality standards program and approved by EPA.

The WER is a more comprehensive mechanism for addressing bioavailability issues than simply expressing the criteria in terms of dissolved metal. Consequently, expressing the criteria in terms of dissolved metal, as done in today's proposed rule for California, does not completely eliminate the utility of the WER. This is particularly true for copper, a metal that forms reduced-toxicity complexes with dissolved organic matter.

The *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals* explains the relationship between WERs for dissolved criteria and WERs for total recoverable criteria. Dissolved measurements are to be used in the site-specific toxicity testing underlying the WERs for dissolved criteria. Because

WERs for dissolved criteria generally are little affected by elevated particulate concentrations, EPA expects those WERs to be somewhat less than WERs for total recoverable criteria in such situations. Nevertheless, after the site-specific ratio of dissolved to total metal has been taken into account, EPA expects a permit limit derived using a WER for a dissolved criterion to be similar to the permit limit that would be derived from the WER for the corresponding total recoverable criterion.

e. Saltwater Copper Criteria

The saltwater copper criteria for aquatic life in today's proposed rule are 4.8 µg/l (CMC) and 3.1 µg/l (CCC) in the dissolved form. New data including data collected from studies for the New York/New Jersey Harbor and the San Francisco Bay indicated a need to revise the copper criteria document to reflect a change in the saltwater CMC and CCC aquatic life values. EPA conducted a comprehensive literature search and added toxicity test data for seven new species to the database for the saltwater copper criteria. EPA believes these new data have national implications and the national criteria guidance now contain a CMC of 4.8 µg/l dissolved and a CCC of 3.1 µg/l dissolved. In the amendments to the NTR, EPA noticed the availability of data to support these changes to the NTR, and solicited comments. The data can be found in the draft document entitled, *Ambient Water Quality Criteria—Copper, Addendum 1995*. This document is available from the Office of Water Resource Center and is available for review in the administrative record for this proposed rule. EPA is now requesting comments on these revised criteria as applied to the State of California. Commenters who wish to refer to their comments on the Notice of Availability must resubmit a copy of their previous comments.

f. Chronic Averaging Period

In establishing water quality criteria, EPA generally recommends an ''averaging period'' which reflects the duration of exposure required to elicit effects in individual organisms (TSD, Appendix D–2.) The CCC is intended to be the highest concentration that could be maintained indefinitely in a water body without causing an unacceptable effect on the aquatic community or its uses. (TSD, Appendix D–1). As aquatic organisms do not generally experience steady exposure, but rather fluctuating exposures to pollutants, and because aquatic organisms can generally tolerate higher concentrations of pollutants over a shorter periods of time, EPA expects that the concentration of a pollutant can exceed the CCC without causing an unacceptable effect if (a) the magnitude and duration of exceedences are appropriately limited and (b) there are compensating periods of time during which the concentration is below the CCC. This is done by specifying a duration of an ''averaging period'' over which the average concentration should not exceed the CCC more often than specified by the frequency (TSD, Appendix D–1).

EPA is proposing a 4-day averaging period for chronic criteria, which means that measured or predicted ambient pollutant concentrations should be averaged over a 4-day period to determine attainment of chronic criteria. EPA acknowledges that the State may develop and adopt an averaging period that differs from EPA's recommendation, so long as it is scientifically supportable.

The most important consideration for setting an appropriate averaging period is the length of time that sensitive organisms can tolerate exposure to a pollutant at levels exceeding a criterion without showing adverse effects on survival, growth, or reproduction. EPA believes that the chronic averaging period must be shorter than the duration of the chronic tests on which the CCC is based, since, in some cases, effects are elicited before exposure of the entire duration. Most of the toxicity tests used to establish the chronic criteria are conducted using steady exposure to toxicants for a least 28 days. (TSD, page 35). Some chronic tests, however, are much shorter than this (TSD, Appendix D–2). EPA selected the 4-day averaging period based on the shortest duration in which chronic test effects are sometimes observed for certain species and toxicants. In addition, EPA believes that the results of some chronic tests are due to an acute effect on a sensitive life stage that occurs some time during the test, rather than being caused by long-term stress or long-term accumulation of the test material in the organisms.

Additional discussion of the rationale for the 4-day averaging period is contained in Appendix D of the TSD. Balancing all of the above factors and data, EPA believes that the 4-day averaging period falls within the scientifically reasonable range of values for choice of the averaging period, and is an appropriate length of time of pollutant exposure to ensure protection of sensitive organisms.

EPA established a 4-day averaging period in the NTR. In settlement of litigation on the NTR, EPA stated that it was ''in the midst of conducting, sponsoring, or planning research related to the basis for and application of'' water quality criteria and mentioned the issue of averaging period. See Partial Settlement Agreement in *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU), D.D.C.). EPA is re-evaluating issues raised about averaging periods and will, if appropriate, revise the 1985 Guidelines.

EPA received public comment relevant to the averaging period during the comment period for the 1995 Amendments to the NTR (40 CFR 22228, May 4, 1995), although these public comments did not address the chronic averaging period separately from the allowable excursion frequency and the design flow. These commenters argued that a once-in-3-year excursion frequency for 4-day average concentrations, or a 7Q10 design flow, was unnecessarily restrictive. For chronic criteria, they noted that EPA has approved the use of a 30Q3 design flow in Colorado, a 30Q5 design flow in Maryland, and a 1 percent exceedance frequency in Pennsylvania. Comments recommended that EPA use the 30Q5 design flow for chronic criteria.

While EPA is undertaking analysis of the chronic design conditions as part of the revisions to the 1985 Guidelines, EPA has not yet completed this work. Until this work is complete, for the reasons set forth in the TSD, EPA continues to believe that the 4-day chronic averaging period represents a reasonable, defensible value for this parameter.

g. Hardness

Freshwater aquatic life criteria for certain metals are expressed as a function of hardness because hardness and/or water quality characteristics that are usually correlated with hardness can reduce or increase the toxicities of some metals. Hardness is used as a surrogate for a number of water quality characteristics which affect the toxicity of metals in a variety of ways. Increasing hardness has the effect of decreasing the toxicity of metals. Water quality criteria to protect aquatic life may be calculated at different concentrations of hardnesses measured in mg/l as $CaCO_3$.

Section 131.38(b)(2) of the proposed rule presents the hardness-dependent equations for freshwater metals criteria. For example, using the equation for zinc, the total recoverable CMCs at a hardness of 10, 50, 100 or 200 mg/l as $CaCO_3$ are 17, 67, 120 and 220 µg/l, respectively. Thus, the specific value in the table in the proposed regulatory text is for illustrative purposes only. Most of the data used to develop these hardness equations for deriving aquatic life

criteria for metals were in the range of 25 mg/l to 400 mg/l as $CaCO_3$, and the formulas are therefore most accurate in this range. The majority of surface waters nationwide and in California have a hardness of less than 400 mg/l as $CaCO_3$.

In the past, EPA generally recommended that 25 mg/l as $CaCO_3$ be used as a default hardness value in deriving freshwater aquatic life criteria for metals when the ambient (or actual) hardness value is below 25 mg/l as $CaCO_3$. However, use of the approach results in criteria that may not be fully protective. Therefore, for waters with a hardness of less than 25 mg/l as $CaCO_3$, criteria should be calculated using the actual ambient hardness of the surface water.

In the past, EPA generally recommended that if the hardness was over 400 mg/l, two options were available: (1) Calculate the criterion using a default WER of 1.0 and using a hardness of 400 mg/l in the hardness equation; or (2) calculate the criterion using a WER and the actual ambient hardness of the surface water in the equation. Use of the second option is expected to result in the level of protection intended in the 1985 Guidelines whereas use of the first option is thought to result in a lower aquatic life criterion. At high hardness there is an indication that hardness and related inorganic water quality characteristics do not have as much of an effect on toxicity of metals as they do at lower hardnesses. Related water quality characteristics do not correlate as well at higher hardnesses as they do at lower hardnesses. Therefore, if hardness is over 400 mg/l as $CaCO_3$, a hardness of 400 mg/l as $CaCO_3$ should be used with a default WER of 1.0; alternatively, the WER and actual hardness of the surface water may be used.

EPA requested comments in the NTR amendments on the use of actual ambient hardness for calculating criteria when the hardness is below 25 mg/l as $CaCO_3$, and when hardness is greater than 400 mg/l as $CaCO_3$. Most of the comments received were in favor of using the actual hardness with the use of the water-effect ratio (1.0 unless otherwise specified by the permitting authority) when the hardness is greater than 400 mg/l as $CaCO_3$. A few commenters did not want the water-effect ratio to be mandatory in calculating hardness, and other commenters had concerns about being responsible for deriving an appropriate water-effect ratio. Overall, the commenters were in favor of using the actual hardness when calculating hardness-dependent freshwater metals criteria for hardness between 0–400 mg/l as $CaCO_3$. EPA took those comments into account in proposing today's proposed rule.

A hardness equation is most accurate when the relationships between hardness and the other important inorganic constituents, notably alkalinity and pH, are nearly identical in all of the dilution waters used in the toxicity tests and in the surface waters to which the equation is to be applied. If an effluent raises hardness but not alkalinity and/or pH, using the hardness of the downstream water might provide a lower level of protection than intended by the 1985 guidelines. If it appears that an effluent causes hardness to be inconsistent with alkalinity and/or pH, the intended level of protection will usually be maintained or exceeded if either (1) data are available to demonstrate that alkalinity and/or pH do not affect the toxicity of the metal, or (2) the hardness used in the hardness equation is the hardness of upstream water that does not contain the effluent. The level of protection intended by the 1985 guidelines can also be provided by using the WER procedure.

In some cases, capping hardness at 400 mg/l might result in a level of protection that is higher than that intended by the 1985 guidelines, but any such increase in the level of protection can be overcome by use of the WER procedure.

For metals whose criteria are expressed as hardness equations, use of the WER procedure will generally be intended to account for effects of such water quality characteristics as total organic carbon on the toxicities of metals. The WER procedure is equally useful for accounting for any deviation from a hardness equation in a site water.

3. Human Health Criteria

EPA's CWA section 304(a) human health criteria guidance provides criteria recommendations to minimize adverse human effects due to substances in ambient water. EPA's CWA section 304(a) criteria guidance 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 human health 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 effect (i.e., cancer). Therefore, EPA's water quality criteria guidance for carcinogens are presented as pollutant concentrations corresponding to increases in the risk of developing cancer. See Human Health Guidelines at 45 FR 79347.

For pollutants that do not manifest any apparent carcinogenic effect in animal studies (i.e., systemic toxicants), EPA assumes that the pollutant has a threshold below which no effect will be observed. This assumption is based on the premise that a physiological mechanism exists within living organisms to avoid or overcome the adverse effect 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 doses over relatively short periods of time to more realistic low doses 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. For non-carcinogens, oral RfD assessments (hereinafter simply ''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. See Human Health

Guidelines. 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 effect 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 effect 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 CWA section 304(a) human health criteria development, EPA typically considers only exposures to a pollutant that occur through the ingestion of water and contaminated fish and shellfish. Thus, the criteria are based on an assessment of risks related to the surface water exposure route only where designated uses are drinking water and fish and shellfish consumption.

The assumed exposure pathways in calculating the criteria are the consumption of 2 liters per day of water at the criteria concentration and the consumption of 6.5 grams per day of fish and shellfish contaminated at a level equal to the criteria concentration but multiplied by a ''bioconcentration factor.'' The use of fish and shellfish 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 and 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). (Referenced in the Human Health Guidelines.) This value is appropriate as it includes a margin of safety so that the general population is protected. See also EPA's discussion of the 2.0 liters/day assumption at 61 FR 65183 (Dec. 11, 1996). The 6.5 grams per day contaminated fish and shellfish consumption value was equivalent to the average per-capita consumption rate of all (contaminated and non-contaminated) freshwater and estuarine fish and shellfish for the U.S. population. See Human Health Guidelines.

EPA 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 and shellfish consumption and 2.0 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 shellfish 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 anglers 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 2.0 liters per day of maximally contaminated drinking water. For example, individuals that ingest ten times more of a carcinogenic pollutant than is assumed in derivation of the criteria at a 10^{-6} risk level 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 statewide criteria are necessary to adequately protect highly exposed subpopulations. Although EPA intends to focus on promulgation of appropriate statewide criteria that will reduce risks to all exposed individuals, including highly exposed subpopulations, site-specific criteria may be developed subsequently by the State where warranted to provide necessary additional protection. See Human Health Guidelines, Issue 8.

EPA has a process to develop a scientific consensus on oral reference dose assessments and carcinogenicity assessments (hereinafter simply cancer slope factors or slope factors or q1*s). Through this process, EPA develops a consensus of Agency opinion which is then used throughout EPA in risk management decision-making. EPA maintains an electronic data base which contains the official Agency consensus for oral RfD assessments and carcinogenicity assessments which is known as the Integrated Risk Information System (IRIS). It is available for use by the public on the National Institutes of Health's National Library of Medicine's TOXNET system, and through diskettes from the National Technical Information Service (NTIS). (NTIS access number is PB 90–591330.)

Section 304(a)(1) of the CWA requires EPA to periodically revise its criteria guidance to reflect the latest scientific knowledge: ''(A) on the kind and extent of all identifiable effects on health and welfare * * *; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on the biological community diversity, productivity, and stability, including information on the factors affecting eutrophication rates of organic and inorganic sedimentation for varying types of receiving waters.'' In developing up-to-date water quality criteria for the protection of human health, EPA consistently relies upon the most recent IRIS values (RfDs and q1*s) as the toxicological basis in the criterion calculation. IRIS reflects EPA's most current consensus on the toxicological assessment for a chemical. In developing the criteria in today's proposed rule, the most recent IRIS values were used together with currently accepted exposure parameters for bioconcentration, fish and shellfish and water consumption, and body weight. The IRIS cover sheet for each pollutant criteria included in today's proposed rule is contained in the administrative record.

For the human health criteria included in today's proposed rule, EPA used the Human Health Guidelines on which criteria recommendations from the appropriate CWA section 304(a) criteria guidance document were based. (These documents are also placed in the administrative record for today's proposed rule.) Where EPA has changed any parameters in IRIS used in criteria derivation since issuance of the criteria guidance document, EPA recalculated the criteria recommendation with the latest IRIS information. Thus, there are differences between the original criteria guidance document recommendations, and those in this proposed rule, but this proposed rule presents EPA's most current CWA section 304(a) criteria recommendation. The basis (q1* or RfD/ADI) and BCF for each pollutant criterion in today's proposed rule is contained in the rule's Administrative Record Matrix which is included in the administrative record for the proposed

rule. In addition, all recalculated human health numbers are denoted by an ''a'' in the criteria matrix in 40 CFR 131.38(b)(1) of the proposed rule. The pollutants for which a revised human health criterion has been calculated since the December 1992 NTR include: mercury; dichlorobromomethane; 1,2-dichloropropane; 1,2-trans-dichloroethylene; 2,4-dimethylphenol; acenaphthene; benzo(a)anthracene; benzo(a)pyrene; benzo(b)flouranthene; benzo(k)flouranthene; 2-chloronaphthalene; chrysene; dibenzo(a,h)anthracene; indeno(1,2,3-cd)pyrene; N-nitrosodi-n-propylamine; alpha-endosulfan; beta-endosulfan; endosulfan sulfate; 2-chlorophenol; butylbenzyl phthalate; and polychlorinated biphenyls.

In November of 1991, the proposed NTR presented criteria for several pollutants in parentheses. These were pollutants for which, in 1980, insufficient information existed to develop human health water quality criteria, but for which, in 1991, sufficient information existed. Since these criteria did not undergo the public review and comment in a manner similar to the other water quality criteria presented in the NTR (for which sufficient information was available in 1980 to develop a criterion, as presented in the 1980 criteria guidance documents), they were not proposed for adoption into the water quality criteria, but were presented to serve as notice for inclusion in future state triennial reviews. Today's rule proposes criteria for these nine pollutants: copper; 1, 2-dichloropropane; 1,2-trans-dichloroethylene; 2,4-dimethylphenol; acenaphthene; 2-chloronaphthalene; N-nitrosodi-n-propylamine; 2-chlorophenol; butylbenzene phthalate. All the criteria are based on IRIS values—either an RfD or q1*—which were listed on IRIS as of November 1991, the date of the proposed NTR. These values have not changed since the final NTR was published in December of 1992. The rule's Administrative Record Matrix in the administrative record of today's proposed rule contains the specific RfDs, q1*s, and BCFs used in calculating these criteria.

Potential Changes to the Human Health Criteria Methodology: EPA expects to propose in the near future several changes to the 1980 ambient water quality criteria derivation guidelines (the Human Health Guidelines). The methodology revisions anticipated reflect significant scientific advances that have occurred during the past several years in such key areas as cancer and noncancer risk assessments, exposure assessments and bioaccumulation. Some anticipated areas of major change, which are being considered in this process include:

1. The new Proposed Guidelines on Carcinogen Risk Assessment emphasize the consideration of mode of action and route of exposure. A weight of evidence narrative will be used instead of the traditional alphanumeric classification (e.g., A, B, C, D, E carcinogens). For dose response assessments, two steps will be involved: determining the range of observation (observed effect) and the range of extrapolation. To characterize the cancer potency, a biologically-based chemical-specific model will be used. In many cases, however, sufficient data may not exist to apply a biological based model. In these cases, linear and nonlinear defaults will be used. A linear default will be used for those chemicals which indicate they are DNA reactive or when other evidence supports linearity. In addition, if a chemical is not DNA reactive but insufficient data exist to characterize a nonlinear mode of action, linearity will be assumed and a linear default will be recommended. The nonlinear default (margin of exposure approach) will be used for those chemicals which are not DNA reactive and for those for which sufficient data to characterize a nonlinear mode of action exist.

2. For noncarcinogens, the concept of an expressing an RfD as a range rather than a single value will be presented for comment. In developing water quality criteria, EPA will provide a default RfD which, in most cases, will be the midpoint of the range, commonly referred to as the point estimate. Alternative approaches, such as the benchmark dose and categorical regression analysis may be employed in developing an RfD and analyzing the risk above the RfD point estimate.

3. Default fish and shellfish consumption values are presented for the general population, for sportfishers, and for subsistence fishers, replacing the single value of 6.5 grams/day used in the 1980 guidance. States may use a fish and shellfish intake level derived from local data on fish and shellfish consumption in place of the default values provided. However, the fish and shellfish intake level chosen must be protective of highly exposed individuals in the population.

4. All criteria should be derived using a bioaccumulation factor (BAF); none should be derived using a bioconcentration factor (BCF), which was used in the 1980 guidance.

5. As an alternative to expressing ambient water quality criteria as a water concentration, criteria may also be expressed in terms of fish tissue concentration. For some substances, particularly those that are expected to exhibit substantial bioaccumulation, the ambient water quality criteria derived may have extremely low values, possibly below the practical limits for detecting and quantifying the substance in the water column. It may be more practical and meaningful in these cases to focus on the concentration of those substances in fish tissue, since fish ingestion would be the predominant source of exposure for these substances that bioaccumulate.

6. When deriving ambient water quality criteria for noncarcinogens and nonlinear carcinogens, a factor (referred to as the relative source contribution) should be included to account for other non-water exposure sources so that the entire RfD will not be not allocated to drinking water and fish consumption alone.

For more details on these changes and others, please refer to the upcoming **Federal Register** notice.

It should be noted that the changes outlined above may result in significant numeric changes in the ambient water quality criteria. For example, for those chemicals which are bioaccumulative in nature (e.g., with bioconcentration factors (BCFs) of 300 or more), bioaccumulation factors may be developed which are 1–3 orders of magnitude greater than the BCFs developed in 1980. This would result in a criterion which is 1–3 orders of magnitude more stringent, if all other parameters (such as RfDs and q1*s) remain roughly unchanged.

EPA will continue to rely on existing criteria as the basis for regulatory and non-regulatory decisions, until EPA revises and reissues a 304(a) criteria guidance using the revised final human health criterion methodology. The existing criteria are still viewed as scientifically acceptable by EPA. The intention of the methodology revisions is to present the latest scientific advancements in the areas of risk and exposure assessment in order to incrementally improve the already sound toxicological and exposure bases for these criteria. As EPA's current human health criteria are the product of several years worth of development, it is reasonable to assume that revisiting all existing criteria could require comparable amounts of time and resources. Given these circumstances, EPA is proposing a process for revisiting these criteria as part of the overall revisions to the methodology for deriving human health criteria that is expected to be published in the **Federal Register** in 1997.

The State of California in its Ocean Plan, adopted in 1990 and approved by EPA in 1991, established numerical water quality criteria using an average fish and shellfish consumption rate of 23 grams per day. This value is based on an earlier California Department of Health Services estimate. The State is currently in the process of readopting its water quality control plans for inland surface waters, enclosed bays, and estuaries. The State intends to consider information on fish and shellfish consumption rates evaluated and summarized in a recent report prepared by the State's Office of Environmental Health Hazard Assessment. The report, which is undergoing final evaluation, is expected to be made public in 1997. EPA supports the State's use of any appropriate higher state-specific fish and shellfish consumption rates in its readoption of criteria in its statewide plans.

a. 2,3,7,8–TCDD (Dioxin) Criteria

In today's action, EPA is proposing human health water quality criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin (''dioxin'') at the same levels as promulgated in the NTR, as amended. These criteria are derived from EPA's 1984 CWA section 304(a) criteria guidance document for dioxin.

EPA has been evaluating the health threat posed by dioxin nearly continuously for well over a decade. Following issuance of the 1984 criteria guidance document, evaluating the health effects of dioxin and recommending human health criteria for dioxin, EPA prepared draft reassessments reviewing new scientific information relating to dioxin in 1985 and 1988. EPA's Science Advisory Board (SAB), reviewing the 1988 draft reassessment, concluded that while the risk assessment approach used in 1984 criteria guidance document had inadequacies, a better alternative was unavailable (see SAB's *Dioxin Panel Review of Documents from the Office or Research and Development relating to the Risk and Exposure Assessment of 2,3,7,8–TCDD* (EPA—SAB–EC–90–003, November 28, 1989) included in the administrative record for today's proposed rule). Between 1988 and 1990, EPA issued numerous reports and guidances relating to the control of dioxin discharges from pulp and paper mills. See e.g., EPA Memorandum, ''Strategy for the Regulation of Discharges of PHDDs & PHDFs from Pulp and Paper Mills to the Waters of the United States,'' from Asst. Administrator for Water to Regional Water Mgmt Div. Directors and NPDES State Directors, dated May 21, 1990 (AR NL–16); EPA Memorandum, ''State Policies, Water Quality Standards, and Permit Limitations Related to 2,3,7,8–TCDD in Surface Water,'' from Assistant Administrators to Water Management Div. Directors, dated January 5, 1990 (AR VA–66). These documents are available in the administrative record for today's proposed rule.

In 1991, EPA's Administrator announced another scientific reassessment of the risks of exposure to dioxin (see Memorandum from Administrator William K. Reilly to Erich W. Bretthauer, Assistant Administrator for Research and Development and E. Donald Elliott, General Counsel, entitled Dioxin: Follow-Up to Briefing on Scientific Developments, April 8, 1991, included in the administrative record for today's proposed rule). At that time, the Administrator made clear that while the reassessment was underway, EPA would continue to regulate dioxin in accordance with existing Agency policy and existing risk methodologies. Thereafter, the Agency proceeded to regulate dioxin in a number of environmental programs, including standards under the Safe Drinking Water Act and the Clean Water Act.

The Administrator's promulgation of the dioxin human health criteria in the 1992 NTR affirmed his decision that the ongoing reassessment should not defer or delay regulating this potent contaminant, and further, that the risk assessment in the 1984 criteria guidance document for dioxin continued to be scientifically defensible. Until the reassessment process was completed, the Agency could not ''say with any certainty what the degree or directions of any changes in the risk estimates might be'' (57 F. R. at 60863–64).

The basis for the dioxin criteria as well as the decision to include the dioxin criteria in the 1992 NTR pending the results of the reassessment were challenged. See *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU) D.D.C.). By order dated September 4, 1996, the Court upheld EPA's decision. EPA's brief and the Court's decision are included in the administrative record for today's proposed rule.

EPA has undertaken significant effort toward completion of the dioxin reassessment. On September 13, 1994, EPA released for public review and comment a draft reassessment of toxicity and exposure to dioxin. See *Health Assessment Document for 2,3,7,8-Tetrachlorobenzo-p-Dioxin (TCDD) and Related Compounds,* U.S. EPA, 1994. EPA is currently addressing comments made by the public and the SAB and anticipates that the final revised reassessment will go to the SAB in the near future. With today's proposal, the Administrator reaffirms that, notwithstanding the on-going risk reassessment, EPA intends to continue to regulate dioxin to avoid further harm to public health, and the basis for the dioxin criteria, both in terms of the cancer potency and the exposure estimates, remains scientifically defensible. The fact that EPA is reassessing the risk of dioxin, virtually a continuous process to evaluate new scientific information, does not mean that the current risk assessment is ''wrong''. It continues to be EPA's position that until the risk assessment for dioxin is revised, EPA supports and will continue to use the existing risk assessment for the regulation of dioxin in the environment. Accordingly, EPA today proposes dioxin criteria based on the 1984 criteria guidance document for dioxin and promulgated in the NTR in 1992.

Toxicity Equivalency: The State of California, in its 1991 water quality control plans, adopted human health criteria for dioxin and dioxin-like compounds based on the concept of toxicity equivalency (TEQ) using toxicity equivalency factors (TEFs). EPA Region 9 reviewed and approved the State's use of the TEQ concept and TEFs in setting the State's human health water quality criteria for dioxin and dioxin-like compounds.

In 1987, EPA formally embraced the TEQ concept as an interim procedure to estimate the risks associated with exposures to 210 chlorinated dibenzo-p-dioxin and chlorinated dibenzofuran (CDD/CDF) congeners, including 2,3,7,8–TCDD. This procedure uses a set of derived TEFs to convert the concentration of any CDD/CDF congener into an equivalent concentration of 2,3,7,8–TCDD. In 1989, EPA updated its TEFs based on an examination of relevant scientific evidence and a recognition of the value of international consistency. This updated information can be found in EPA's 1989 *Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs)* (EPA /625/3–89/016, March 1989). EPA had been active in an international effort aimed at adopting a common set of TEFs (International TEFs/89 or I–TEFs/89), to facilitate information exchange on environmental contamination of CDD/CDF. This document reflects EPA's support of an internationally consistent set of TEFs, the I–TEFs/89.

EPA uses I–TEFs/89 in many of its regulatory programs, and encourages

their use in state programs. EPA supports and encourages the State of California's use of EPA's 1989 Interim Procedures in implementing the 2,3,7,8–TCDD water quality criteria contained in today's proposed rule. The concept of TEQ and the use of the I–TEFs/89, as outlined in EPA's 1989 Interim Procedures, provide valuable guidance in using the 2,3,7,8–TCDD water quality criteria in setting National Pollutant Discharge Elimination System (NPDES) water quality-based permit limits that are protective of human health for dioxin and dioxin-like compounds.

b. Arsenic Criteria

EPA is not proposing human health criteria for arsenic in today's proposed rule. EPA recognizes that EPA promulgated human health water quality criteria for arsenic for a number of states in 1992 based on EPA's 1980 section 304(a) criteria guidance for arsenic as updated in IRIS. However, a number of issues and uncertainties have arisen concerning the health effects of arsenic. These issues and uncertainties (summarized in ''Issues Related to Health Risk of Arsenic'' contained in the administrative record for today's proposed rule) include arsenic exposure evaluations, metabolism and detoxification processes, analytical methods, and effects at low doses. EPA has determined that these issues and uncertainties are sufficiently significant to necessitate a careful evaluation of the risks of arsenic exposure before the Agency promulgates water quality criteria for arsenic in additional states. Today's decision is consistent with the recent decision by the Assistant Administrator for Water (Memorandum from R. Perciasepe to Assistant and Regional Administrators dated February 6, 1995, also included in the administrative record) deferring the revision of the drinking water standard of 0.05 mg/l for arsenic pending, among other things, the review of the risk assessment for arsenic. This review is currently underway.

Given these circumstances, EPA has made a risk management decision not to propose human health criteria for arsenic. Permitting authorities in California should rely on existing narrative water quality criteria to establish effluent limitations as necessary for arsenic. California has previously expressed its science and policy position by establishing a criterion level of 5 μg/l for arsenic; EPA recommends that permitting authorities refer to that value in evaluating and interpreting the narrative water quality criteria.

c. Mercury Criteria

The criteria proposed here use the latest RfD in EPA's Integrated Risk Information System (IRIS) and the weighted average practical bioconcentration factor (PBCF) from the 1980 section 304(a) criteria guidance document for mercury. EPA considered the approach used in the Great Lakes Water Quality Initiative (GLI) incorporating Bioaccumulation Factors (BAFs), but rejected this approach for reasons stated below. The equation used here to derive an ambient water quality criterion for mercury from exposure to organisms and water is the following:

For organism and water consumption:

$$HHC = \frac{RfD \times BW}{WC + (FC \times PBCF)}$$

Where:

RfD = Reference Dose
BW = Body Weight
WC = Water Consumption
FC = Total Fish and Shellfish Consumption per Day
PBCF = Practical Bioconcentration Factor (weighted average)

For mercury, the most current RfD from IRIS is 1×10^{-4} mg/kg/day. The RfD is derived from a benchmark dose analysis using a parts per million (ppm) maternal hair concentration as the exposure surrogate and the combination of all neurological effects in infants as the response variable from the Marsh *et. al* (1987) study. A Weibel model for extra risk was used. The resulting estimated dose at 10% extra risk was 11 ppm of maternal hair, or about 1×10^{-3} mg/kg/day. An uncertainty factor of 10 was included to arrive at an RfD of 1×10^{-4} mg/kg/day. This factor is composed of a half-log of 10 for within-human variability and a half log of 10 for database insufficiency, notably the lack of a two generation reproductive study.

The body weight used in the equation for the mercury criteria, as discussed in the Human Health Guidelines, is a mean adult human body weight of 70 kg. The drinking water consumption rate, as discussed in the Human Health Guidelines, is 2.0 liters per day.

The fish and shellfish consumption for mercury takes into account both average fish and shellfish consumption and average intake from each body of water. The value for the fish and shellfish consumption is based on the average total intake of fish and shellfish from fresh water, estuarine coastal and open oceans (18.7 g/day). The average individual fish and shellfish consumption from freshwater bodies is 1.72 g/day (0.00172 kg), from estuarine-coastal waters is 4.78 g/day (0.00478 kg), and from open oceans is 12.2 g/day (0.0122 kg). Species of fish and shellfish used in the calculation are those from which information was available on human consumption on average mercury concentration in edible tissue. See *Ambient Water Quality Criteria for Mercury (EPA 440/5–80–058).*

The BCF is defined as the ratio of chemical concentration in the organism to that in surrounding water. Bioconcentration occurs through uptake and retention of a substance from water only, through gill membranes or other external body surfaces. In the context of setting exposure criteria it is generally understood that the terms ''BCF'' and ''steady-state BCF'' are synonymous. A steady-state condition occurs when the organism is exposed for a sufficient length of time that the ratio does not change substantially.

The BCFs that were used herein are the ''Practical Bioconcentration Factors (PBCFs)'' that were derived in 1980: 5500 for fresh water, 3765 for estuarine coastal waters, and 9000 for open oceans. See pages C–100–1 of *Ambient Water Quality Criteria for Mercury* (EPA 440/5–80–058) for a complete discussion on the PBCF. Because of the way they were derived, these PBCFs take into account uptake from food as well as uptake from water. A weighted average PBCF was calculated to take into account the average consumption from the three waters using the following equation:

$$\text{Weighted Average Practical BCF} = \frac{\Sigma(\text{FC} \times \text{PBCF})}{\Sigma(\text{FC})}$$

$$= \frac{(0.00172)(5500) + (0.00478)(3765) + (0.0122)(9000)}{0.00172 + 0.00478 + 0.0122}$$

$$= \frac{137.3}{0.0187} = 7342.6$$

Given the large value for the weighted average PBCF, the contribution of drinking water to total daily intake is negligible so that assumptions concerning the chemical form of mercury in drinking water become less important. The human health mercury criteria proposed for this rule are based on the latest RfD as listed in IRIS and a weighted PBCF from the 1980 304(a) criteria guidance document for mercury.

On March 23, 1995 (60 FR 15366), EPA promulgated the Great Lakes Water Quality Initiative (GLI). The GLI incorporated bioaccumulation factors (BAFs) in the derivation of criteria to protect human health because it is believed BAFs are a better predictor than BCFs of the concentration of a chemical within fish tissue as it includes consideration of the uptake of contaminants from all routes of exposure. A bioaccumulation factor is defined as the ratio (in L/kg) of a substance's concentration in tissue to the concentration in the ambient water, in situations where both the organism and its food are exposed and the ratio does not change substantially over time. The final GLI establishes a hierarchy of four methods for deriving BAFs for non-polar organic chemicals: (1) Field-measured BAFs; (2) predicted BAF derived using a field-measured biota-sediment accumulation factor; (3) predicted BAFs derived by multiplying a laboratory-measured BCF by a food chain multiplier; and 4) predicted BAFs derived by multiplying a BCF calculated from the log Kow by a food-chain multiplier. The final GLI developed BAFs for trophic levels three and four fish of the Great Lakes Basin. Respectively, the BAFs for mercury for trophic level 3 and 4 fish were: 27,900 and 140,000.

The BAF promulgated in the GLI was developed specifically for the Great Lakes System. It is uncertain whether the BAFs of 27,900 and 140,000 are appropriate for use in California at this time, and thus, this proposal does not use the BAF in setting the human health criteria for mercury. To a considerable degree the magnitude of the BAF for mercury in a given system depends on how much of the total mercury in that system is present in the methylated form. Methylation rates very widely from one aquatic system to another for reasons that are not fully understood. Lacking the data, it is difficult to determine if the BAF used in the GLI represent the potential for mercury bioaccumulation in surface waters in California. It should be noted, however, that there is no scientific reason to believe that a true average BAF in California, were it known, would be lower than that developed for the Great Lakes basin; that is, the true average for California could be higher or lower than the BAF developed for the GLI.

EPA is developing a national BAF for mercury. The mercury BAF is part of the Mercury Study Report to Congress: SAB Review Draft (The Draft Report to Congress) . The Draft Report to Congress is currently available through NTIS (EPA–452/R–96–001a–h) . The next step is for the SAB to review the Draft Report to Congress. After the SAB reviews the Draft Report and the Agency makes changes based on their comments, the Report to Congress will be released with a final national BAF for mercury. Once the Report to Congress has been publicly reviewed, and finalized, the Agency will consider the science and could make changes to the section 304(a) criteria guidance for mercury to reflect the recommendation of the Report to Congress. If the section 304(a) criteria guidance for mercury changes, states will be expected to review their water quality standards for mercury and determine if their standards are protective.

d. Polychlorinated Biphenyls (PCBs) Criteria

The NTR, as amended, calculated human health criteria for PCBs using a cancer potency factor of 7.7 per (mg/kg)/day from the Agency's IRIS. This cancer potency factor was derived from the Norback and Weltman (1985) study which looked at rats that were fed Aroclor 1260. The study used the linearized multistage model with a default cross-species scaling factor (body weight ratio to the 2/3 power). Although it is known that PCB congeners vary greatly as to their potency in producing biological effects, for purposes of its carcinogenicity assessment, EPA considered Aroclor 1260 to be representative of all PCB mixtures. The Agency did not pool data from all available congener studies or generate a geometric mean from these studies, since the Norback and Weltman study was judged by EPA as acceptable, and not of marginal quality, in design or conduct as compared with other studies. Thereafter, the Institute for Evaluating Health Risks (IEHR, 1991) reviewed the pathological slides from the Norback and Weltman study, and concluded that some of the malignant liver tumors should have been interpreted as nonmalignant lesions, and that the cancer potency factor should be 5.1 per (mg/kg)/day as compared with EPA's 7.7 per (mg/kg)/day.

The Agency's recent peer-reviewed reassessment of the cancer potency of PCBs published in a final report, *PCBs: Cancer Dose-Response Assessment and Applications to Environmental Mixtures* (EPA/600/P–96/001F), adopts a different approach that distinguishes among PCB mixtures by using information on environmental processes. (The report is included in the administrative record of today's proposed rule.) The report considers all cancer studies (which used commercial mixtures only) to develop a range of cancer potency factors, then uses information on environmental processes to provide guidance on choosing an appropriate potency factor for representative classes of environmental mixtures and different pathways. The reassessment provides that, depending on the specific application, either central estimates or upper bounds can be appropriate. Central estimates describe a typical individual's risk, while upper bounds provide assurance (i.e., 95% confidence) that this risk is not likely to be underestimated if the underlying model is correct. Central estimates are used for comparing or ranking environmental hazards, while upper bounds provide information about the precision of the comparison or ranking. In the reassessment, the use of the upper bound values were found to increase cancer potency estimates by two or

three-fold over those using central tendency. Upper bounds are useful for estimating risks or setting exposure-related standards to protect public health, and are used by EPA in quantitative cancer risk assessment. Thus, the cancer potency of PCB mixtures is determined using a tiered approach based on environmental exposure routes with upper-bound potency factors (using a body weight ratio to the 3/4 power) ranging from 0.07 (lowest risk and persistence) to 2 (high risk and persistence) per (mg/kg)/day for average lifetime exposures to PCBs. It is noteworthy that bioaccumulated PCBs appear to be more toxic than commercial PCBs and appear to be more persistent in the body. For exposure through the food chain, risks can be higher than other exposures.

EPA issued the final reassessment report on September 27, 1996 and updated IRIS to include the reassessment on October 1, 1996. For this proposed rule, EPA derived the human health criteria for PCBs using a cancer potency factor of 2 per (mg/kg)/day, an upper bound potency factor reflecting high risk and persistence. This decision is based on recent multimedia studies indicating that the major pathway of exposure to persistent toxic substances such as PCBs is via dietary exposure (i.e., contaminated fish and shellfish consumption).

Following is the calculation of the human health criterion (HHC) for organism and water consumption:

$$HHC = \frac{RF \times BW \times (1{,}000\,\mu g/mg)}{q1^* \times [WC + (FC \times BCF)]}$$

Where:

RF=Risk Factor=$1 \times 10\ (-6)$

BW=Body Weight=70 kg

q1*=Cancer slope factor=2 kg-day/mg

WC=Water Consumption=2 l/day

FC=Fish and Shellfish Consumption=0.0065 kg/day

BCF=Bioconcentration Factor=31,200

the HHC (µg/l)=0.00017 µg/l (rounded to two significant digits).

Following is the calculation of the human health criterion for organism only consumption:

$$HHC = \frac{RF \times BW \times (1{,}000\,\mu g/mg)}{q1^* \times FC \times BCF}$$

Where:

RF=Risk Factor=$1 \times 10\ (-6)$

BW=Body Weight=70 kg

q1*=Cancer slope factor=2 kg-day/mg

FC=Total Fish and Shellfish Consumption per Day=0.0065 kg/day

BCF=Bioconcentration Factor=31,200

the HHC (µg/l)=0.00017 µg/l (rounded to two significant digits).

The criteria are both equal to 0.00017 µg/l and apply to the total PCBs or congener or isomer analyses (PCBs exposures should not be characterized in terms of aroclors). See *PCBs: Cancer Dose Response Assessment and Application to Environmental Mixtures* (EPA/600/9–96–001F). For a discussion of the body weight, water consumption, and fish and shellfish consumption factors, see the Human Health Guidelines. For a discussion of the BCF, see the 304(a) criteria guidance document for PCBs (included in the administrative record for this proposed rulemaking).

e. Section 304(a) Human Health Criteria Excluded

As is the case in the NTR, as amended, today's proposed rule does not propose criteria for certain priority pollutants for which CWA section 304(a) criteria guidance exists because those criteria were not based on toxicity to humans or aquatic organisms. The basis for these particular criteria is organoleptic effects (e.g., taste and odor) which would make water and edible aquatic life unpalatable but not toxic. Because the basis for this rule is to protect the public health and aquatic life from toxicity consistent with the language and intent in CWA section 303(c)(2)(B), EPA is promulgating criteria only for those priority toxic pollutants whose criteria recommendations are based on toxicity. The CWA section 304(a) human health criteria based on organoleptic effects for zinc and 3-methyl-4-chlorophenol are excluded for this reason. See the 1992 NTR discussion at 57 FR 60864.

f. Cancer Risk Level

EPA's CWA section 304(a) criteria guidance documents for priority toxic pollutants that are based on carcinogenicity present concentrations for upper bound risk levels of 1 excess cancer case 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 level as EPA policy.

In today's proposed rule, EPA is proposing criteria that protect at an incremental cancer risk level of one in a million (10^{-6}) for all priority toxic pollutants regulated as carcinogens, consistent with those criteria promulgated in the NTR, as amended, for the State of California. The State had requested EPA to use a 10^{-6} risk level for carcinogenic pollutants in the NTR. In addition, standards adopted by the State contained in the Enclosed Bays and Estuaries Plan (EBEP), and the Inland Surface Waters Plan (ISWP), partially approved by EPA on November 6, 1991, and the Ocean Plan approved by EPA on June 28, 1990, contain a risk level of 10^{-6} for most carcinogens. Thus, the State has historically protected at a 10^{-6} risk level for carcinogenic pollutants. For today's proposed rule, the State has indicated a preference for EPA to propose criteria for carcinogenic pollutants at a 10^{-6} risk level, but to also discuss and request comment on a 10^{-5} risk level. Therefore, EPA is explicitly requesting comment on the adoption of a 10^{-5} risk level for carcinogenic pollutants proposed in this rule for the State of California. The effect of a 10^{-5} risk level will be to increase carcinogenic pollutant criteria values (noted in today's proposed matrix by footnote c) which are not already promulgated in the NTR, as amended, by one order of magnitude. For example, the proposed organism-only criterion for gamma BHC (pollutant number 105 in the matrix) is 0.013 µg/l; the criterion based on a 10^{-5} risk level would be 0.13 µg/l.

The State, in its readoption of its statewide plans for inland surface waters and enclosed bays and estuaries may consider other risk levels for carcinogenic pollutants. EPA

recommends that states consider minimum risk levels in the range of 10^{-4} to 10^{-6} for carcinogenic priority toxic pollutants to protect public health and welfare. See Human Health Guidelines.

F. Description of the Proposed Rule

1. Scope

Subpart (a), entitled ''Scope'', states that this rule is a proposed promulgation of criteria for priority toxic pollutants in the State of California for inland surface waters, enclosed bays, and estuaries. Subpart (a) also states that this rule contains an authorizing compliance schedule provision.

2. EPA Criteria for Priority Toxic Pollutants

EPA's proposed criteria for California are presented in tabular form that will appear at 40 CFR 131.38. For ease of presentation, the table that appears in this proposed rule combines water quality criteria promulgated in the NTR, as amended, that are outside the scope of this rulemaking, with the proposed criteria that are within the scope of today's proposed rule. This is intended to help readers determine applicable water quality criteria for the State of California. The table contains several footnotes for clarification; however, when EPA promulgates the final rule, the source of the criteria, either the NTR, as amended, or this rulemaking, may no longer be included as footnotes to the table.

As proposed, subpart (b) presents a matrix of the applicable EPA aquatic life and/or human health criteria for priority toxic pollutants. Section 303(c)(2)(B) of the CWA addresses only pollutants listed as ''toxic'' pursuant to section 307(a) of the CWA for which EPA has developed section 304(a) criteria guidance. 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. Of these, the Agency identified a list of 126 ''priority toxic pollutants'' to implement the CWA (see 40 CFR 131.36(b)). Reference in this proposed rule to priority toxic pollutants, toxic pollutants, or toxics refers to the 126 priority toxic pollutants.

EPA has not developed both aquatic life and human health CWA section 304(a) criterion guidance for all of the priority toxic pollutants. The matrix in paragraph (b) contains human health criteria in Column D for 100 priority toxic pollutants which are divided into criteria (Column 1) for water consumption (i.e., 2.0 liters per day) and aquatic organism consumption (i.e., 6.5 grams per day of aquatic organisms), and into criteria (Column 2) for aquatic organism only consumption. The term aquatic organism includes fish and shellfish such as shrimp, clams, oysters and mussels. One reason the total number of priority toxic pollutants with criteria proposed today differs from the total number of priority toxic pollutants contained in earlier published CWA section 304(a) criteria guidance is because EPA has developed and is proposing chromium criteria for two valence states with respect to aquatic life criteria. Thus, although chromium is a single priority toxic pollutant, there are two criteria for chromium for aquatic life protection. See pollutant 5 in today's proposed 40 CFR 131.38(b). Another reason is that EPA is proposing human health criteria for nine priority pollutants for which health-based national criteria have been calculated based on information obtained from EPA's IRIS database (EPA provided notice of these nine criteria in the NTR for inclusion in future State triennial reviews. See 57 FR 60848, 60890).

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 TSD. For example, water body 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 short-term concentrations and that the criteria continuous concentrations (the chronic criteria) are four-day averages. It should also be noted that for certain metals, the actual criteria are equations which are included as footnotes to the matrix. The toxicity of these metals is water hardness dependent and may be adjusted. The values shown in the table are illustrative only, 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.

Several of the freshwater aquatic life criteria are incorporated into the matrix in the format used in the 1980 criteria methodology which uses a final acute value instead of a continuous maximum concentration. This distinction is noted in footnote g of the table.

Proposed 40 CFR 131.38(c) would establish the applicability of the criteria to the State of California. Proposed 40 CFR 131.38(d) is described in Section F of this preamble.

EPA's purpose today is to propose the numeric toxics criteria necessary for California to meet the requirements of the CWA. In order for such criteria to achieve their intended purpose, the implementation scheme must be such that the final results protect aquatic life and public health. In Section E of this preamble, a discussion focuses on the factors in EPA's assessment of criteria for carcinogens. For example, fish and shellfish consumption rates, bioaccumulation factors, and cancer potency slopes are 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 numeric criterion is selected for either aquatic life or human health protection, this facilitates the calculation of water quality-based effluent limits and/or total maximum daily loads (TMDLs) for that chemical. EPA has included in this rule appropriate implementation factors necessary to maintain the level of protection intended. These factors are included in subsection (c) of the proposed rule.

For example, in order to do steady state waste load allocation analyses, most states have low flow values for streams and rivers which establish flow rates for various purposes. These low flow values become design flows for sizing treatment plants and developing water quality-based effluent limits and/or TMDLs. Historically, these 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 TSD, EPA introduced hydrologically and biologically based analyses for the protection of aquatic life and human health. (These concepts have been expanded subsequently in EPA's Technical Guidance Manual for Performing Wasteload Allocations, Book 6, Design Conditions, U.S. EPA, 1986 . 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 promulgate design flows for instream flows and thereby maintain the intended stringency of the criteria for priority toxic pollutants.) 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. Other methods for evaluating the instream flow record may be available; use of these methods may result in TMDLs and/or water quality-based effluent limitations which adequately protect human health and/or aquatic life. The results of either of these two methods, or an equally protective alternative method, may be used.

The State of California may adopt specific design flows for streams and rivers to protect designated uses against the effects of toxics. Generally, in other states, these have followed the guidance in the TSD. However, EPA believes it is essential to state that the criteria will apply at specified design flows for steady state analyses in today's rule so that, where California has not yet adopted any such design flows, the criteria proposed today would be implemented appropriately. The TSD also recommends the use of three dynamic models to perform wasteload allocations. Dynamic wasteload models do not generally use specific steady state design flows but accomplish the same effect by factoring in the probability of occurrence of stream flows based on the historical flow record. For simplicity, only steady state conditions will be discussed here. Clearly, if the criteria were implemented using design flows that are too high, the resulting toxics controls would not be fully effective, because the resulting ambient concentrations would exceed EPA's criteria.

In the case of aquatic life, assuming exceedences occur more frequently than once in 3 years on the average, exceedences would result in diminished vitality of stream ecosystems characterized by the loss of desired species. Numeric water quality criteria should apply at all flows that are equal to or greater than flows specified below. The low flow values 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 that the harmonic mean flow be applied with human health criteria for carcinogens. The harmonic mean is a standard calculated statistical value. 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. (For a description of harmonic means see ''Design Stream Flows Based on Harmonic Means,'' Lewis A. Rossman, Jr. of Hydraulics Engineering, Vol. 116, No. 7, July, 1990.) Hydrologic assessment methods other than the hydrologically-based and biologically-based methods may prove effective in applying water quality criteria in specific receiving water settings.

All waters, whether or not suitable for such hydrologic calculations but included in this rule (including lakes, estuaries, and marine waters), would be required to attain the criteria proposed today. Such attainment would be required to occur at the end of the discharge pipe, unless the State authorizes mixing zones. EPA has approved mixing zone provisions in Regional Water Quality Control Board Basin Plans. Where the State intends to authorize a mixing zone, the criteria would apply at the locations allowed by the mixing zone. For example, the chronic criteria (CCC) would apply at the defined boundary of the chronic mixing zone. Discussion of and guidance on 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. Analytical detection limits have never been an acceptable basis for setting water quality criteria since they are not related to actual environmental impacts. The environmental impact of a pollutant is based on a scientific determination, not a 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. See 1985 Guidelines, page 21. As the methods improve, limits closer to the actual criteria necessary to protect aquatic life and human health became measurable. The Agency does not believe it is appropriate to propose or promulgate criteria that are not sufficiently protective.

EPA does believe, however, that the use of analytical detection limits are appropriate for determining compliance with National Pollutant Discharge Elimination System (NPDES) permit limits. This view of the role of detection limits was articulated in guidance for translating dioxin criteria into NPDES permit limits, which is the principal method used for water quality standards enforcement. See ''Strategy for the Regulation of Discharges of PHDDs and PHDFs from Pulp and Paper Mills to Waters of the U.S.'' Memorandum from the Assistant Administrator for Water to the Regional Water Management Division Directors, May 21, 1990. This guidance presents a model for addressing toxic pollutants which have criteria less than current detection limits. This guidance is equally applicable to other priority toxic pollutants with criteria less than current detection limits. The guidance explains that standard analytical methods may be used for purposes of determining compliance with permit limits, but not for purposes of establishing water quality criteria or permit limits. Under the CWA, analytical methods are appropriately used in connection with NPDES permit limit compliance determinations. Because of the function of water quality criteria, EPA has not considered the sensitivity of analytical methods in deriving the criteria proposed today.

EPA has proposed 40 CFR 131.38(c)(3) to determine when freshwater or saltwater aquatic life criteria apply. This provision incorporates a time parameter to better

define the critical condition. The structure of the paragraph is to establish applicable rules and to allow for site-specific exceptions where the rules are not consistent with actual field conditions. Because a distinct separation generally does not exist between freshwater and saltwater aquatic communities, EPA is establishing the following: (1) The freshwater criteria apply at salinities of 1 part per thousand and below at locations where this occurs 95% or more of the time; (2) saltwater criteria apply at salinities of 10 parts per thousand and above at locations where this occurs 95% more of the time; and (3) at salinities between 1 and 10 parts per thousand the more stringent of the two apply unless EPA approves the application of the freshwater or saltwater criteria based on an appropriate biological assessment. The percentiles included here were selected to minimize the chance of overlap, that is, one site meeting both criteria. Determination of these percentiles can be done by any reasonable means such as interpolation between points with measured data or by the application of calibrated and verified mathematical models (or hydraulic models). It is not EPA's intent to require actual data collection at particular locations.

In the brackish water transition zones of estuaries with varying salinities, there generally will be a mix of freshwater and saltwater species. Generally, therefore, it is reasonable for the more stringent of the freshwater or saltwater criteria to apply. In evaluating appropriate data supporting the alternative set of criteria, EPA will focus on the species composition as its preferred method. This assignment of criteria for fresh, brackish and salt 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.

Subsection (d) lists the designated water and use classifications for which the proposed criteria apply. The criteria are applied to the beneficial use designations adopted by the State of California; EPA has not promulgated any new use classifications in this rule.

Exceedence Frequency: In a water quality criterion for aquatic life, EPA recommends an allowable frequency for excursions of the criteria. See 1985 Guidelines, pages 11–13. This allowable frequency provides an appropriate period of time during which the aquatic community can recover from the effect of an excursion and then function normally for a period of time before the next excursion. An excursion is defined as an occurrence of when the average concentration over the duration of the averaging period is above the CCC or the CMC. As ecological communities are naturally subjected to a series of stresses, the allowable frequency of pollutant stress may be set at a value that does not significantly increase the frequency or severity of all stresses combined. See also TSD, Appendix D. In addition, providing an allowable frequency for exceeding the criterion recognizes that it is not generally possible to assure that criteria are never exceeded. (TSD, page 36.)

Based on the available data, EPA is proposing that the acute criterion for a pollutant be exceeded no more than once in three years on the average. EPA is also proposing that the chronic criterion for a pollutant be exceeded no more than once in three years on the average. EPA acknowledges that the State may develop allowable frequencies that differ from these allowable frequencies, so long as they are scientifically supportable, but believes that these allowable frequencies are protective of the designated uses.

The use of aquatic life criteria for developing water quality-based effluent limits in permits requires the permitting official to use an appropriate wasteload allocation model. (TSD, Appendix D–6.) As discussed above, there are generally two methods for determining design flows, the hydrologically-based method and the biologically-based method.

The biologically-based method directly uses the averaging periods and frequencies specified in the aquatic life criteria for determining design flows. (TSD, Appendix. D–8.) Because the biologically-based method calculates the design flow directly from the duration and allowable frequency, it most accurately provides the allowed number of excursions. The hydrologically based method applies the CMC at a design flow equal to or equivalent to the 1Q10 design flow (i.e., the lowest one-day flow with a recurrence frequency of one year in ten years), and applies the CCC at the 7Q10 design flow (i.e., the lowest seven day flow with a recurrence frequency of one year in ten years).

EPA established a three year allowable frequency in the NTR. In settlement of the litigation on the NTR, EPA stated that it was in the midst of conducting, sponsoring, or planning research aimed at addressing scientific issues related to the basis for and application of water quality criteria and mentioned the issue of allowable frequency. See Partial Settlement Agreement in *American Forest and Paper Ass'n, Inc. et al.* v. *U.S. EPA* (Consolidated Case No. 93–0694 (RMU) D.D.C. To that end, EPA is reevaluating issues raised about allowable frequency as part of its work in revising the 1985 Guidelines.

In addition, EPA received public comment on the allowable frequency incorporated into the amendments to the NTR. These comments argued that a once every three years on the average excursion frequency for 4-day average concentrations, or a 7Q10 design flow for chronic criteria, was unnecessarily restrictive. For chronic criteria, commenters noted that EPA has approved use of a 30Q3 design in Colorado, a 30Q5 design flow in Maryland, and a 1 percent exceedance frequency in Pennsylvania. Comments recommended that EPA use the 30Q5 design flow for chronic criteria.

EPA recognizes that additional data concerning (a) the probable frequency of lethal events for an assemblage of taxa covering a range of sensitivities to pollutants, (b) the probable frequency of sublethal effects for such taxa, (c) the differing effects of lethal and sublethal events in reducing populations of such taxa, and (d) the time needed to replace organisms lost as a result of toxicity, may lead to further refinement of the allowable frequency value. Due to lack of available resources, EPA has not yet completed this work. Until this work is complete, EPA believes that the three year allowable frequency represents a value in the reasonable range for this parameter.

3. Implementation

Once the applicable designated uses and water quality criteria for a water body are determined, under the National Pollutant Discharge Elimination System (NPDES) program, discharges to the water body must be characterized and the permitting authority must determine the need for permit limits. If a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criteria, the permitting authority must develop permit limits as necessary to meet water quality standards. These permit limits are water quality-based effluent limitations or WQBELs. The terms ''cause,'' ''reasonable potential to cause,'' and ''contribute to'' are the terms in the NPDES regulations for conditions under which water quality-based permit limits are required. See 40 CFR 122.44(d)(1).

Total Maximum Daily Loads (TMDLs): If a water quality problem is identified, a wasteload allocation (WLA) based on an existing total maximum daily load

(TMDL) may be established. A TMDL is the sum of the individual WLAs for point sources and load allocations (LA) for nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. WLAs represent that portion of a TMDL that is allocated to existing and future point sources so that surface water quality is protected at all flow conditions.

The TMDL process uses water quality analyses to predict water quality conditions and pollutant concentrations. Point source and nonpoint source allocations are established so that predicted receiving water concentrations do not exceed water quality standards. TMDLs and WLAs/LAs should be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards, with seasonal variations and a margin of safety that takes into account any lack of knowledge concerning the relationship between point and nonpoint source loadings and water quality.

The CWA under section 303(d), requires the establishment of TMDLs for stream segments listed as ''water quality limited'' pursuant to section 303(d). In such segments, water quality does not meet applicable water quality standards and/or is not expected to meet applicable water quality standards. A TMDL includes a determination of the amount of a pollutant, or property of a pollutant, from point, nonpoint, and natural background sources, including a margin of safety, that may be discharged to a water-quality limited water body.

During California's recent set of Task Force meetings concerning the readoption of statewide water quality control plans, the Permitting Task Force made several recommendations concerning the TMDL process. Since the TMDL process can be significantly labor and data intensive, a recommendation was made to create collaborative efforts to establish TMDLs on water quality limited water bodies. This collaborative effort by dischargers, the State, EPA, and other stakeholders, could distribute work and associated costs between the interested parties, as well as shorten the overall time necessary to complete the analyses. Another recommendation was to allow innovative alternatives to traditional ''pounds per day'' TMDLs. EPA supports these Task Force recommendations for the State of California.

Within the TMDL framework, EPA encourages innovative approaches such as effluent trading as a method to attain and/or maintain water quality standards. Effluent trading allows sources that can control pollutants beyond compliance with current requirements to sell or trade credits for its excess reduction to another source unable to control its own pollutants as effectively or as efficiently. The goal of an effluent trading program is to achieve similar or improved environmental results in a more cost-effective manner than under current regulatory structures. EPA's most current policy on effluent trading is summarized in the ''Policy Statement for Effluent Trading in Watersheds'' which was issued in January of 1996 and which reiterates President Clinton's commitment to effluent trading as expressed in the March 16, 1995 report on ''Reinventing Environmental Regulation.'' The Policy states that ''EPA will work cooperatively with key stakeholders to find sensible, innovative ways to meet water quality standards quicker and at less cost than traditional approaches alone.'' The policy outlines several different types of trades that may take place. These trades include but are not limited to the following: (1) Intra-plant trading between outfalls within one facility; (2) pretreatment trading between indirect industrial point sources that discharge to a POTW; (3) point to point source trading, point to nonpoint source trading, and nonpoint to nonpoint source trading.

Interim Permit Limits: The State's Permitting Task Force also discussed at length the issue of interim numeric permit limits when a TMDL/WLA/LA or other special study is underway but not completed. The Task Force made several recommendations regarding how to determine these interim limits. The Task Force recommended that interim numeric limits be calculated based on past performance and future uncertainty. Past performance and future uncertainty can be considered as factors in determining interim permit limits; however, permitting authorities may consider other factors, particularly factors concerning the water quality of the receiving water body and the overall goal to attain the water quality standard. The Task Force also recommended that a specific method be followed in determining interim limits and ''trigger'' concentrations above which corrective action would be necessary. EPA supports innovative ideas such as these, however, the State as the permitting authority has broad discretion in determining how interim permit limits should be ascertained in different situations. EPA supports the State's consideration of stakeholder Task Force recommendations to help deal with these controversial and complex issues.

Mixing Zones: Another important issue discussed during the State's Task Force meetings was the issue of mixing zones. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and where water quality standards can be exceeded. Mixing zones have been applied in the water quality standards program since its inception. The present water quality standards regulation allows states to adopt acute and chronic mixing zones as a matter of state discretion, so long as the state's mixing zone protects the designated uses.

A mixing zone should be established to ensure that the zone will not impair the integrity of the water body as a whole, the zone will not cause lethality to passing organisms, and, considering likely pathways of exposure, that there are no significant human health risks. For application of two-number aquatic life criteria, as proposed in this rule, there may be up to two types of mixing zones. In the zone immediately surrounding the outfall, neither the acute nor the chronic criterion is met. The acute criterion is met at the edge of this zone. In the next mixing zone, the acute, but not the chronic, criterion is met. The chronic criterion is met at the edge of the second mixing zone. However, since both aquatic life and human health criteria are proposed in today's rule, the State may establish independent mixing zone policies for each. For any particular pollutant from any particular discharge, the magnitude, frequency, duration and mixing zone associated with each of the type of criteria may determine which one most limits the allowable discharge.

Several California Regional Water Quality Control Boards have adopted mixing zone provisions in their respective Basin Plans. These mixing zone provisions can be applied to discharges to water bodies to which water quality standards based on the criteria contained in this proposed rule will apply when these criteria are promulgated final.

Variances: Another important procedure to assist the State in effectively implementing water quality standards in the NPDES program is the water quality standard variance procedure. The State may adopt a statewide policy (or Regional Boards may adopt Basin-wide policies) to allow for water quality standard variances to individual dischargers. The variance policy would allow the State or Regional Board to grant a variance to an individual permittee from a water quality standard which is the basis of a water quality-based effluent limitation in a permit. The variance would allow the permittee time to achieve reasonable progress towards attaining a specific

water quality-based effluent limitation, without violating CWA section 402(a)(1) which requires that NPDES permittees meet all applicable water quality standards.

A permittee applying for a variance may not be a new or recommencing discharger. The water quality standard variance applies only to the permittee requesting the variance and only to the pollutant or pollutants specified in the variance. A variance does not effect the corresponding water quality standard for the water body receiving the discharge. Variances are designed to preserve the underlying water quality standard over the long term, while providing flexibility to individual dischargers in complying with permit limits based on the standards. When a variance is granted, the discharger is assured compliance during the term of a variance, as long as all variance conditions are met.

A State-adopted variance policy will be approved by the EPA if it is consistent with the substantive requirements set out at 40 CFR Part 131 for removing a designated use. Specifically, the State's policy must require the inclusion of a demonstration that a water quality standard is unattainable, based on one or more of the following grounds:

1. Naturally occurring pollutant concentrations prevent the attainment of the water quality standard;

2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the water quality standard, unless these conditions may be compensated for by the discharge of sufficient volume of effluent to enable the standard to be met without violating State water conservation requirements;

3. Human-caused conditions or sources of pollution prevent the attainment of the water quality standard and cannot be remedied, or would cause more environmental damage to correct than to leave in place;

4. Dams, diversions or other types of hydrologic modifications preclude the attainment of a water quality standard, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the standard;

5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate cover, flow, depth, pools, riffles, and the like, unrelated to chemical water quality, preclude attainment of the water quality standard; or

6. Controls more stringent than those required by CWA sections 301(b) and 306 would result in substantial and widespread economic and social impact.

EPA will approve a State policy providing for variances if the policy includes the following provisions:

1. The State will include each individual variance as part of its water quality standard or water quality plan;

2. The variance will include documentation that treatment more advanced than that required by CWA section 301(b) and 306 has been carefully considered, and that alternative effluent control strategies have been evaluated;

3. The underlying, more stringent criterion will be maintained and will be binding on all other dischargers;

4. The discharger who will be given a variance for one particular constituent will be required to meet the applicable criteria for other constituents;

5. The variance will be granted for a specific period of time and must be rejustified upon expiration, but at least every three years;

6. Reasonable progress will be made towards meeting the underlying standards;

7. The variance will not likely jeopardize the continued existence of any threatened or endangered species listed under Section 4 of the Endangered Species Act or result in the destruction or adverse modification of such species' critical habitat; and

8. The variance will be subjected to public notice, comment, and hearing. See CWA section 303(c)(1) and 40 CFR 131.20. The public notice should contain a clear description of the impact of the variance upon achieving the water quality standard in the water body.

Once a variance has been approved by the State, it must be submitted to EPA for approval. If this proposed rule is still in effect, as with the State adoption of site-specific criteria, EPA would have to undertake rulemaking to make the necessary changes to this rule. Further guidance on variance policies is provided in EPA's 1994 Water Quality Standards Handbook, Chapters 2 and 5 (EPA 823–B–94–005a, August 1994).

EPA, however, cautions California and the public that promulgation of this federal rule removes most of the flexibility available to the State for modifying its standards on a discharger-specific or stream-specific basis. For example, variances and site-specific criteria development are actions sometimes adopted by states. These are optional policies under terms of the federal water quality standards regulation. Except for the water-effect ratio procedure for certain metals, EPA has not incorporated either optional policy, in general, in this proposed rulemaking, that is, EPA has not generally authorized State modifications of federal water quality standards. Each of these types of modifications will, in general, require federal rulemaking on a case-by-case basis to change the federal rule. Because of the time consuming nature of reviewing such requests, limited federal resources, and the need for the Agency to move into other priority program areas in establishing environmental controls, EPA alerts California and the public that a prompt Agency response is unlikely. The best course of action, if such provisions are desired, is for the State to adopt its own standards and take advantage, if it so chooses, of the flexibility offered by these optional provisions.

4. Wet Weather Flows

Questions have already arisen concerning the applicability of these proposed criteria to discharges from wet weather point sources. A wet weather point source means any discernible confined and discrete conveyance from which pollutants are, or may be, discharged as the result of a wet weather event. For purposes of this discussion, discharges from wet weather point sources shall include only: discharges of storm water from a municipal separate storm sewer as defined at 40 CFR 122.26(b)(8); storm water discharge associated with industrial activity as defined at 40 CFR 122.26(b)(14); discharges of storm water and sanitary wastewaters (domestic, commercial, and industrial) from a combined sewer overflow; or any storm water discharge for which a permit is required under section 402(p) of the CWA. A storm water discharge associated with industrial activity which is mixed with process wastewater is not considered a wet weather point source.

National Pollutant Discharge Elimination System (NPDES) permits for wet weather point source discharges must include limits necessary to implement applicable water quality standards, through application of water quality-based effluent limitations or WQBELs. Section 301(b)(1)(C) of the CWA, 33 U.S.C. 1311(b)(1)(C); see also Memorandum of E. Donald Elliot, Assistant Administrator and General Counsel, to Nancy J. Marvel, Region 9, dated January 9, 1991. When this rulemaking is complete, these criteria will be used to determine water quality standards in California and will therefore be the basis of WQBELs in NPDES permits for wet weather point sources. However, EPA recognizes that it is commonly infeasible to express

WQBELs as numeric limits for wet weather discharges and that in such cases best management practices (''BMPs'') may serve as WQBELs. See, *e.g., NRDC* v. *Costle,* 568 F. 2d 1369, 1380 (D.C. Cir. 1977) (''when numeric effluent limitations are infeasible, EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels.''); *NRDC* v. *U.S. EPA,* 822 F. 2d 104, 122 (D.C. Cir. 1987) (''* * * Congress has seen fit to empower EPA to prescribe as wide a range of permit conditions as the agency deems appropriate in order to assure compliance with applicable effluent limits.''). It is therefore anticipated that WQBELs, including those necessary to meet the criteria set forth in this proposed rule, will be expressed as BMPs in wet weather discharges' NPDES permits, when the permitting authority determines that it is infeasible to express WQBELS as numeric limits.

5. Schedules of Compliance

A compliance schedule refers to an enforceable sequence of interim requirements in a permit leading to ultimate compliance with water quality-based effluent limitations or WQBELs in accordance with the CWA. The proposed authorizing compliance schedule provision authorizes, but does not require, the permit issuing authority in the State of California to include such compliance schedules in permits under appropriate circumstances. The State of California is authorized to administer the National Pollutant Discharge Elimination System (NPDES) program and may exercise its discretion when deciding if a compliance schedule is justified because of the technical or financial (or other) infeasibility of immediate compliance.

This authorizing compliance schedule provision is included in the proposed rule because of the potential for existing dischargers to have new or more stringent effluent limitations, under the final rule, for which immediate compliance would not be possible or practicable.

New and Existing Dischargers: The proposed provision allows compliance schedules only for an ''existing discharger'' which is defined as any discharger which is not a ''new California discharger.'' A ''new California discharger'' includes ''any building, structure, facility, or installation from which there is, or may be, a 'discharge of pollutants', the construction of which commenced after the effective date of this regulation.'' These definitions are modelled after the existing 40 CFR 122.2 definitions for parallel terms, but with a cut-off date modified to reflect this rule. Only ''new California dischargers'' are required to comply immediately upon commencement of discharge with effluent limitations derived from the criteria in this rule.

For ''existing dischargers'' whose permits were reissued or modified to contain new or more stringent limitations based upon certain water quality requirements, the permit could allow up to five years to comply with such limitations. The provision applies to new or more stringent effluent limitations based on the criteria in this EPA rule.

EPA has included ''increasing dischargers'' within the category of ''existing dischargers'' since ''increasing dischargers'' are existing facilities with a change—an increase—in their discharge. Such facilities may include those with seasonal variations. ''Increasing dischargers'' will already have treatment systems in place for their current discharge, thus, they have less opportunity than a new discharger does to design and build a new treatment system which will meet new water quality-based requirements for their changed discharge. Allowing existing facilities with an increasing discharge a compliance schedule will avoid placing the discharger at a competitive disadvantage vis-a-vis other existing dischargers who are eligible for compliance schedules.

The proposed rule does not prohibit the use of a short-term ''shake down period'' for new California dischargers as is provided for new sources or new dischargers in 40 CFR 122.29(d)(4). These regulations require that the owner or operator of (1) a new source; (2) a new discharger (as defined in 40 CFR 122.2) which commenced discharge after August 13, 1979; or (3) a recommencing discharger shall install and implement all pollution control equipment to meet the conditions of the permit before discharging. The facility must also meet all permit conditions in the shortest feasible time (not to exceed 90 days). This shake-down period is not a compliance schedule. This approach may be used to address violations which may occur during a new facility's start-up, especially where permit limits are water quality-based and biological treatment is involved.

The burden of proof to show the necessity of a compliance schedule is on the discharger, and the discharger must request approval from the permit issuing authority for a schedule of compliance. The discharger should submit a description of the minimum required actions or evaluations that must be undertaken in order to comply with the new or more restrictive discharge limits. Dates of completion for the required actions or evaluations should be included, and the proposed schedule should reflect the shortest practicable time to complete all minimum required actions.

Duration of Compliance Schedules: EPA believes that compliance schedules of three years or less will be sufficient to allow facilities to make the changes necessary to meet new or more restrictive discharge requirements in most cases. Such compliance periods are consistent with analogous provisions of the CWA including sections 301(b)(2) and 304(l). For example, section 301(b)(2)(C)—(F) of the Act provides that various technology-based effluent limitations shall be complied with as expeditiously as possible but no later than three years after effluent limitations are promulgated. Similarly, section 304(l) provides that sources shall comply with individual control strategies (water-quality based requirements) within three years.

However, the Agency also recognizes the concerns of dischargers regarding the amount of time and resources in some cases that may be needed for implementing certain new or complex state-of-the-art treatment technologies and other pollution prevention programs. The Agency recognizes that evaluation, design and implementation of facility-wide comprehensive pollution prevention control strategies involving product substitution, process line changes, new piping, revised waste handling, etc. may require more than three years at large facilities. In addition, EPA is aware that the technical and administrative process of modifying and implementing revised requirements for numerous industrial users at publicly owned treatment works, as well as planning, budgeting, and undertaking significant new construction to change treatment processes at a municipal treatment works, may require more than three years.

Therefore, the proposed rule provides that compliance schedules may provide for up to five years to meet new or more stringent effluent limitations in those limited circumstances where the permittee can demonstrate to the permit authority that such an extended schedule is warranted. EPA emphasizes its belief that in most situations less than three years will be required; EPA believes that permit authorities should consider shorter compliance schedules wherever possible or alternatively, not allow compliance schedules where unnecessary. This provision should not

be considered a default compliance schedule duration for existing facilities.

In instances where dischargers wish to conduct toxicological studies, analyze results, and adopt and implement new or revised water quality-based effluent limitations, EPA believes that five years is sufficient time within which to complete this process.

Under this proposal, where a schedule of compliance exceeds one year, interim requirements are to be specified and interim progress reports are to be submitted at least annually to the permit issuing authority, in at least one-year time intervals.

The proposed rule allows all compliance schedules to extend up to a maximum duration of five years, which is the maximum term of any NPDES permit. See 40 CFR 122.46. The discharger's opportunity to obtain a compliance schedule occurs when the existing permit for that discharge is issued, reissued or modified, whichever is sooner. Such compliance schedules, however, cannot be extended to any indefinite point of time in the future because no final compliance date for WQBELs based upon this rule shall be more than ten years from the effective date of the rule. Thus, delays in reissuing expired permits (including those which continue in effect under applicable NPDES regulations) cannot indefinitely extend the period of time during which a compliance schedule is in effect. Ten years allows for inclusion of the single maximum five-year compliance schedule in a permit which is reissued five years after the effective date of this rule (having been previously issued without WQBELS using today's proposed criteria on the eve of the effective date of this rule).

EPA recognizes that where a permit is modified during the permit term, and the permittee needs the full five years to comply, the five-year schedule may extend beyond the term of the modified permit. In such cases, the rule allows for the modified permit to contain a compliance schedule with an interim limit by the end of the permit term. When the permit is reissued, the permit authority may extend the compliance schedule in the next permit, provided that, taking into account the amount of time allowed under the previous permit, the entire compliance schedule shall not exceed five years. Final permit limits and compliance dates will be included in the record for the permit. Final compliance dates must occur within five years from the date of permit issuance, reissuance, or modification, unless additional or less time is provided for by law.

Antibacksliding: EPA wishes to address the potential concern over antibacksliding where revised permit limits based on new information are the result of the completion of additional studies. The Agency's interpretation of the CWA is that the antibacksliding requirements of section 402(o) of the CWA do not apply to revisions to effluent limitations made before the scheduled date of compliance for those limitations.

State Compliance Schedule Provisions: EPA supports the State in adopting a statewide provision independent of or as part of the current effort to readopt statewide water quality control plans, or in adopting individual basin-wide compliance schedule provisions through its nine Regional Water Quality Control Boards (RWQCBs). The State and RWQCBs have broad discretion to adopt a provision, including discretion on reasonable lengths of time for final compliance with WQBELs. EPA recognizes that practical time frames within which to set interim goals may be necessary to achieve meaningful, long-term improvements in water quality in California.

At this time, at least one RWQCB has adopted an authorizing compliance schedule provision as an amendment to its Basin Plan during its last triennial review process. If EPA includes an authorizing compliance schedule provision in the final rule, any appropriately adopted Basin Plan amendment concerning a compliance schedule provision would also be effective for the Basin.

G. Executive Order (E.O.) 12866, Regulatory Planning and Review

Under Executive Order 12866, [58 FR 51,735 (October 4, 1993)] the Agency must determine whether the regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

It has been determined that this rule is not a ''significant regulatory action'' under the terms of Executive Order (E.O.) 12866 and is therefore not subject to OMB review. The proposed rule establishes ambient water quality criteria which, by themselves, do not directly impose economic impacts. When these criteria are combined with the State-adopted designated uses for inland surface waters, enclosed bays and estuaries, water quality standards will be created. EPA acknowledges that there may be a cost to some dischargers for complying with new water quality standards after those standards are translated into specific National Pollutant Discharge Elimination System (NPDES) permit limits by the State. Consistent with the intent of E.O. 12866, EPA prepared an Economic Analysis (EA). Since the State has significant flexibility and discretion in how it chooses to implement standards within the NPDES permit program, the EA by necessity includes many assumptions about how the State will implement the water quality standards. These assumptions are based on a combination of EPA guidance and current permit conditions for the facilities examined in this analysis. (This is appropriate because if the State does not adopt statewide implementation provisions, the rule-based water quality standards would be implemented using existing State basin plan provisions, and EPA regulations and guidance.) A more precise measure of costs and benefits may not be known until the State adopts its implementation provisions. To account for the uncertainty of these assumptions, this analysis estimates a wide range of costs and benefits. By completing the EA, EPA intends to inform the public about how entities might be affected by implementation of rule-based water quality standards in the NPDES permit program.

1. Baselines

In order to estimate the costs and benefits, an appropriate baseline must be established. The baseline is the starting point for measuring incremental costs and benefits of a proposed regulation. The baseline is established by assessing what would occur in the absence of the proposed regulation. EPA estimated the incremental costs and benefits of potential State implementation of water quality standards based on the criteria

contained in today's proposed rule using two different models which used different baselines.

The first model used a baseline that results in no incremental impacts. This baseline assumes that, in the absence of this rule, the State would, pursuant to the NPDES regulations, 40 CFR 122.44(d)(iv), rely on the Regional Board narrative standards to establish numeric water quality-based effluent limits in permits. These limits could be based on the latest EPA 304(a) criteria—the same information upon which today's proposed criteria are based, or supplemented where necessary by other relevant information. Under this scenario, no impacts would be attributed permit limits based on implementation of water quality standards using the criteria contained in today's proposed rule, since the analysis presumes that the State, in the absence of this rule, would implement effluent limits that are as stringent as those that would be implemented using water quality standards based on today's proposed criteria.

The baseline used in the second model assumes that in the absence of the rule, current permit requirements and current effluent concentrations would continue into the future. This model generally uses a baseline of current permit limits to develop a high scenario cost estimate and a baseline of current effluent concentrations to develop a low scenario cost estimate. Using this second model, EPA estimated a range of potential costs that would result from State implementation of this rule's water quality criteria in NPDES permits. The costs and benefits sections that follow summarize the methodology and results of the analysis using this baseline.

2. Costs

Under the second model, EPA assessed the estimated compliance costs that facilities may incur to meet permit limits based on the criteria in today's proposed rule. The analysis focused on direct compliance costs such as capital costs and operation and maintenance costs (O&M) for end-of-pipe pollution control, indirect source controls, pollution prevention, monitoring, and costs of pursuing alternative methods of compliance.

The population of facilities with NPDES permits that discharge into California's enclosed bays, estuaries and inland surface waters includes 184 major dischargers and 1,057 minor dischargers. Of the 184 major facilities, 128 are publicly owned treatment works (POTWs) and 56 are industrial facilities. Approximately 2,144 indirect dischargers designated as significant industrial users discharge wastewater to those POTWs. For the direct dischargers, EPA used a three-phased process to select a sample of facilities to represent California dischargers potentially affected by the State's implementation of permit limits based on the criteria contained in this rule.

The first phase consisted of choosing three case study areas for which data was thought to exist. The three case studies with a total of 5 facilities included: the South San Francisco Bay (the San Jose/Santa Clara Water Pollution Control Plant and Sunnyvale Water Pollution Control Plant); the Sacramento River (the Sacramento Regional Wastewater Treatment Plant); and the Santa Ana River (the City of Riverside Water Quality Control Plant and the City of Colton Municipal Wastewater Treatment Facility). The second phase consisted of selecting five additional major industrial dischargers to complement the case-study POTWs.

The third and last selection phase involved selecting 10 additional facilities to improve the basis for extrapolating the costs of the selected sample facilities to the entire population of potentially affected dischargers. The additional 10 facilities were selected such that the group examined: (1) Was divided between major POTWs and major industrial discharger categories in proportion to the numbers of facilities in the State; (2) gave greater proportionate representation to major facilities than minor facilities based on a presumption that the majority of compliance costs would be incurred by major facilities; (3) gave a proportionate representation to each of four principal conventional treatment processes typically used by facilities in specified industries in California; and (4) was representative of the proportionate facilities located within the different California Regional Water Quality Control Boards. Within these constraints, facilities were selected at random to complete the sample.

For those facilities that were projected to exceed permit limits based on the proposed criteria, EPA estimated the incremental costs of compliance. Using a decision matrix or flow chart, costs were developed for two different scenarios—a ''low-end'' cost scenario and a ''high-end'' cost scenario—to account for a range of regulatory flexibility available to the State when implementing permit limits based on the proposed water quality criteria. The assumptions for baseline loadings also vary over the two scenarios. The low-end scenario generally assumed that facilities were discharging at the maximum effluent concentrations taken from actual monitoring data, while the high-end scenario generally assumed that facilities were discharging at their current effluent limits. The decision matrix specified assumptions used for selection of control options, such as optimization of existing treatment processes and operations, in-plant pollutant minimization and prevention, and end-of-pipe treatment.

Under this second baseline, where California is not presumed to implement narrative criteria pursuant to 40 CFR 122.44(d) in all permits, the annualized potential costs that direct and indirect dischargers may incur as a result of State implementation of permit limits based on water quality standards using today's proposed criteria are estimated to be between $15 million and $87 million. EPA believes that the costs incurred as a result of State implementation of these permit limits will approach the low-end of the cost range. Costs are unlikely to reach the high-end of the range because State authorities are likely to choose implementation options that provide some degree of flexibility or relief to point source dischargers. Furthermore, cost estimates for both scenarios, but especially for the high-end scenario, may be overstated because the analysis tended to use conservative assumptions in calculating these permit limits and in establishing baseline loadings. The baseline loadings for the high-end were based on current effluent limits rather than actual pollutant discharge data. Most facilities discharge pollutants in concentrations well below current effluent limits.

Under the low-end cost scenario, major industrial facilities and POTWs incur about 65 percent of the potential costs, and indirect dischargers incur about 35 percent of the potential costs. Among the direct dischargers, two categories incur the majority of potential costs: POTWs (67 percent), and Chemical/Petroleum Products (18 percent). The two highest average cost categories are Metals and Transportation Equipment ($57,000 per year) and POTWs ($27,000 per year). About 20 percent of the low-end costs are associated with pollution prevention activities, while 70 percent are associated with pursuing alternative methods of compliance under the regulations.

Under the high-end cost scenario, major industrial facilities and POTWs incur about 96 percent of the potential costs, and indirect dischargers incur about 4 percent of the potential costs. Among the direct dischargers, three categories incur the majority of potential

costs—POTWs (70 percent), Chemical/Petroleum Products (18 percent), and Metals and Transportation Equipment (8 percent). The average annual per plant cost for different industry categories ranges from zero to $816,000. The two highest average cost categories under the second baseline are Metals and Transportation Equipment ($816,000 per year) and Chemical/Petroleum Products ($678,000 per year). The shift in proportion of potential costs between direct and indirect dischargers is due to the assumption that more direct dischargers will use end-of-pipe treatment under the high-end scenario. Thus, a smaller proportion of indirect dischargers (10 percent) are impacted under the high-end scenario, since municipalities would add end-of-pipe treatment which would reduce the need for controls from indirect discharges. About 90 percent of the costs are for capital and operating costs for wastewater treatment while about 10 percent of the high-end costs are associated with pollution prevention activities.

Cost-Effectiveness: Cost-effectiveness is estimated in terms of the cost of reducing the loadings of toxic pollutants from point sources. The cost-effectiveness is derived by dividing the annual costs of implementing permit limits based on water quality standards using today's proposed criteria by the toxicity-weighted pounds (pound-equivalents) of pollutants removed. Pound-equivalents are calculated by multiplying pounds of each pollutant removed by the toxic weight (based on the toxicity of copper) for that pollutant.

Based on this analysis, State implementation of permit limits based on today's proposed criteria would be responsible for the reduction of about 630,000 to 7 million toxic pound-equivalents per year, or 18 to 30 percent of the toxic-weighted baseline for the low- and high-end scenarios, respectively. The cost-effectiveness of the scenarios ranges from $8 to $12 per pound-equivalent.

3. Benefits

The benefits analysis is intended to provide insight into both the types and potential magnitude of the economic benefits expected as a result of implementation of water quality standards based on today's proposed criteria. To the extent feasible, empirical estimates of the potential magnitude of the benefits are developed and then compared to the estimated costs of implementing water quality standards based on today's proposed criteria.

To perform a benefits analysis, the types or categories of benefits that apply need to be defined. EPA relied on a set of benefits categories that typically applies to changes in the water resource environment. Benefits were categorized as either use benefits or passive (nonuse) benefits depending on whether or not they involve some source of direct use of, or contact with, the resource. The most prominent use benefit categories are those related to recreational fishing, boating, and swimming. Another use benefit category of significance is human health risk reduction. Human health risk reductions can be realized through actions that reduce human exposure to contaminants such as exposure through the consumption of fish containing elevated levels of pollutants. Passive use benefits are those improvements in environmental quality that are valued by individuals apart from any use of the resource in question.

Benefits estimates were derived in this study using an approach in which benefits of discrete large-scale changes in water quality beyond present day conditions were estimated wherever feasible. A share of those benefits was then apportioned to implementation of water quality standards based on today's proposed criteria. The apportionment estimate was based on a three-stage process:

First, EPA assessed current total loadings from all sources that are contributing to the toxics-related water quality problems observed in the State. This defines the overall magnitude of loadings. Second, the share of total loadings that are attributable to sources that would be controlled through implementation of water quality standards based on today's proposed criteria was estimated. Since this analysis was designed to focus only on those controls imposed on point sources, this stage of the process entailed estimating the portion of total loadings originating from point sources. Third, the percentage reduction in loadings expected due to implementation of today's proposed criteria was estimated and then multiplied by the share of point source loadings to calculate the portion of benefits that could be attributed to implementation of water quality standards based on today's proposed criteria.

Total monetized annual benefits were estimated in the range of $1.5 to $51.7 million. By category, annual benefits were $0.0 to $5.3 million for avoided cancer risk, $0.6 to $10.1 million for recreational angling, and $0.9 to $36.3 million for passive use benefits.

There are numerous categories of potential or likely benefits that have been omitted from the quantified and monetized benefit estimates. In terms of potential magnitudes of benefit, the following are likely to be significant contributors to the underestimation of the monetized values presented above:

- Improvements in water-related (in-stream and near stream) recreation apart from fishing. The omission of potential motorized and nonmotorized boating, swimming, picnicking, and related in-stream and stream-side recreational activities from the benefits estimates could contribute to an appreciable underestimation of total benefits. Such recreational activities have been shown in empirical research to be highly valued, and even modest changes in participation and or user values could lead to sizable benefits statewide. Some of these activities can be closely associated with water quality attributes (notably, swimming). Other recreational activities may be less directly related to the water quality improvements, but might nonetheless increase due to their association with fishing, swimming, or other activities in which the participants might engage.
- Improvements in consumptive and nonconsumptive land-based recreation, such as hunting and wildlife observation. Improvements in aquatic habitats may lead (via food chain and related ecologic benefit mechanisms) to healthier, larger, and more diverse populations of avian and terrestrial species, such as waterfowl, eagles, and otters. Improvements in the populations for these species could manifest as improved hunting and wildlife viewing opportunities, which might in turn increase participation and user day values for such activities. Although the scope of the benefits analysis has not allowed a quantitative assessment of these values at either baseline or post-rule conditions, it is conceivable that these benefits could be appreciable.
- Improvements in human health resulting from reduction of non-cancer risk. EPA estimated that implementation of water quality standards based on the proposed criteria would result in a reduction of mercury concentrations in fish tissue and, thus, a reduction in the hazard from consumption of mercury contaminated fish. However, EPA was unable to monetize benefits due to reduced non-cancer health effects.
- Human health benefits for saltwater anglers outside of San Francisco Bay were not estimated. The number of saltwater anglers outside of San Francisco Bay is estimated to be 673,000 (based on Huppert, 1989, and U.S. FWS, 1993). The omission of other saltwater anglers may cause human health benefits to be underestimated.

H. Executive Order 12875, Enhancing the Intergovernmental Partnership

In compliance with Executive Order (E.O.) 12875 (58 FR 58093, October 28, 1993), EPA has involved the State and local governments in the development of this rule. In addition to the significant participation by State and local governments, several specific activities have been carried out. These include:

(1) In early August 1995, EPA published and distributed to approximately 4,000 recipients, a four-page newsletter to notify California stakeholders that EPA would be proposing criteria for priority toxic pollutants, and to invite interested parties to a public meeting in late August 1995. The extensive distribution list came from the State's interested stakeholder list developed for its readoption of water quality control plans.

(2) On August 24, 1995, EPA held two public meetings (one on the morning and one in the afternoon) to discuss the EPA' s promulgation with stakeholders and to answer any specific concerns. EPA announced that it would meet with any stakeholder group independently to discuss their group's concerns.

(3) Since approximately December of 1993, EPA has been holding public Focus Group Meetings with the discharger community and the State to inform them of EPA's progress on the rulemaking and to learn about the State's progress on the readoption of its statewide water quality control plans. Over the last three and one-half years, EPA has held over 12 meetings.

(4) In October of 1995, EPA and the State met with several leaders of the California's environmental community to discuss EPA's process and progress on its promulgation project and the State's process and progress on its readoption of statewide water quality control plans.

(5) In December of 1994 and in March of 1996, EPA participated in the State's public meetings for its readoption of statewide plans. At each meeting, EPA gave a short update on its progress of promulgating toxic criteria and then answered specific questions from interested parties.

(6) From April to October of 1995, EPA participated extensively in all eight of the State's Stakeholder Task Force groups which met monthly to discuss the State's readoption of statewide water quality control plans. When appropriate, EPA discussed its promulgation project and answered stakeholder questions concerning it.

EPA plans to continue this extensive outreach to its stakeholder groups. Contact the person listed under the **FOR FURTHER INFORMATION CONTACT** section at the beginning of this preamble for more information.

I. The Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), establishes requirements for federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, a federal agency generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with a ''federal mandate'' that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating any regulation for which a written statement is needed, section 205 of the UMRA generally requires the agency to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows an agency to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the agency's Administrator publishes with the final rule an explanation why that alternative was not adopted. Before a federal agency establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of the affected small governments to have meaningful and timely input in the development of regulatory proposals with significant federal intergovernmental mandates, and for informing, educating, and advising small governments on compliance with the regulatory requirements. While EPA does not believe the rule would significantly or uniquely affect small governments, EPA has nevertheless made outreach efforts to small governments as is outlined in its small government agency plan.

EPA has determined that this rule does not contain a federal mandate that may result in expenditures by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. The proposed rule imposes no direct enforceable duties on the State or any local government or on the private sector; rather, this rule proposes ambient water quality criteria which, when combined with State-adopted designated uses, will create water quality standards for those water bodies with adopted uses. The State may use these resulting water quality standards in implementing its existing water quality control programs. Today's proposed rule does not directly regulate or affect any entity and, therefore, is not subject to the requirements of sections 202 and 205 of the UMRA.

As discussed above, EPA has examined the range of possible indirect impacts from State implementation of the rule in the National Pollutant Discharge Elimination System (NPDES) permit program. As discussed above in Section G, the State has significant flexibility in establishing and implementing NPDES permit limits. As a result, the analysis makes many assumptions concerning how the State will implement the water quality standards in the NPDES permit program. These assumptions are discussed in the analysis. The actual effect on any group of stakeholders is greatly dependent on the State's implementation.

J. The Regulatory Flexibility Act

Under the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*), federal agencies generally are required to conduct an initial regulatory flexibility analysis (IRFA) describing the impact of the regulatory action on small entities as part of a proposed rulemaking. However, under section 605(b) of the RFA, if the Administrator for the agency certifies that the proposed rule will not have a significant economic impact on a substantial number of small entities, the agency is not required to prepare an IRFA. The Administrator is today certifying, pursuant to section 605(b) of the RFA, that this proposed rule will not have a significant impact on a substantial number of small entities. Therefore, the Agency did not prepare an initial regulatory flexibility analysis.

The RFA requires analysis of the impacts of a rule on the small entities subject to the rules' requirements. See *United States Distribution Companies* v. *FERC*, 88 F.3d 1105, 1170 (D.C. Cir. 1996). Today's rule establishes no requirements applicable to small entities, and so is not susceptible to regulatory flexibility analysis as prescribed by the RFA. (''[N]o [regulatory flexibility] analysis is necessary when an agency determines that the rule will not have a significant economic impact on a substantial

number of small entities that are subject to the requirements of the rule,'' *United Distribution* at 1170, quoting *Mid-Tex Elec. Co-op* v. *FERC*, 773 F.2d 327, 342 (D.C. Cir. 1985) (emphasis added by *United Distribution* court).) The Agency is thus certifying that today's rule will not have a significant economic impact on a substantial number of small entities, within the meaning of the RFA.

Under the CWA water quality standards program, states must adopt water quality standards for their waters that must be submitted to EPA for approval; if the Agency disapproves a state standard and the state does not adopt appropriate revisions to address EPA's disapproval, EPA must promulgate standards consistent with the statutory requirements. EPA has authority to promulgate criteria or standards in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of the Act. These state standards (or EPA-promulgated standards) are implemented through various water quality control programs including the National Pollutant Discharge Elimination System (NPDES) program that limits discharges to navigable waters except in compliance with an EPA permit or permit issued under an approved state program. The CWA requires that all NPDES permits must include any limits on discharges that are necessary to meet state water quality standards.

Thus, under the CWA, EPA's promulgation of water quality criteria or standards establishes standards that the state implements through the NPDES permit process. The state has discretion in deciding how to meet the water quality standards and in developing discharge limits as needed to meet the standards. While the state's implementation of federally-promulgated water quality criteria or standards *may* result in new or revised discharge limits being placed on small entities, the criteria or standards themselves do not apply to any discharger, including small entities.

Today's rule, as explained above, does not itself establish any requirements that are applicable to small entities. As a result of EPA's action here, the State of California will need to ensure that permits it issues comply with the water quality standards established by the criteria in today's proposed rule. In so doing, the State will have a number of discretionary choices associated with permit writing. While California's implementation of today's rule may ultimately result in some new or revised permit conditions for some dischargers, including small entities, EPA's action today does not impose any of these as yet unknown requirements on small entities.

Although the statute does not require EPA to prepare an IRFA when it proposes water quality criteria which will establish water quality standards for California, EPA has undertaken an analysis equivalent to an IRFA. This analysis focuses on State and local implementation procedures related to the NPDES permit program. This analysis is included in a document entitled, Implementation Analysis of Ambient Water Quality Criteria for Priority Toxic Pollutants in California which is part of the administrative record for this rulemaking. This document looks at the many implementation procedures of the NPDES permit program that the State implements to control pollutants from point source discharges. The procedures discussed in the document include: methods to calculate water quality-based effluent limits; mixing zones; site-specific translators for metals criteria; compliance schedules; effluent trading; water-effect ratios; variances; designated use reclassification; and site-specific criteria. Each of these implementation procedures can have an effect on how water quality standards, based on the criteria in today's proposed rule, will impact NPDES permit holders. Many of these procedures will lessen impacts on regulated entities.

The document also looks at implementation procedures used in the pretreatment program to control pollutant discharges from indirect dischargers. Indirect dischargers include retail, commercial, and small industrial facilities that discharge to publicly owned treatment works (POTWs). Local entities have significant flexibility to implement their pretreatment programs. These procedures include: methods to calculate local limits (allocation of pollutants); methods of pollution prevention for various specific sources; pretreatment pollutant trading; methods of low cost pollutant reductions; technical assistance to move toward or achieve zero-discharge; cost accounting to drive down levels of discharges; and a few of the regulatory relief options discussed in the direct discharger section, e.g., compliance schedules.

The discussion illustrates the significant amount of flexibility available to the State and local agencies when implementing the NPDES permit program and pretreatment program and emphasizes that appropriate use of the available implementation tools can greatly affect the impact to many direct and indirect dischargers.

K. The Paperwork Reduction Act

This action requires no new or additional information collection subject to the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, and therefore no information collection request will be submitted to the Office of Management and Budget for review.

L. The Endangered Species Act

Pursuant to section 7(a) of the Endangered Species Act (ESA), EPA is consulting with the U.S. Fish and Wildlife Service (FWS) and the U.S. National Marine Fisheries Service (NMFS) concerning EPA's rulemaking action for the State of California. EPA has initiated informal consultation, and will complete informal and formal, if necessary, consultation before final action on the final rule. As a result of this consultation, EPA may modify some provisions of this proposed rule.

As part of the ESA process, EPA will submit to FWS and NMFS a Biological Evaluation for their review. When submitted, this document will become part of the administrative record for this rulemaking. If EPA initiates formal consultation, the FWS and NMFS would issue a Biological Opinion which may include Reasonable and Prudent Alternatives (RPAs). EPA will then make decisions regarding implementation of any RPAs. EPA, FWS and NMFS will continue to work closely together on this ESA consultation process.

List of Subjects In 40 CFR Part 131

Environmental protection, Indian-lands, Water pollution control, Water quality standard, Toxic pollutant.

Dated: July 25, 1997.

Carol Browner,

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: 33 U.S.C. 1251 *et seq.*

Subpart D—[Amended]

2. Section 131.38 is added to subpart D to read as follows:

§ 131.38 Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California.

(a) *Scope.* This section is a general promulgation of criteria for priority toxic pollutants in the State of

California for inland surface waters and enclosed bays and estuaries. This section also contains a compliance schedule provision.

(b)(1) Criteria for Priority Toxic Pollutants in the State of California.

BILLING CODE 6560–50–P

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
						For Consumption of:	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
1. Antimony	7440360					14 a,s	4300 a,t
2. Arsenic	7440382	340 i,m,w	150 i,m,w	69 i,m	36 i,m		
3. Beryllium	7440417					n	n
4. Cadmium	7440439	4.3 e,i,m, w,x	2.2 e,i,m, w	42 i,m	9.3 i,m	n	n
5a. Chromium (III)	16065831	550 e,i,m, o	180 e,i,m, o			n	n
5b. Chromium (VI)	18540299	16 i,m,w	11 i,m,w	1100 i,m	50 i,m	n	n
6. Copper	7440508	13 e,i,m, w,x	9.0 e,i,m, w	4.8 i,m	3.1 i,m	1300	
7. Lead	7439921	65 e,i,m	2.5 e,i,m	210 i,m	8.1 i,m	n	n
8. Mercury	7439976	1.4 i,m,w	0.77 i,m,w	1.8 i,m	0.94 i,m	0.050 a	0.051 a
9. Nickel	7440020	470 e,i,m, w	52 e,i,m, w	74 i,m	8.2 i,m	610 a	4600 a
10. Selenium	7782492	p	5.0 q	290 i,m	71 i,m	n	n
11. Silver	7440224	3.4 e,i,m		1.9 i,m			
12. Thallium	7440280					1.7 a,s	6.3 a,t
13. Zinc	7440666	120 e,i,m,	120 e,i,m,	90 i,m	81 i,m		

		w,x	w				
14. Cyanide	57125	22 o	5.2 o	1 r	1 r	700 a	220,000 a,j

A		B FRESHWATER		C SALTWATER		D HUMAN HEALTH For Consumption of:	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
15. Asbestos	1332214					7,000,000 fibers/L k,s	
16. 2,3,7,8 Tetrachloro-dibenzo-p-dioxin (TCDD or Dioxin)	1746016					0.000000013 c	0.000000014 c
17. Acrolein	107028					320 s	780 t
18. Acrylonitrile	107131					0.059 a,c,s	0.66 a,c,t
19. Benzene	71432					1.2 a,c	71 a,c
20. Bromoform	75252					4.3 a,c	360 a,c
21. Carbon Tetrachloride	56235					0.25 a,c,s	4.4 a,c,t
22. Chlorobenzene	108907					680 a,s	21,000 a,j,t
23. Chlorodibromomethane	124481					0.41 a,c	34 a,c
24. Chloroethane	75003						
25. 2-Chloroethylvinyl Ether	110758						

Compound	CAS Number	B FRESHWATER CMC d (ug/L) B1	B FRESHWATER CCC d (ug/L) B2	C SALTWATER CMC d (ug/L) C1	C SALTWATER CCC d (ug/L) C2	D HUMAN HEALTH For Consumption of: Water & Organisms (ug/L) D1	D HUMAN HEALTH For Consumption of: Organisms Only (ug/L) D2
26. Chloroform	67663					5.7 a,c	470 a,c
27. Dichlorobromomethane	75274					0.56 a,c	46 a,c
28. 1,1-Dichloroethane	75343						
29. 1,2-Dichloroethane	107062					0.38 a,c,s	99 a,c,t
30. 1,1-Dichloroethylene	75354					0.057 a,c,s	3.2 a,c,t
31. 1,2-Dichloropropane	78875					0.52 a	39 a
32. 1,3-Dichloropropylene	542756					10 a,s	1,700 a,t
33. Ethylbenzene	100414					3,100 a,s	29,000 a,t
34. Methyl Bromide	74839					48 a	4,000 a
35. Methyl Chloride	74873					n	n
36. Methylene Chloride	75092					4.7 a,c	1,600 a,c
37. 1,1,2,2-Tetrachloroethane							

	79345					0.17 a,c,s	11 a,c,t
38. Tetrachloroethylene	127184					0.8 c,s	8.85 c,t
39. Toluene	108883					6,800 a	200,000 a
40. 1,2-Trans-Dichloroethylene	156605					700 a	140,000 a

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	For Consumption of: Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
41. 1,1,1-Trichloroethane	71556					n	n
42. 1,1,2-Trichloroethane	79005					0.60 a,c,s	42 a,c,t
43. Trichloroethylene	79016					2.7 c,s	81 c,t
44. Vinyl Chloride	75014					2 c,s	525 c,t
45. 2-Chlorophenol	95578					120 a	400 a
46. 2,4-Dichlorophenol	120832					93 a,s	790 a,t
47. 2,4-Dimethylphenol	105679					540 a	2,300 a

48. 2-Methyl- 4,6-Dinitrophenol	534521					13.4 s	765 t
49. 2,4-Dinitrophenol	51285					70 a,s	14,000 a,t
50. 2-Nitrophenol	88755						
51. 4-Nitrophenol	100027						
52. 3-Methyl 4-Chlorophenol	59507						

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	For Consumption of: Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
53. Pentachlorophenol	87865	19 f,w	15 f,w	13	7.9	0.28 a,c	8.2 a,c,j
54. Phenol	108952					21,000 a	4,600,000 a,j,t
55. 2,4,6-Trichlorophenol	88062					2.1 a,c	6.5 a,c
56. Acenaphthene	83329					1,200 a	2,700 a
57. Acenaphthylene	208968						
58. Anthracene	120127					9,600 a	110,000 a

59. Benzidine	92875					0.00012 a,c,s	0.00054 a,c,t
60. Benzo(a)Anthracene	56553					0.0044 a,c	0.049 a,c
61. Benzo(a)Pyrene	50328					0.0044 a,c	0.049 a,c
62. Benzo(b)Fluoranthene	205992					0.0044 a,c	0.049 a,c
63. Benzo(ghi)Perylene	191242						
64. Benzo(k)Fluoranthene	207089					0.0044 a,c	0.049 a,c

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
						For Consumption of:	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
65. Bis(2-Chloroethoxy)Methane	111911						
66. Bis(2-Chloroethyl)Ether	111444					0.031 a,c,s	1.4 a,c,t
67. Bis(2-Chloroisopropyl)Ether	108601					1,400 a	170,000 a,t
68. Bis(2-Ethylhexyl)Phthalate	117817					1.8 a,c,s	5.9 a,c,t

69. 4-Bromophenyl Phenyl Ether	101553						
70. Butylbenzyl Phthalate	85687					3000 a	5200 a
71. 2-Chloronaphthalene	91587					1,700 a	4,300 a
72. 4-Chlorophenyl Phenyl Ether	7005723						
73. Chrysene	218019					0.0044 a,c	0.049 a,c
74. Dibenzo(a,h)Anthracene	53703					0.0044 a,c	0.049 a,c
75. 1,2 Dichlorobenzene	95501					2,700 a	17,000 a
76. 1,3 Dichlorobenzene	541731					400	2,600

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
						For Consumption of:	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
77. 1,4 Dichlorobenzene	106467					400	2,600
78. 3,3 Dichlorobenzidine	91941					0.04 a,c,s	0.077 a,c,t
79. Diethyl Phthalate	84662					23,000 a,s	120,000 a,t

80. Dimethyl Phthalate	131113					313,000 s	2,900,000 t
81. Di-n-Butyl Phthalate	84742					2,700 a,s	12,000 a,t
82. 2,4-Dinitrotoluene	121142					0.11 c,s	9.1 c,t
83. 2,6-Dinitrotoluene	606202						
84. Di-n-Octyl Phthalate	117840						
85. 1,2-Diphenylhydrazine	122667					0.040 a,c,s	0.54 a,c,t
86. Fluoranthene	206440					300 a	370 a
87. Fluorene	86737					1,300 a	14,000 a
88. Hexachlorobenzene	118741					0.00075 a,c	0.00077 a,c

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	For Consumption of: Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2
89. Hexachlorobutadiene	87683					0.44 a,c,s	50 a,c,t
90. Hexachlorocyclopentadiene	77474					240 a,s	17,000 a,j,t

Compound	CAS Number	B FRESHWATER CMC d (ug/L) B1	B FRESHWATER CCC d (ug/L) B2	C SALTWATER CMC d (ug/L) C1	C SALTWATER CCC d (ug/L) C2	D HUMAN HEALTH For Consumption of: Water & Organisms (ug/L) D1	D HUMAN HEALTH For Consumption of: Organisms Only (ug/L) D2
91. Hexachloroethane	67721					1.9 a,c,s	8.9 a,c,t
92. Indeno(1,2,3-cd)Pyrene	193395					0.0044 a,c	0.049 a,c
93. Isophorone	78591					8.4 c,s	600 c,t
94. Naphthalene	91203						
95. Nitrobenzene	98953					17 a,s	1,900 a,j,t
96. N-Nitrosodimethylamine	62759					0.00069 a,c,s	8.1 a,c,t
97. N-Nitrosodi-n-Propylamine	621647					0.005 a	1.4 a
98. N-Nitrosodiphenylamine	86306					5.0 a,c,s	16 a,c,t
99. Phenanthrene	85018						
100. Pyrene	129000					960 a	11,000 a
101. 1,2,4-Trichlorobenzene	120821						

102. Aldrin	309002	3 g		1.3 g		0.00013 a,c	0.00014 a,c
103. alpha-BHC	319846					0.0039 a,c	0.013 a,c
104. beta-BHC	319857					0.014 a,c	0.046 a,c
105. gamma-BHC	58899	0.95 w		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 a,c	0.00059 a,c
108. 4,4'-DDT	50293	1.1 g	0.001 g	0.13 g	0.001 g	0.00059 a,c	0.00059 a,c
109. 4,4'-DDE	72559					0.00059 a,c	0.00059 a,c
110. 4,4'-DDD	72548					0.00083 a,c	0.00084 a,c
111. Dieldrin	60571	0.24 w	0.056 w	0.71 g	0.0019 g	0.00014 a,c	0.00014 a,c
112. alpha-Endosulfan	959988	0.22 g	0.056 g	0.034 g	0.0087 g	110 a	240 a
113. beta-Endosulfan	33213659	0.22 g	0.056 g	0.034 g	0.0087 g	110 a	240 a
114. Endosulfan Sulfate	1031078					110 a	240 a

A		B		C		D	
		FRESHWATER		SALTWATER		HUMAN HEALTH	
Compound	CAS Number	CMC d (ug/L) B1	CCC d (ug/L) B2	CMC d (ug/L) C1	CCC d (ug/L) C2	For Consumption of: Water & Organisms (ug/L) D1	Organisms Only (ug/L) D2

115. Endrin 72208	0.086 w	0.036 w	0.037 g	0.0023 g	0.76 a	0.81 a,j
116. Endrin Aldehyde 7421934					0.76 a	0.81 a,j
117. Heptachlor 76448	0.52 g	0.0038 g	0.053 g	0.0036 g	0.00021 a,c	0.00021 a,c
118. Heptachlor Epoxide 1024573	0.52 g	0.0038 g	0.053 g	0.0036 g	0.00010 a,c	0.00011 a,c
119.- 125. Polychlorinated biphenyls (PCBs)		0.014 g,u		0.03 g,u	0.00017 v	0.00017 v
126. Toxaphene 8001352	0.73	0.0002	0.21	0.0002	0.00073 a,c	0.00075 a,c
TOTAL NUMBER OF CRITERIA (h):	24	28	23	27	99	97

BILLING CODE 6560–50–C

Footnotes:

a. These criteria have been revised to reflect the Agency q1* or RfD, as contained in the Integrated Risk Information System (IRIS) as of October 1, 1996. The fish tissue bioconcentration factor (BCF) from the 1980 documents was retained in each case.

b. This letter is not used as a footnote.

c. These criteria are based on carcinogenicity of 10 (−6) risk.

d. The Criteria Maximum Concentration (CMC) equals the highest concentration of a pollutant to which aquatic life can be

exposed for a short period of time without deleterious effects. Criteria Continuous Concentration (CCC) equals 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 equals micrograms per liter.

e. These freshwater aquatic life criteria for metals are expressed as a function of total hardness (mg/l) in the water body. The equations are provided in matrix at paragraph (b)(2) of this section. Values displayed above in the matrix correspond to a total hardness of 100 mg/l.

f. These 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. These 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) which by the 1980 Guidelines are instantaneous values as contrasted with a CMC which is a short-term average.

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. For human health, there are 100 priority toxic pollutants with either ''water + organism'' or ''organism only'' criteria. 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 criteria for chromium to reflect the fact that this list of 126 priority pollutants includes only a single listing for chromium.

i. Criteria for these metals are expressed as a function of the water-effect ratio, WER, as defined in paragraph (c) of this section.
CMC=column B1 or C1 value×WER;
CCC=column B2 or C2 value×WER.

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, 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. This criterion for asbestos is the MCL (40 CFR 131.36).

l. This letter is not used as a footnote.

m. These freshwater and saltwater criteria for metals are expressed in terms of the dissolved fraction of the metal in the water column. Criterion values were calculated by using EPA's Clean Water Act 304(a) guidance values (described in the total recoverable fraction) and then applying the conversion factors.

n. EPA is not promulgating human health criteria for these contaminants. However, permit authorities should address these contaminants in NPDES permit actions using the State's existing narrative criteria for toxics.

o. These criteria were promulgated for specific waters in California in the National Toxics Rule (''NTR''), codified at 40 CFR 131.36, December 22, 1992, as amended by May 4, 1995. The specific waters to which the NTR criteria apply include: Waters of the State defined as bays or estuaries and waters of the State defined as inland, i.e., all surface waters of the State not ocean waters. These waters specifically include the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta.

Note: This section does not supersede § 131.36 (the NTR, as amended), for this criterion.

p. The CMC = 1/[(f1/CMC1) + (f2/CMC2)] where f1 and f2 are the fractions of total selenium that are treated as selenite and selenate respectively, and f1 + f2 = 1. CMC1 and CMC2 are the CMCs for selenite and selenate, respectively, or 185.9 ug/l and 12.83 ug/l, respectively. This criterion is in the total recoverable form. A criterion of 20 ug/l was promulgated for specific waters in California in the NTR, as amended, and was promulgated in the total recoverable form. The specific waters to which the NTR criterion applies include: Waters of the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta; and waters of Salt Slough, Mud Slough (north) and the San Joaquin River, Sack Dam to the mouth of the Merced River.

Note: This rule does not supersede § 131.36 (the NTR, as amended), for this criterion. The criterion in this section applies to additional waters of the United States in the State of California by this rulemaking.

Note also: The State of California adopted and EPA approved a site specific criterion for the San Joaquin River, mouth of Merced to Vernalis; therefore, this criterion does not apply to these waters.

q. This criterion is in the total recoverable form. This criterion was promulgated for specific waters in California in the NTR, as amended, and was promulgated in the total recoverable form. The specific waters to which the NTR criterion applies include: Waters of the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta; and waters of Salt Slough, Mud Slough (north) and the San Joaquin River, Sack Dam to Vernalis.

Note: This section does not supersede § 131.36 (the NTR, as amended), for this criterion. This criterion applies to additional waters of the United States in the State of California by this rulemaking.

Note also: The State of California adopted and EPA approved a site-specific criterion for the Grassland Water District, San Luis National Wildlife Refuge, and the Los Banos State Wildlife Refuge; therefore, this criterion does not apply to these waters.

r. These criteria were promulgated for specific waters in California in the NTR, as amended. The specific waters to which the NTR criteria apply include: Waters of the State defined as bays or estuaries including the San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta.

Note: This section does not supersede § 131.36 (the NTR, as amended), for these criteria.

s. These criteria were promulgated for specific waters in California in the NTR, as amended. The specific waters to which the NTR criteria apply include: Waters of the Sacramento-San Joaquin Delta and waters of the State defined as inland (i.e., all surface waters of the State not bays or estuaries or ocean) that include a MUN use designation.

Note: This section does not supersede § 131.36 (the NTR, as amended), for these criteria.

t. These criteria were promulgated for specific waters in California in the NTR, as amended. The specific waters to which the NTR criteria apply include: Waters of the State defined as bays and estuaries including San Francisco Bay upstream to and including Suisun Bay and the Sacramento-San Joaquin Delta; and waters of the State defined as inland (i.e., all surface waters of the State not bays or estuaries or ocean) without a MUN use designation.

Note: This section does not supersede § 131.36 (the NTR, as amended), for these criteria.

u. PCBs are a class of chemicals which include aroclors 1242, 1254, 1221, 1232, 1248, 1260, and 1016, CAS numbers 53469219, 11097691, 11104282, 11141165, 12672296, 11096825, and 12674112, respectively. The aquatic life criteria apply to this set of PCBs.

v. This criterion applies to total PCBs or congener or isomer analyses.

w. This criterion has been recalculated pursuant to the 1995 Updates: Water Quality Criteria Documents for the Protection of Aquatic Life in Ambient Water, Office of Water, EPA–820–B–96–001, September 1996. See also Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water, Office of Water, EPA–80–B–95–004, March 1995, available from the Water Resource Center, USEPA, 401 M St. SW., mail code RC 4100, Washington, DC 20460.

x. The State of California has adopted and EPA has approved site specific criteria for the Sacramento River (and tributaries) above Hamilton City; therefore, these proposed criteria do not apply to these waters.

General Notes

1. This chart lists all of EPA's priority toxic pollutants whether or not criteria guidance are available. Blank spaces indicate the absence of criteria guidance. 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): zinc, 3-methyl-4-chlorophenol.

3. For purposes of this section, freshwater criteria and saltwater criteria apply as specified in paragraph (c)(3) of this section.

(2) Factors for Calculating Metals Criteria:

$$CMC = WER \times (\text{Acute Conversion Factor}) \times (\exp\{m_A[\ln(\text{hardness})]+b_A\})$$

CCC = WER × (Chronic Conversion Factor) × (exp{m_C[ln(hardness)]+b_C})

Final CMC and CCC values should be rounded to two significant figures.

TABLE 1 TO PARAGRAPH (b)(2)

Metal	Conversion factor (CF) for freshwater acute criteria	CF for freshwater chronic criteria	CF for saltwater acute criteria	CF (a) for saltwater chronic criteria
Antimony	(d)	(d)	(d)	(d)
Arsenic	1.000	1.000	1.000	1.000
Beryllium	(d)	(d)	(d)	(d)
Cadmium (b)	0.944	0.909	0.994	0.994
Chromium (III)	0.316	0.860	(d)	(d)
Chromium (VI)	0.982	0.962	0.993	0.993
Copper	0.960	0.960	0.83	0.83
Lead (b)	0.791	0.791	0.951	0.951
Mercury	0.85	0.85	0.85	0.85
Nickel	0.998	0.997	0.990	0.990
Selenium	(c)	(c)	0.998	0.998
Silver	0.85	(d)	0.85	(d)
Thallium	(d)	(d)	(d)	(d)
Zinc	0.978	0.986	0.946	0.946

Footnotes:

(a) Conversion Factors for chronic marine criteria are not currently available. Conversion Factors for acute marine criteria have been used for both acute and chronic marine criteria.

(b) Conversion Factors for these pollutants are hardness dependent. CFs are based on a hardness of 100 mg/l as calcium carbonate ($CaCO_3$). Other hardness can be used; CFs should be recalculated using the following equations:

Cadmium: Acute: CF = 1.136672—[(ln{hardness})(0.041838)]

Chronic: CF = 1.101672—[(ln{hardness})(0.041838)]

Lead: Acute and Chronic: CF = 1.46203—[(ln{hardness})(0.145712)]

(c) Bioaccumulative compound and inappropriate to adjust to percent dissolved.

(d) EPA has not published an aquatic life criterion value.

Note: The term ''Conversion Factor'' represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. See ''Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria'', October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource Center, USEPA, 401 M St. SW., mail code RC 4100, Washington, DC 20460; and § 131.36(b)(1).

TABLE 2 TO PARAGRAPH (b)(2)

Metal	m_A	b_A	m_C	b_C
Cadmium	1.128	−3.6867	0.7852	−2.715
Copper	0.9422	−1.700	0.8545	−1.702
Chromium (III)	0.8190	3.688	0.8190	1.561
Lead	1.273	−1.460	1.273	−4.705
Nickel	0.8460	2.255	0.8460	0.0584
Silver	1.72	−6.52	.....	.....
Zinc	0.8473	0.884	0.8473	0.884

Note: The term ''exp'' represents the base e exponential function.

(c) *Applicability.* (1) The criteria in paragraph (b) of this section apply to the State's designated uses cited in paragraph (d) of this section and apply concurrently with any criteria adopted by the State, except when State regulations contain criteria which are more stringent for a particular parameter and use, or except as provided in footnotes p, q, and x in paragraph (b) of this section.

(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 other Federally-adopted and State-adopted 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.

(i) For all waters with 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 water body including at the point of discharge into the water body.

(ii) The State shall not use a low flow value below which numeric standards can be exceeded that is less stringent than the following for water 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) is 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 short-term average

not to be exceeded more than once every three years on the average;

CCC (Continuous Criteria Concentration) is the water quality criteria to protect against chronic effects in aquatic life and is the highest in stream 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 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 the State does not have such a low flow value below which numeric standards do not apply, then the criteria included in paragraph (d) or 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 95% or more of the time, 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 95% or more of the time, the applicable criteria are the saltwater criteria in Column C except for selenium in the San Francisco Bay estuary where the applicable criteria are the freshwater criteria in Column B (refer to footnotes p and q in section (b)(1) of this section); and

(iii) For waters in which the salinity is between 1 and 10 parts per thousand as defined in paragraphs (c)(3)(i) and (ii) of this section, the applicable criteria are the more stringent of the freshwater or saltwater criteria. However, the Regional Administrator may approve the use of the alternative freshwater or saltwater criteria if scientifically defensible information and data demonstrate that on a site-specific basis the biology of the water body is dominated by freshwater aquatic life and that freshwater criteria are more appropriate; or conversely, the biology of the water body 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 paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations. For waters with a hardness of over 400 mg/l as calcium carbonate, a hardness of 400 mg/l as calcium carbonate shall be used with a default Water-Effect Ratio (WER) of 1, or the actual hardness of the ambient surface water shall be used with a WER. The same provisions apply for calculating the metals criteria for the comparisons provided for in paragraph (c)(3)(iii) of this section.

(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.

(iii) The criteria for metals (compounds #1–#13 in paragraph (b) of this section) are expressed as dissolved except where otherwise noted. For purposes of calculating aquatic life criteria for metals from the equations in footnote i in the criteria matrix in paragraph (b)(1) of this section and the equations in paragraph (b)(2) of this section, the water effect ratio is generally computed as a specific pollutant's acute or chronic toxicity value measured in water from the site covered by the standard, divided by the respective acute or chronic toxicity value in laboratory dilution water. To use a water effect ratio other than the default of 1, the WER must be determined as set forth in Interim Guidance on Determination and Use of Water Effect Ratios, U.S. EPA Office of Water, EPA–823–B–94–001, February 1994, or alternatively, other scientifically defensible methods adopted by the State as part of its water quality standards program and approved by EPA. For calculation of criteria using site-specific values for both the hardness and the water effect ratio, the hardness used in the equations in paragraph (b)(2) of this section must be determined as required in paragraph (c)(4)(ii) of this section. Water hardness must be calculated from the measured calcium and magnesium ions present, and the ratio of calcium to magnesium should be approximately the same in standard laboratory toxicity testing water as in the site water.

(d)(1) Except as specified in paragraph (d)(3) of this section, all waters assigned any aquatic life or human health use classifications in the Water Quality Control Plans for the various Basins of the State (''Basin Plans''), as amended, adopted by the California State Water Resources Control Board (''SWRCB''), except for ocean waters covered by the Water Quality Control Plan for Ocean Waters of California (''Ocean Plan'') adopted by the SWRCB with resolution Number 90–27 on March 22, 1990, are subject to the criteria in paragraph (d)(2) of this section, without exception. These criteria apply to waters contained in the Basin Plans. More particularly, these criteria apply to waters in the Basin Plan chapters specifying water quality objectives (the State equivalent of federal water quality criteria) for the toxic pollutants identified in paragraph (d)(2) of this section. Although the State has adopted several use designations for each of these waters, for purposes of this action, the specific standards to be applied in paragraph (d)(2) of this section are based on the presence in all waters of some aquatic life designation and the presence or absence of the MUN use designation (municipal and domestic supply). (See Basin Plans for more detailed use definitions.)

(2) The following criteria from the matrix in paragraph (b)(1) of this section apply to the water and use classifications defined in paragraph (d)(1) of the section and identified below:

Water and use classification	Applicable Criteria
All inland waters of the United States or enclosed bays and estuaries that are waters of the United States that include a MUN use designation.	These waters are assigned the criteria in: Columns B1 and B2—all pollutants Columns C1 and C2—all pollutants Column D1—all pollutants
All inland waters of the United States or enclosed bays and estuaries that are waters of the United States that do not include a MUN use designation.	These waters are assigned the criteria in: Columns B1 and B2—all pollutants Columns C1 and C2—all pollutants Column D2—all pollutants

(3) Nothing in this section is intended to supersede specific criteria, including specific criteria for the San Francisco Bay estuary, promulgated for California in § 131.36.

(4) The human health criteria shall be applied at the State-adopted 10 (−6) risk level.

(5) Nothing in this section applies to waters located in Indian Country.

(e) *Schedules of Compliance:* (1) It is presumed that new and existing point source dischargers will promptly comply with any new or more restrictive water quality-based effluent limitations (''WQBELs'') based on the water quality criteria set forth in this section.

(2) When a permit issued on or after the effective date of this regulation to a new discharger contains a WQBEL based on water quality criteria set forth in the section, the permittee shall comply with such WQBEL upon the commencement of the discharge. A new discharger is defined as any building, structure, facility, or installation from which there is or may be a ''discharge of pollutants'' (as defined in 40 CFR 122.2) to the State of California's inland surface waters or enclosed bays and estuaries, the construction of which commenced after the effective date of this regulation.

(3) Where an existing discharger reasonably believes that it will be infeasible to promptly comply with a new or more restrictive WQBEL based on the water quality criteria set forth in this section, the discharger may request approval from the permit issuing authority for a schedule of compliance.

(4) A compliance schedule shall require compliance with WQBELs based on water quality criteria set forth in this section as soon as possible, taking into account the dischargers technical ability to achieve compliance with such WQBEL.

(5) If the schedule of compliance exceeds one year from the date of permit issuance, reissuance or modification, the schedule shall set forth interim requirements and dates for their achievement. The dates of completion between each requirement may not exceed one year. If the time necessary for completion of any requirement is more than one year and is not readily divisible into stages for completion, the permit shall require, at a minimum, specified dates for annual submission of progress reports on the status of interim requirements.

(6) In no event shall the permit issuing authority approve a schedule of compliance for a point source discharge which exceeds five years from the date of permit issuance, reissuance, or modification, whichever is sooner. Where shorter schedules of compliance are prescribed or schedules of compliance are prohibited by law, those provisions shall govern.

(7) If a schedule of compliance exceeds the term of a permit, interim permit limits effective during the permit shall be included in the permit and addressed in the permit's fact sheet or statement of basis. The administrative record for the permit shall reflect final permit limits and final compliance dates. Final compliance dates for final permit limits, which do not occur during the term of the permit, must occur within five years from the date of issuance, reissuance or modification of the permit which initiates the compliance schedule. Where shorter schedules of compliance are prescribed or schedules of compliance are prohibited by law, those provisions shall govern.

(8) No compliance schedule established in accordance with paragraphs (e)(3) through (7) of this section shall allow more than ten years from the effective date of this rule to achieve compliance with any WQBEL based on the criteria set forth in this section.

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