The Vinyl Institute

A Division of The Society of The Plastics Industry, Inc.

October 4, 1988

TO: The VI Health, Safety & Environment Committee

Enclosed is a copy of the Vinyl Institute statement filed on September 28th with the California Department of Health Services on the proposed MCL for vinyl chloride. Also enclosed are copies of statements by the Uni-Bell PVC Pipe Association and the National Sanitation Foundation.

Meredith

Meredith N. Scheck
Assistant Director

MNS/pmb
enclosures

SPI-06734

Wayne Interchange Plaza II • 155 Route 46 West • Wayne, NJ 07470 • (201) 890-9299

The Vinyl Institute

A Division of The Society of The Plastics Industry, Inc.

August 31, 1988

TO: The VI Health, Safety & Environment Committee

RE: California Proposed MCL for Vinyl Chloride

Attached is a notice of proposed rulemaking published on August 12, 1988 in the California Register which would set a Maximum Contaminant Level (MCL) for vinyl chloride at .0005 mg/l, considerably more stringent than the federal level.

The written comment period ends on September 28th (the same day as a scheduled public hearing on the proposal). Please review this notice and be prepared to discuss at the September 21st meeting whether the VI should submit comments on this proposal. If you believe that comments are necessary, any suggestions for specific language in such comments would be appreciated.

Meredith N. Scheck
Assistant Director

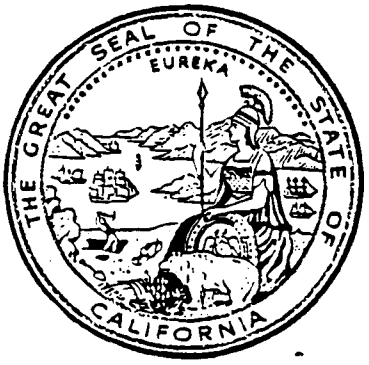
MNS/pmb
cc: R. Walker
R. Church
D. Neale

SPI-06735

Wayne Interchange Plaza II • 155 Route 46 West • Wayne, NJ 07470 • (201) 890-9299

Publication Date 08-12-88 Register 88, NO.33- Z

CALIFORNIA REGULATORY NOTICE REGISTER



GEORGE DEUKMEJIAN, GOVERNOR

Published by
OFFICE OF ADMINISTRATIVE LAW

LINDA STOCKDALE BREWER, Director
555 Capitol Mall, Suite 1290
Sacramento, CA 95814

TITLE 22. DEPARTMENT OF HEALTH SERVICES

ACTION: Notice of Proposed Rulemaking.

SUBJECT: Maximum Contaminant Levels for Carbon Tetrachloride, 1,4-Dichlorobenzene, 1,2-Dichloroethane, and Vinyl Chloride in Drinking Water (R-38-88).

PUBLIC PROCEEDINGS: Notice is hereby given that the California Department of Health Services will hold a public hearing commencing at 10:00 a.m. on September 28, 1988 in the Auditorium at 714 P Street, Sacramento, CA, at which time any person may present statements or arguments orally or in writing relevant to the action described in this notice. Any written statements or arguments must be received by the Office of Regulations, Department of Health Services, 714 P Street, Room 1000, P.O. Box 942732, Sacramento, CA 94234-7320, by 5:00 p.m. on September 28, 1988, which is hereby designated as the close of the written comment period. It is requested but not required that written statements or arguments be submitted in triplicate.

CONTACT: Inquiries concerning the action described in this notice may be directed to Ron C. Wetherall, Chief, Office of Regulations at (916) 324-4829.

INFORMATIVE DIGEST: All suppliers of domestic water to the public are subject to regulations by the U.S. Environmental Protection Agency (EPA) under the Safe Drinking Water Act (Public Law 93-523) as well as by the California Department of Health Services under the California Safe Drinking Water Act (Sections 4010-4039.5, Health and Safety Code). California has been granted "primacy" for enforcement of the Federal Act under specified conditions including adoption of water quality and monitoring regulations. Such regulations have been adopted as Sections 64401-64475, Title 22, California Code of Regulations (CCR). These regulations are comparable with the EPA's National Interim Primary Drinking Water Regulations and the National Secondary Drinking Water Regulations, Title 40, Code of Federal Regulations, Part 141.

The proposed regulation will set Maximum Contaminant Levels (MCLs), the maximum permissible level for a contaminant in drinking water, for 1,2-dichloroethane at .0005 mg/l, vinyl chloride at .0005 mg/l, carbon tetrachloride at .0005 mg/l and 1,4-dichlorobenzene at .005 mg/l, more stringent levels than the existing federal MCLs, which were set at .005 mg/l, .002 mg/l, .005mg/l and .075 mg/l respectively (Federal Register 52(130), 25690, July 8, 1987).

The proposed regulation would involve adding 1,2-dichloroethane, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene to the list of organic chemical analyses in Section 64433 and these compounds with their MCLs to Table 3, Section 64435, Article 4 of Title 22, California Code of Regulations (CCR).

SPI-06737

AUTHORITY: Sections 208 and 4026 of the Health and Safety Code.

REFERENCE: Sections 4017 and 4024 of the Health and Safety Code.

FISCAL IMPACT ESTIMATE:

A. Fiscal Effect on Local Government: This regulation will result in an estimated one-time cost of $1,163,700. There are ongoing costs estimated at $49,100 per year for operation and maintenance of treatment facilities and $45,899 per year for monitoring (average cost per year over five years).

B. Fiscal Effect on State Government: No fiscal impact exists.

C. Fiscal Effect on Federal Funding of State Programs: No fiscal impact exists.

D. Fiscal Effect on Private Persons or Businesses Directly Affected: This regulation will result in an estimated one-time cost of $302,600. There are ongoing costs estimated at $7,500 per year for operation and maintenance of treatment facilities and $18,806 per year for monitoring (average cost per year over five years).

E. Fiscal Effect on Small Businesses: No fiscal impact exists.

DETERMINATIONS: The proposed regulation does not impose a mandate on local agencies or school districts which requires state reimbursement. Local agencies may incur costs as a result of this regulation in two ways: First, some local agencies will incur costs in their operation of public water systems. These costs are not the result of a "new program or higher level of service" within the meaning of Article XIIIB, Section 6 of the California Constitution because they apply generally to all individuals and entities that operate public water systems in California and do not impose unique requirements on local governments. Therefore, no state reimbursement of these costs is required.

Some local agencies may also incur additional costs in discharging their responsibility to enforce the new monitoring requirements for the small public water systems (under 200 service connections) which they regulate. However, the Department has determined that any increase in the local agency costs resulting from enforcing this regulation will be insignificant. Furthermore, local agencies are authorized to assess fees to pay reasonable expenses incurred in enforcing statutes and regulations related to small public water systems (Health and Safety Code Section 510). Therefore, no reimbursement of any incidental costs to local agencies or school districts in enforcing this regulation is required (Government Code Section 17556(d)).

The Department has also determined that the regulations would not have a significant adverse economic impact on small businesses.

AVAILABILITY OF STATEMENT OF REASONS AND TEXT OF REGULATIONS: The Department has prepared and has available for public review an initial statement of reasons for the proposed regulations, all the information upon which the proposed regulations are based, and the text of the proposed regulations. A copy of the initial statement of reasons and a copy of the text of the proposed regulations are available upon request by writing to the Office of Regulations at the address noted above, which address will also be the location of public records, including reports, documentation and other materials related to the proposed regulations.

AVAILABILITY OF CHANGED OR MODIFIED TEXT: The full text of any regulation which is changed or modified from the express terms of the proposed action will be made available by the Department's Office of Regulations at least 15 days prior to the date on which the Department adopts, amends or repeals the resulting regulation.

ADDITIONAL STATEMENTS AND COMMENTS: In accordance with Government Code Section 11346.5(a)(7), the Department must determine that no alternative considered by the Department would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action. Other regulation changes may be scheduled for hearing at the same time appointed for public hearing on the action described in this notice. An agenda for the public hearing will be posted at the time and place of hearing designated above.

DEPARTMENT OF HEALTH SERVICES

Dated: June 23, 1988

Kenneth W. Kizer, M.D., M.P.H.
Director

SPI-06739

UNI-BELL PVC PIPE ASSOCIATION

2655 Villa Creek Drive, Suite 155, Dallas, Texas 75234 Telephone (214) 243-3902

September 27, 1988

TO: Uni-Bell Board of Directors
Uni-Bell Associate Members
Uni-Bell International Affiliates

FROM: Robert Walker

SUBJECT: **Uni-Bell Testimony Opposing Lower Vinyl Chloride Limit**

I prepared the attached statement in response to California's proposal to lower the drinking water limit for vinyl chloride from 2.0 parts per billion (0.002 mg/l) to 0.5 parts per billion (0.0005 mg/l). Ernie Pronske graciously offered to present our statement in Sacramento, California, on September 28 during the public hearing scheduled for this proposed rulemaking.

We have also enclosed for your information a copy of the Vinyl Institute's excellent draft submittal on the same subject which you will find to be most thorough and very well thought-out.

We propose to keep you informed regarding the outcome of California's latest adventure into innovative regulation.

RPW/vac

cc: Roy Gottesman
Meredith Scheck
Mike Stickel
Arthur Kahn

STATEMENT OPPOSING PROPOSED MAXIMUM CONTAMINANT LEVEL FOR VINYL CHLORIDE IN DRINKING WATER (R-38-88)

Prepared for:

Office of Regulations
Department of Health Services
714 P Street, Room 1000
Sacramento, CA 94234-7320

Prepared by:

Uni-Bell PVC Pipe Association
2655 Villa Creek Drive, Suite 155
Dallas, TX 75234

September 28, 1988

Introduction

My name is Ernest H. Pronske. I am a member of the Board of Directors of the Uni-Bell PVC Pipe Association and I am Vice President of the largest producer of PVC pipe, J-M Manufacturing, with corporate offices and manufacturing facilities in nearby Stockton, California.

The Uni-Bell PVC Pipe Association is comprised of the major producers of polyvinyl chloride (PVC) pipes and related products both domestically and around the world. PVC pipe has become very popular as a proven reliable product for transporting drinking water. Each year over 200,000 miles of PVC water pipe is installed.

The Uni-Bell PVC Pipe Association is pleased to respond to the notice provided in the California Register 88, No. 33 - Z (Pg. 2653) that proposes to lower the maximum contaminant level (MCL) in drinking water for vinyl chloride from 0.002 mg/l to 0.0005 mg/l.

Polyvinyl Chloride (PVC) is produced through the irreversible polymerization of vinyl chloride. PVC, unlike vinyl chloride, has exceptional inertness that has made it highly desirable for a variety of highly sensitive medical and health care applications. PVC is not considered carcinogenic.

In the process of polymerizing vinyl chloride in the manufacture of PVC resin, trace amounts of unreacted vinyl chloride may be entrapped in the PVC. A small fraction of the unreacted vinyl chloride may be extractable from PVC pipes.

In recognition of this potential, and in the interest of maximum safety, the PVC industry rigorously controls the amount of unreacted vinyl chloride in PVC pipe resin. In North America, the residual unreacted vinyl chloride in PVC pipe resins has been monitored by the

National Sanitation Foundation (NSF), as a part of their certification program for plastic pipes.

As a result, PVC pipes manufactured throughout North America have vinyl chloride levels that average well below one part per million which translates into extractant water concentrations that defy detection, i.e., levels calculated to be less than one-tenth of a part per billion (0.0001 mg/l). Furthermore, these extremely low extractant levels of vinyl chloride have been shown to diminish with time. Thus, PVC water pipes would not jeopardize compliance with the proposed 0.0005 mg/l vinyl chloride MCL.

Clearly the vinyl chloride source of concern is not PVC pipe. The regulation of vinyl chloride is based upon the in situ transformation of trichloroethylene and similar solvents in groundwater. Nevertheless, the PVC pipe industry is concerned by California's proposal to deviate substantially from the EPA's vinyl chloride MCL which was established only last year.

Basis for Reconsideration

We are requesting that the Department of Health Services reconsider their proposed 0.0005 mg/l MCL for vinyl chloride. The reasons that warrant such reconsideration are as follows:

- Even good laboratories will experience some variability when conducting tests for substances at very low concentrations. The resultant variability increases as the detection limit is approached. To avoid such problems, the EPA employs a concept they refer to as practical quantitation level (PQL). PQL is basically the lowest concentration that can be reliably measured within specified parameters of precision during routine laboratory conditions.

PQL's are typically five to ten times greater than the so called minimum detection limit. Even so, EPA characterizes the PQL as a relatively stringent target for everyday performance. The EPA's MCL for vinyl chloride is equal to vinyl chloride's PQL of 0.002 mg/l.

The proposed California MCL of 0.0005 mg/l is the minimum detection limit for vinyl chloride and as such is a level which even good laboratories will not be able to consistently measure. Such measurement imprecision could render the 0.0005 mg/l level unenforceable.

- California Department of Health Services data indicate that there is only one water system in the entire state that would be affected by the proposed lower vinyl chloride limit. That water system is currently limited to industrial use and, therefore, will not be affected.

  In light of this, the justification for regulation at a level below that imposed by the EPA should be questioned. The costs for every community in California to monitor for extreme low levels of vinyl chloride will be excessive and wasteful. Vinyl chloride is not a threat to California's drinking waters.

- The EPA's risk assessment procedures are extremely conservative. EPA employs the most conservative extrapolation models and EPA factors in a number of other safety factors and conservative assumptions.

  California should reconsider EPA's established conservative methodology and adopt the EPA's MCL for vinyl chloride. The proposed vinyl chloride level is

unnecessarily restrictive.

Summary Statement of Recommendations

In conclusion, we respectfully urge the California Department of Health Services to reconsider their proposed vinyl chloride MCL. Proper consideration of analytical reliability, California needs and adverse health risks support the adoption of a vinyl chloride MCL consistent with that established by EPA in 1987.

We appreciate this opportunity to comment and thank you for your thoughtful review of our input.

National Sanitation Foundation

3475 Plymouth Road
P.O. Box 1468
Ann Arbor, Michigan 48106 U.S.A.
Telephone: 313-769-8010
Telex: 753215 NATSANFND UD
FAX: 313-769-0109

STATEMENT OF THE

NATIONAL SANITATION FOUNDATION

TO THE

CALIFORNIA DEPARTMENT OF HEALTH SERVICES

REGARDING THE

PROPOSED MAXIMUM CONTAMINANT LEVEL

RULEMAKING FOR VINYL CHLORIDE

SEPTEMBER 27, 1988

The National Sanitation Foundation (NSF) appreciates the opportunity to comment on the California Department of Health Services' (CDHS) proposed Maximum Contaminant Level (MCL) rulemaking for Vinyl Chloride. (CAL.R-38-88; June 23, 1988).

Health effects information clearly justifies setting the MCL for vinyl chloride (VC) at "the lowest feasible level"; however, lowest feasible level and method detection limit (MDL) are not achievable equivalents for regulatory decisions.

The US Environmental Protection Agency (EPA) defines MDL as the result of measurements by a given laboratory under non-routine and controlled, ideal, research-type conditions. These conditions are not typical in laboratories engaged in compliance monitoring. EPA recognized this when it elected to use the practical quantitation level (PQL) as its basis for setting regulations for volatile organic chemicals (VOCs). "PQL" is defined as the lowest level that can be reliably measured with acceptable precision under routine laboratory conditions.

The PQL-MCL concept was validated by a database obtained by EPA from Federal, state, and independent laboratories round-robin analyses. EPA provided reference samples to the survey laboratories. At a VC concentration of 0.0015 mg/L (1.5 ppb), only 8 of 18 Federal and state laboratories (44%) measure the VC with $\pm$ 40% precision.

One of the unique problems with analytical measurement of VC is maintaining stable reference samples with which to calibrate instruments and complete the requirements for quality control.

Having a sufficient number of laboratories capable of accurately measuring a parameter of interest is essential to effective regulatory control. It is doubtful this goal can be achieved at the level proposed by California for regulating vinyl chloride in drinking water.

Analysts at NSF routinely test for vinyl chloride as unreacted monomer in the wall of polyvinyl chloride (PVC) pipe, and as monomer leached from pipe

(VC in water) as a required control in our product certification program. We also routinely measure VC in an aqueous medium, as required for point-of-use water treatment devices, bottled water, and drinking water additives certifications. It is likely that more VC analyses are performed routinely in our laboratory than in any other Federal, state, or independent laboratory worldwide.

Pertinent data available from the Federal Register (FR52 (130) 25699-25700, July 8, 1987), the California notice of proposed rulemaking, and quality control records available at NSF are summarized in Table I.

TABLE I. SUMMARY OF DATA

	MDL[1]	PQL[1]	Proposed MCL[1]	Final MCL[1]
EPA		2.0	1.0	2.0
CA	0.5	?	0.5	?
NSF	0.5[2]	1.0[3]		

[1]All units as ppb.
[2]Precision = ± 35%.
[3]Precision = ± 15%.

Because of the exceptional experience - expertise and frequency of analysis - of the NSF staff, the MDL and PQL comparisons between NSF and the Federal and state laboratories data from EPA appears favorable to NSF, and clearly, it should. But, if the EPA concept of PQL = MCL is accepted by California, the proposed MCL must be adjusted in the final rulemaking decision. Further, if precision $\leq \pm$ 20% at the MCL is a goal, the number of laboratories acceptable for providing data to the State may be very limited.

NSF is an approved water quality laboratory in the State of California. Regulatory decisions made by Caliifornia are significant factors in the support

provided by NSF to the State. We urge that the final MCL for vinyl chloride in drinking water be set at a level which can be reliably measured by laboratories under routine conditions. We believe that the MCL for VC established by EPA is consistent with current capabilities in most laboratories under conditions of accepted good laboratory practice.

Thank you for the opportunity to comment. We are willing to provide further information to your State at any time upon request.

bcc: NSF Plastics Joint Committee
NSF Plastics Industry Forum
Robert P. Walker, Uni-Bell
Richard W. Church, PPFA
Stanley Mruk, PPI
Roy T. Gottesman, The Vinyl Institute

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SPI-06750

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Prepared for:

Office of Regulations
Department of Health Services
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We appreciate this opportunity to comment and thank you for your thoughtful review of our input.

TITLE 22. CALIFORNIA DEPARTMENT OF HEALTH SERVICES

ACTION: Notice of Proposed Rulemaking.

SUBJECT: Maximum Contaminant Levels for Carbon Tetrachloride, 1,4-Dichlorobenzene, 1,2-Dichloroethane, and Vinyl Chloride in Drinking Water (R-38-88).

PUBLIC PROCEEDINGS: Notice is hereby given that the California Department of Health Services will hold a public hearing commencing at 10:00 a.m. on September 28, 1988 in the Auditorium at 714 P Street, Sacramento, CA, at which time any person may present statements or arguments orally or in writing relevant to the action described in this notice. Any written statements or arguments must be received by the Office of Regulations, Department of Health Services, 714 P Street, Room 1000, P.O. Box 942732, Sacramento, CA 94234-7320, by 5:00 p.m. on September 28, 1988, which is hereby designated as the close of the written comment period. It is requested but not required that written statements or arguments be submitted in triplicate.

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B. Fiscal Effect on State Government: No fiscal impact exists.

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D. Fiscal Effect on Private Persons or Businesses Directly Affected: This regulation will result in an estimated one-time cost of $302,600. There are ongoing costs estimated at $7,500 per year for operation and maintenance of treatment facilities and $18,806 per year for monitoring (average cost per year over five years).

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DEPARTMENT OF HEALTH SERVICES

R-38-88

Dated: June 23, 1988

Kenneth W. Kizer, M.D., M.P.H.
Director

Literature cited in this regulation package can be reviewed at the following Department of Health Services' Public Water Supply Branch District Offices:

Sacramento --	714 P Street, Room 692 P. O. Box 942732 Sacramento, CA 94234-7320 (916) 323-6111
Berkeley --	2151 Berkeley Way, Room 113 Berkeley, CA 94704 (415) 540-2154
Los Angeles --	1449 West Temple Street, Room 202 Los Angeles, CA 90026 (213) 620-2980
San Bernardino --	1836 Commercenter Circle, Suite B San Bernardino, CA 92048 (714) 383-4328
Fresno --	5545 East Shields Avenue, Room 102 Fresno, CA 93727 (209) 445-5321

INITIAL STATEMENT OF REASONS

1,2-Dichloroethane, carbon tetrachloride, and 1,4-dichlorobenzene are drinking water contaminants with potential adverse health effects on humans. Vinyl chloride is a drinking water contaminant that is a known human carcinogen.

1,2-Dichloroethane

1,2-Dichloroethane (1,2-DCA) is used as a solvent for fats, oils, waxes, gums, resins, and particularly for rubber.

The statewide monitoring program mandated by AB 1803 (Chapter 881, Statutes of 1983) found 1,2-dichloroethane in groundwater in both large and small community water system wells at levels which exceed the proposed Maximum Contaminant Level (MCL) [California Department of Health Services (CDHS), 1986, 1988a].

Vinyl Chloride

Vinyl chloride is used in the production of polyvinyl chloride.

The AB 1803 monitoring program found vinyl chloride in groundwater in one large community water system well used for industrial purposes (CDHS, 1986, 1988a). The vinyl chloride concentration exceeds the proposed MCL, but the well is used now only for nonpotable purposes.

Carbon Tetrachloride

Carbon tetrachloride is a relatively inexpensive and useful solvent which has been widely used for both industrial and household purposes. Household use is now being restricted and in industrial situations it is being replaced in many instances by less toxic solvents.

The AB 1803 monitoring program found carbon tetrachloride in groundwater in both large and small community water system wells at levels which exceed the proposed MCL (CDHS, 1986, 1988a).

1,4-Dichlorobenzene

1,4-Dichlorobenzene (DCB) is used in mothballs, as a preservative for furs and natural fibers, and to deodorize toilets. It is also a chemical intermediate in the production of aniline dyes and in the synthesis of polyphenylene sulfide resins for electronic applications. There are three isomers, ortho, meta, and para. p-Dichlorobenzene is of most concern in terms of health effects. U.S. domestic production in 1982 of p-DCB is estimated at 72.6 million pounds (CDHS, 1988b).

The AB 1803 monitoring program found 1,4-dichlorobenzene in groundwater in both large and small community water system wells (CDHS, 1986, 1988a).

Pursuant to the State's 1985-86 Budget, the Department of Health Services (DHS) has been mandated to establish MCLs for contaminants in drinking water in order to protect public health. On July 8, 1987 the U.S. Environmental Protection Agency (USEPA) promulgated primary drinking water standards in the form of MCLs for 1,2-dichloroethane, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene (USEPA, 1987). Pursuant to California's Health and Safety Code, Section 4026, the California Department of Health Services (CDHS) is required to set MCLs for these compounds at least as stringent as those adopted by the USEPA. These compounds have been found in California drinking waters (CDHS, 1986, 1988a). Current levels of both 1,2-dichloroethane and carbon tetrachloride exceed the proposed MCLs; since all four contaminants have the potential for adverse effects on health, CDHS has determined that MCLs should be established as proposed.

22 C.C.R. Section 64433. Types of Analyses; and Section 64435. Maximum Contaminant Levels

The purpose of this Section is to add 1,2-dichloroethane, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene to the list of chemical analyses in Section 64433 (a) (4) and these compounds with their MCLs to Table 3 of Section 64435 of the California Code of Regulations (CCR). CDHS is proposing MCLs for these compounds to control levels in drinking water and protect the public health. Under this regulation, community water systems will be required to monitor for all four compounds. Any

system with levels exceeding the MCLs will be required to take mitigation measures to comply.

Alternative to Numerical Standard (MCL)

As an alternative, the Department has considered reducing the risk to public health posed by 1,2-DCA, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene, in drinking water by requiring mitigation by water systems with contamination from these compounds regardless of the level. Since this would require all contaminated systems to take mitigation measures, it is the more costly alternative. The cost increment involved in systemwide mitigation as compared to use of the numerical standard (MCL) is not justified by the relatively small incremental reduction in risk to the public health that would be achieved. Therefore, the MCL approach was selected for the regulation because it adequately protects the public health, while it minimizes the fiscal impact of mitigation procedures on the citizens of the State.

RISK ASSESSMENT

The USEPA summarized the toxicological considerations in support of their MCLs for 1,2-dichloroethane, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene (USEPA, 1985; USEPA, 1987). The Department reviewed the summary and the supporting documentation and is proposing MCLs for these compounds which are more stringent than those of the USEPA for the reasons stated below.

1,2-Dichloroethane

A comprehensive risk assessment including a thorough review of the USEPA documentation on 1,2-DCA has been performed by the Department (CDHS; 1988c); the summary is in Appendix 1. The Department has determined that by California guidelines for cancer risk assessment, 1,2-DCA is an animal carcinogen with a potential to be a human carcinogen.

The range of concentrations in drinking water associated with the de minimis risk (one theoretical excess cancer case for every one million persons exposed over a lifetime) is .00002 to .0121 mg/l. Based on the relative sensitivities of the studies and other significant parameters, the Department determined that the concentration most appropriate for regulatory purposes was in the range of .00002 to .0003 mg/l, below the detection limit of .0005 mg/l. Therefore, the Department proposes setting the MCL at the detection limit of .0005 mg/l.

Vinyl Chloride

CDHS performed a comprehensive risk assessment including a thorough review of the USEPA documentation on vinyl chloride (1988d); a summary is in Appendix 1.

CDHS determined that potency estimates derived from the human occupational data on vinyl chloride may be limited in usefulness (underestimates) due to the fact that the saturable pharmacokinetics are not taken into account. There are also other

methodological problems. CDHS used animal studies performed at low doses within the region of linear, non-saturating pharmacokinetics as the basis of cancer potency estimation. Analyses of both human and animal data indicate that the concentration of vinyl chloride in public drinking water supplies posing a de minimis risk of cancer is more stringent than the current limit of detection of .0005 mg/l. Therefore, the Department proposes setting the MCL at the detection limit of .0005 mg/l.

Carbon Tetrachloride

Based on a number of reviews of carbon tetrachloride toxicology and exposure data (U.C.Davis Risk Assessment Group, 1988; International Agency for Research on Cancer, 1978; Office of Environmental Health Hazard Assessment (OEHHA), 1987; USEPA, 1985, 1987), CDHS determined that there is sufficient evidence under the State of California cancer risk assessment guidelines to identify carbon tetrachloride as an animal carcinogen with the potential for inducing cancer in people (see Appendix 1). The guidelines also recommend that sensitive species be used as the basis for risk estimation. The U.C.Davis group determined that the range of drinking water concentrations associated with the de minimis risk is .00004 to .0023 mg/l. Based on the most appropriate animal study, the Department determined that the de minimis drinking water concentration for regulatory purposes is .0002 mg/l, more stringent than the current detection limit of .0005 mg/l. Therefore, the Department proposes setting the MCL at the detection limit of .0005 mg/l.

1,4-Dichlorobenzene

The Department did a comprehensive review of the USEPA risk assessment on 1,4-dichlorobenzene, as well as other pertinent studies, and determined that by State of California cancer risk assessment guidelines, 1,4-dichlorobenzene is considered a potential human carcinogen (see Appendix 1 for summary). Concentrations of 1,4-dichlorobenzene in water corresponding to the de minimis cancer risk range from .0002 to .0081 mg/l. Concentrations ranging from .0003 to .001 mg/l have been recommended by the USEPA and World Health Organization (WHO) to address aesthetic considerations (taste and odor). Based on the cancer risk assessment, the Department proposes setting the MCL at .005 mg/l.

DISCUSSION OF COST AND HEALTH ISSUES

The process of establishing the MCLs for 1,2-dichloroethane, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene involves not only a thorough consideration of the risks to public health posed by exposure (i.e., health issues, population exposed and levels of exposure), but also an evaluation of the feasibility of meeting the proposed standards in terms of sensitivity of existing analytical methods, available mitigation measures, and fiscal impact.

The concentration levels derived by the CDHS and USEPA risk assessments were evaluated in terms of the following areas of concern: (1) analytical methods, (2) health issues, (3)

population exposed and levels of exposure, (4) availability of mitigation measures, and (5) costs of treatment.

(1) Analytical Methods---There are analytical methods available for vinyl chloride, carbon tetrachloride, 1,4-dichlorobenzene, and 1,2-dichloroethane suitable for the proposed MCL levels.

(2) Health Issues---1,2-Dichloroethane, carbon tetrachloride, and 1,4-dichlorobenzene are potential human carcinogens by California risk assessment guidelines. Vinyl chloride is a known human carcinogen.

(3) Population Exposed and Levels of Exposure---Based on AB1803 data, current levels of exposure to carbon tetrachloride (approximately 24,150 persons are exposed at levels above the proposed MCL), and 1,2-dichloroethane (apprx. 14,890 to levels above the proposed MCL), in California are of concern, exposure to 1,4-dichlorobenzene is minimal (apprx. 8000 to levels less than the proposed MCL) and there is no known exposure to vinyl chloride (CDHS; 1986, 1988a). The potential for greater levels of exposure to a larger population is present due to the widespread use of these compounds.

(4) Availability/Performance of Mitigation Measures---Research done on the availability and performance of the best available treatment technologies---air stripping (AS) and granular activated carbon (GAC)---indicate that both technologies are effective and appropriate for any size system, both from a design and an operational perspective.

(5) Costs of Monitoring and Mitigation---

MONITORING COSTS

Monitoring costs are based on the requirements in the proposed regulation R-61-85 (Drinking Water Monitoring).

Due to the fact that the volatile organic chemicals (VOCs) for which MCLs are being proposed can be monitored simultaneously by a single laboratory sample analysis, the monitoring costs have been split into two segments. The first is termed "Baseline" and provides the minimum VOC monitoring costs which all California water systems will bear, regardless of contamination levels. For this cost analysis, the assumption is made that all systems are "vulnerable" and, therefore, require monitoring every other year after the first year of quarterly monitoring (proposed regulation R-61-85). The result of this assumption is a conservative cost estimate (worst case analysis). Pursuant to the proposed regulation, monitoring requirements for vulnerable systems begin a two-year repeating cycle in year four (i.e., years 6 and 7 repeat years 4 and 5). Therefore, five years of costs are presented. The "Baseline" costs are presented in Appendix 2.

The second segment of monitoring costs is termed "Increment" and provides the additional monitoring costs incurred as a result of the contamination levels for a specific VOC for which an MCL is being proposed. The well contamination data used to determine the "Increment" costs was obtained from Assembly Bill (AB) 1803 monitoring data (CDHS; 1986, 1988a). The "Increment" represents

the fiscal impact for additional monitoring (confirmation, quarterly, and/or monthly sampling pursuant to the requirements in proposed regulation R-61-85 of contaminated wells which would result from the proposed VOC MCL. "Increment" costs are presented in Tables 1 through 3 for 1,2-dichloroethane, carbon tetrachloride (CTET), and 1,4-dichlorobenzene (1,4-DCB) respectively.

Table 1: Increment Monitoring Costs for 1,2-DCA (MCL = .0005 mg/l)

System Type	Num.	Population	Costs ($1000)				
			yr-1	yr-2	yr-3	yr-4	yr-5
LARGE[a]							
Private	275	4,773,267	2.0	4.7	4.1	4.6	4.0
Public	886	20,931,482	4.8	11.0	9.6	10.8	9.4
TOTAL	1161	25,704,749	6.8	15.7	13.7	15.4	13.4
SMALL[b]							
Private	655	159,840[c]	0.5	1.3	1.1	1.2	1.0
Public	2074	445,998[c]	1.4	3.6	3.0	3.4	2.8
TOTAL	2729	605,838[c]	1.9	4.9	4.1	4.6	3.8
NTNCWS[d]							
Private	347	11,900[e]	-	-	-	-	-
Public	1098	31,450[e]	-	-	-	-	-
TOTAL	1445	43,350[e]	-	-	-	-	-
GRAND TOTAL	5335	26,353,937	8.7	20.6	17.8	20.0	17.2

[a] Large systems have greater than 200 service connections.

[b] Small systems have more than 5, but less than or equal to 200 service connections.

[c] Population is estimated by assuming that each system serves 222 people; this number was obtained by surveying small systems in 3 counties.

[d] NTNCWS = non-transient, water non-community systems; a non-community system that regularly serves at least 25 of the same people over six months of a year.

[e] Population is estimated by assuming that each system serves 25 people, the minimum permanent population required to qualify as a NTNCWS.

NOTE:
NTNCWS monitoring costs are included in anticipation of DHS' adoption of the recently promulgated definition for non-transient, non-community water systems and application of the National Primary Drinking Water Regulations for synthetic organic chemicals to those systems (USEPA, 1987).

Table 2: Increment Monitoring Costs for CTET (MCL = .0005 mg/l)

System Type	Num.	Population	Costs ($1000)				
			yr-1	yr-2	yr-3	yr-4	yr-5
LARGE[a]							
Private	275	4,773,267	6.1	14.1	12.2	13.8	11.9
Public	886	20,931,482	14.3	33.4	28.9	32.6	28.1
TOTAL	1161	25,704,749	20.4	47.5	41.1	46.4	40.0
SMALL[b]							
Private	655	159,840[c]	1.0	2.3	2.0	2.3	2.0
Public	2074	445,998[c]	2.9	6.4	5.6	6.4	5.6
TOTAL	2729	605,838[c]	3.9	8.7	7.6	8.7	7.6
NTNCWS[d]							
Private	347	11,900[e]	-	-	-	-	-
Public	1098	31,450[e]	-	-	-	-	-
TOTAL	1445	43,350[e]	-	-	-	-	-
GRAND TOTAL	5335	26,353,937	24.3	56.2	48.7	55.1	47.6

[a] Large systems have greater than 200 service connections.

[b] Small systems have more than 5, but less than or equal to 200 service connections.

[c] Population is estimated by assuming that each system serves 222 people; this number was obtained by surveying small systems in 3 counties.

[d] NTNCWS = non-transient, water non-community systems; a non-community system that regularly serves at least 25 of the same people over six months of a year.

[e] Population is estimated by assuming that each system serves 25 people, the minimum permanent population required to qualify as a NTNCWS.

NOTE:
NTNCWS monitoring costs are included in anticipation of DHS' adoption of the recently promulgated definition for non-transient, non-community water systems and application of the National Primary Drinking Water Regulations for synthetic organic chemicals to those systems (USEPA, 1987).

Table 3: Increment Monitoring Costs for 1,4-DCB (MCL = .005 mg/l)

System Type	Num.	Population	Costs ($1000)				
			yr-1	yr-2	yr-3	yr-4	yr-5
LARGE[a]							
Private	275	4,773,267	-	-	-	-	-
Public	886	20,931,482	-	1.1	0.6	0.5	-
TOTAL	1161	25,704,749	-	1.1	0.6	0.5	-
SMALL[b]							
Private	655	159,840[c]	-	0.5	0.3	0.3	-
Public	2074	445,998[c]	-	-	-	-	-
TOTAL	2729	605,838[c]	-	0.5	0.3	0.3	-
NTNCWS[d]							
Private	347	11,900[e]	-	-	-	-	-
Public	1098	31,450[e]	-	-	-	-	-
TOTAL	1445	43,350[e]	-	-	-	-	-
GRAND TOTAL	5335	26,353,937	-	1.6	0.9	0.8	-

[a] Large systems have greater than 200 service connections.

[b] Small systems have more than 5, but less than or equal to 200 service connections.

[c] Population is estimated by assuming that each system serves 222 people; this number was obtained by surveying small systems in 3 counties.

[d] NTNCWS = non-transient, water non-community systems; a non-community system that regularly serves at least 25 of the same people over six months of a year.

[e] Population is estimated by assuming that each system serves 25 people, the minimum permanent population required to qualify as a NTNCWS.

NOTE:
NTNCWS monitoring costs are included in anticipation of DHS' adoption of the recently promulgated definition for non-transient, non-community water systems and application of the National Primary Drinking Water Regulations for synthetic organic chemicals to those systems (USEPA, 1987).

MITIGATION COSTS

1,2-Dichloroethane (1,2-DCA)

According to the AB 1803 data (CDHS; 1986, 1988a), there are 4 large system and 2 small system wells operating which are not in compliance with the proposed MCL for 1,2-DCA and have not been treated, closed, or blended. These wells will require mitigation.

Based on the documentation provided by Moehser et al. (1987) and Selleck et al. (1986; 1987), DHS determined that packed tower aeration and granular activated carbon (GAC) absorption were the two best treatment technologies currently available for the removal of volatile organic chemicals from water. This is consistent with the findings of the USEPA (1987).

Treatment costs (April, 1986 dollars) for 1,2-dichloroethane are presented in Table 4 below.

Table 4: Treatment Costs for 1,2-DCA (MCL = .0005 mg/l)

System Type	Capital ($)		O & M ($/yr)	
	GAC	Air Stripping	GAC	Air Stripping
Large				
Public	2,549,400	471,500	2,252,500	23,800
Private	268,000	49,300	167,400	1,200
TOTAL LARGE	2,817,400	520,800	2,419,900	25,000
Small*				
Public	-	-	-	-
Private	175,200	81,900	27,000	1,800
TOTAL SMALL	175,200	81,900	27,000	1,800
TOTAL TRT. COSTS	2,992,600	602,700	2,446,900	26,800

* Due to lack of flow data, costs were based on an assumed flow of 15 gpm.

Vinyl Chloride

Based on the AB 1803 data (CDHS; 1986, 1988a), the only affected water system is now limited to industrial use and, therefore, mitigation is not necessary.

Carbon Tetrachloride

According to the AB 1803 data (CDHS; 1986, 1988a), there are 6 large and 4 small system wells operating which are not in compliance with the proposed MCL for carbon tetrachloride and have not been treated, closed, or blended. These wells will require mitigation.

Treatment costs (April 1986 dollars) for carbon tetrachloride are provided in Table 5 below.

Table 5: Treatment Costs for CTET (MCL = .0005 mg/l)

System Type	Capital ($)		O & M ($/yr)	
	GAC	Air Stripping	GAC	Air Stripping
Large				
Public	3,957,800	614,900	324,500	23,800
Private	444,500	94,300	33,700	3,000
TOTAL LARGE	4,402,300	709,200	358,200	26,800
Small*				
Public	175,200	77,300	12,900	1,500
Private	175,200	77,100	13,300	1,500
TOTAL SMALL	350,400	154,400	26,200	3,000
TOTAL TRT. COSTS	4,752,700	863,600	384,400	29,800

* Due to lack of flow data, costs were based on an assumed flow of 15 gpm.

1,4-Dichlorobenzene

There were no wells found by the AB 1803 monitoring program (CDHS; 1986) to have water with 1,4-DCB concentrations greater than the proposed MCL. Two large water system wells and one small water system well have been found to have 1,4-dichlorobenzene levels not exceeding the proposed MCL. Therefore, water systems should be in compliance with the proposed MCL for 1,4-DCB and mitigation costs are not anticipated.

In summary, the following MCLs are proposed: 1,2-dichloroethane, 0.0005 miligrams per liter (mg/l); vinyl chloride, 0.0005 mg/l; carbon tetrachloride, 0.0005 mg/l; and 1,4-dichlorobenzene, 0.005 mg/l.

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APPENDIX 1

PROPOSED MAXIMUM CONTAMINANT LEVEL

1,2-Dichloroethane
(Ethylene Dichloride)

SUMMARY

1,2-Dichloroethane (1,2-DCA) is a short-chain halogenated hydrocarbon used primarily in the production of the common solvents TCA, TCE and PCE. The major controversy surrounding derivation of the acceptable maximum concentration of 1,2-DCA in California is the potential, if any, of the compound to cause cancer in human beings. Chronic oral administration of 1,2-DCA in Osborne-Mendel rats and B6C3F1 mice was associated with increased numbers of forestomach squamous cell carcinomas, fibromas, hemangiosarcomas and mammary gland adenocarcinomas in rats and increased numbers of hepatic carcinomas, alveolar/bronchiolar adenomas, mammary carcinomas and endometrial carcinomas in mice. Metabolism of 1,2-dichloroethane led to production of 2-chloroacetaldehyde, a reactive half-sulfur mustard [s-(2-chloroethyl)-GSH] and an episulfonium ion; microsomal metabolites of 1,2-dichloroethane were reported to bind with DNA *in vitro* and after either oral or inhalation exposure of rats to radio-labelled 1,2-DCA, the lung and kidney contained the greatest amounts of covalent binding. There were no marked differences in covalent protein or DNA binding between the two different routes of exposure. Study of 1,2-DCA in standard, short-term mutagenicity tests found significant responses in both prokaryotic and eukaryotic systems.

In accordance with the 1985 CDHS Cancer Risk Assessment guidelines, 1,2-DCA has been identified as a known animal carcinogen, and the most sensitive site and surface area based potency values are used for the cancer risk assessment. Using the data obtained from the most sensitive test species/strain, the male and female Osborne-Mendel rat, the drinking water concentration associated with the 10^{-6} or *de minimis* risk of cancer is calculated to fall below the current anayltical level of detection of 0.5 ppb.

De Minimis Risk Posed by Exposure to Vinyl Chloride in Tap Water

Summary:

Vinyl chloride is a known human carcinogen. Experimental studies suggest that metabolic activation of vinyl chloride is required for carcinogenicity. The metabolism of vinyl chloride has been demonstrated to be saturable, and the effect of this phenomenon on the dose response for carcinogenicity must be considered. Potency values estimated from human occupational data and reported in the literature have not taken into account the saturable pharmacokinetics of vinyl chloride and consequently may be underestimated. Other methodological problems limit the usefulness of these cancer potency estimates. Animal studies performed at low doses within the region of linear, non-saturating pharmacokinetics are used as the basis of cancer potency estimation. Analyses of both human and animal data indicate that the concentration of vinyl chloride in public drinking water supplies posing a theoretical 10^{-6} risk of cancer falls below the current limit of detection of 0.5 ppb.

ATTACHMENT I

Drinking Water Concentrations of Carbon Tetrachloride

Associated with a 10^{-6} Risk of Cancer*

Study	Species	Tumor	Potency	Exposure Scenario: Ingestion (2 l/day)	Exposure Scenario: Multiple Routes**
Edwards et al., 1942	Mouse	Hepatoma	0.18	0.2	0.05
Della Porta et al., 1961	Hamster	Hepatoma	8.85	0.004	0.001
NCI, 1976	Rats	Combined Liver	0.014	2.3	0.6
	Mice	Hepatocellular Carcinoma	0.16	0.2	0.05

* Extracted from UC Davis Risk Assessment Group, Health Risk Assessment of Carbon Tetrachloride (CTC) in California Drinking Water, UC Davis, Davis California 1988.

**Assumes inhalation and dermal exposure to carbon tetrachloride occurs during bathing and other water using activities.

SUMMARY

Dichlorobenzenes are colorless liquids that are heavier than water. The major water uses threatened by dichlorobenzene contamination are fisheries, potable water supplies and recreational areas. para-Dichlorobenzene (p-DCB) is carcinogenic for rats and mice and an association between human leukemias and p-DCB exposure has been reported. para-Dichlorobenzene poisoning has also been associated with human fatalities due to liver failure.

The major controversy surrounding the toxicology of p-DCB is the potential, if any, of this compound to cause human cancer. Based on CDHS guidelines (1985):

> "Positive evidence for carcinogenicity from properly conducted bioassays in two species of animals, or two properly conducted bioassays in the same species carried out at separate times in the same laboratory or preferably in two separate laboratories, is considered by the DHS and by IARC as sufficient evidence for carcinogenicity in animals. This, in turn, is considered as sufficient evidence for potential human carcinogenicity."

Chronic oral p-DCB exposure was carcinogenic for rats and mice; NTP (1986) concluded that oral p-DCB was associated with clear evidence of carcinogenicity in rodents. p-DCB is therefore considered a potential human carcinogen. Based on a linear low-dose extrapolation of the animal cancer bioassay data as stipulated in CDHS (1985), concentrations corresponding to a theoretical excess risk of cancer at the rate of one case in one million persons exposed to p-DCB in California drinking water range from 0.2 - 8.1 ppb. Secondary concentrations ranging from 0.3 - 1.0 ppb have been recommended by the U.S. EPA and WHO to address aesthetic considerations of p-DCB in drinking water.

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF HEALTH SERVICES
7151 BERKELEY WAY
BERKELEY, CA 94704

MEMORANDUM

TO: Dave Spath, Ph.D.
Public Water Supply Branch

DATE: April 15, 1988

RE: Proposed Maximum Contaminant Level for for Carbon Tetrachloride

FROM: Lauren Zeise, Ph.D
Toxic Chemicals Assessment Section

Researchers at the University of California at Davis have reviewed the toxicological and exposure data on carbon tetrachloride pertinent for the determination of health effects from public consumption of water contaminated with carbon tetrachloride. They have also estimated water concentrations associated with a theoretical 10^{-6} risk (de minimis risk) of cancer. In addition, the Air Toxics Unit within OEHHA has evaluated the toxicology of carbon tetrachloride and developed estimates of cancer potency.

These reviews as well as those of other scientific and regulatory bodies (e.g., the International Agency for Research on Cancer and the USEPA) find that carbon tetrachloride is an animal carcinogen. It has induced cancer, primarily of the liver, in multiple species (i.e., mice, rats, and hamsters) by multiple routes. Under the State of California guidelines, this is sufficient evidence of carcinogenicity for the identification of carbon tetrachloride as an animal carcinogen with the potential for inducing cancer in people.

Estimation of the human cancer potency of carbon tetrachloride is difficult. Human data are inadequate and, although there are a number of positive animal cancer bioassays, none are sufficient for a definitive determination of cancer potency in animals. In particular, the best long term study for this purpose by the National Cancer Institute (NCI) at best only provides a lower bound estimate of cancer potency in the mouse. Because nearly all of the mice in that study died early of cancer, the study provides little information on how cancer incidence might increase with increasing dose. There appear to be differences in species/strain sensitivity to carbon tetrachloride, with the mouse and hamster more sensitive than the rat. Some of the discrepancies in risk estimates for carbon tetrachloride can be attributed to these differences. The State of California in its cancer risk assessment guidelines recommends that sensitive species be used as the basis for risk estimation.

Water concentrations associated with a theoretical 10^{-6} risk of cancer are listed in Attachment I, which was taken from the UC Davis review. As the attachment shows, de minimis risk water concentrations range over three orders of magnitude and depend on the exposure scenario assumed and the experiment used a a basis for the risk assessment. The value provided for the NCI mouse study should be considered an overestimate of the

water concentration for that particular study. The de minimis risk water concentration for the most sensitive study is 1 part per trillion. This Attachment indicates that the water concentration associated with the theoretical de minimis risk of cancer is likely to fall below the current limit of detection of carbon tetrachloride in tap water.

cc: Calvin Willhite, Ph.D./HES

APPENDIX 2

BASELINE VOC MONITORING COSTS

Monitoring costs are based on the requirements in the proposed regulation R-61-85 (Drinking Water Monitoring).

Due to the fact that the volatile organic chemicals (VOCs) for which MCLs are being proposed can be monitored simultaneously by a single laboratory sample analysis, the monitoring costs have been split into two segments. The "Baseline" segment provides the minimum VOC monitoring costs which all California water systems will bear, regardless of contamination levels. For this estimate, all systems are assumed to be "vulnerable," requiring monitoring every other year after the first year of quarterly monitoring (proposed regulation R-61-85). This assumption results in a conservative cost estimate (worst case analysis). Vulnerable systems begin a two-year repeating cycle in year four (i.e., years 6 and 7 repeat years 4 and 5). Costs over a five year period are presented, but years 2 and 4 are omitted because there are no baseline costs in those years.

BASELINE COST ESTIMATE FOR VOC MONITORING

System Type	Num.	Population	Costs[a] ($1000)		
			yr-1	yr-3	yr-5
LARGE[b]					
Private	275	4,773,267	2258.2	564.5	564.5
Public	886	20,931,482	5487.3	1371.8	1371.8
TOTAL	1161	25,704,749	7745.5	1936.3	1936.3
SMALL[c]					
Private	720	159,840[d]	670.3	167.6	167.6
Public	2009	445,998[d]	2124.2	531.1	531.1
TOTAL	2729	605,838[d]	2794.5	698.7	698.7
NTNCWS[e]					
Private	476	11,900[f]	354.9	88.7	88.7
Public	1258	31,450[f]	1124.8	281.2	281.2
TOTAL	1734	43,350[f]	1479.7	369.9	369.9
GRAND TOTAL	5624	26,353,937	12019.7	3004.9	3004.9

[a] Costs are zero for years 2 and 4 and, therefore, are not shown.

[b] Large systems have greater than 200 service connections.

[c] Small systems have more than 5, but less than or equal to 200 service connections.

[d] Population is estimated by assuming that each system serves 222 people; this number was obtained by surveying small systems in 3 counties.

[e] NTNCWS = non-transient, non-community water systems; a non-community system that regularly serves at least 25 of the same people over six months of a year.

[f] Population is estimated by assuming that each system serves 25 people, the minimum permanent population required to qualify as a NTNCWS.

NOTES:
1. Small water system ownership is not available in any database; therefore, ownership is estimated, based on large system ratios.
2. NTNCWS monitoring costs are included in anticipation of DHS' adoption of the USEPA's recently promulgated definition for non-transient, non-community water systems and application of the National Primary Drinking Water Regulations for synthetic organic chemicals to those systems (USEPA, 1987).

PROPOSED REGULATION

Section 64433, Article 4, of Title 22, California Code of Regulations is to be amended as follows:

64433. Types of Analyses.

(a) As a minimum, analyses shall be made for the following constituents:

(1) General mineral analyses for bicarbonate, carbonate, and hydroxide alkalinity, calcium, chloride, copper, foaming agents (MBAS), iron, magnesium, manganese, pH, sodium, sulfate, specific conductance, total dissolved solids, total hardness and zinc.

(2) General physical analyses for color, odor and turbidity.

(3) Inorganic chemical analyses for arsenic, barium, cadmium, chromium, lead, mercury, nitrate (as NO_3), selenium, silver and fluoride.

(4) Organic chemical analyses for endrin, lindane, methoxychlor, toxaphene and chlorophenoxys 2,4-D and 2,4,5-TP Silvex and synthetics 1,2-dichloroethane, vinyl chloride, carbon tetrachloride, and 1,4-dichlorobenzene.

NOTE: Authority cited: Sections 208 and 4026, Health and Safety Code.

Reference: Sections 4017 and 4024, Health and Safety Code.

Section 64435, Article 4, of Title 22, California Code of Regulations is to be amended as follows:

64435. **Maximum Contaminant Levels.**

(a) Water containing contaminants exceeding the maximum contaminant levels shown on Tables 2, 3 and 4 presents a risk to the health of humans when continually used for drinking or culinary purposes.

Table 2
Maximum Contaminant Levels
Inorganic Chemicals

Constituent	Maximum Contaminant Level, mg/l
Arsenic	0.05
Barium	1.
Cadmium	0.010
Chromium	0.05
Lead	0.05
Mercury	0.002
Nitrate (as NO_3)	45.
Selenium	0.01
Silver	0.05

Table 3
Maximum Contaminant Levels
Organic Chemicals

Constituent	Maximum Contaminant Level, mg/l
(a) Chlorinated Hydrocarbons	
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
(b) Chlorophenoxys	
2,4-D	0.1
2,4,5-TP Silvex	0.01
(c) Synthetics	
1,2-Dichloroethane	0.0005
Vinyl Chloride	0.0005
Carbon Tetrachloride	0.0005
1,4-Dichlorobenzene	0.005

Table 4
Limiting Concentrations for Fluoride

Annual Average of Maximum Daily Air Temperature		Fluoride Concentration, mg/l			
Degrees Fahrenheit	Degrees Celsius	lower	optimum	upper	Maximum Contaminant Level
53.7 and below	12.0 and below	0.9	1.2	1.7	2.4
53.8 to 58.3	12.1 to 14.6	0.8	1.1	1.5	2.2
58.4 to 63.8	14.7 to 17.6	0.8	1.0	1.3	2.0
63.9 to 70.6	17.7 to 21.4	0.7	0.9	1.2	1.8
70.7 to 79.2	21.5 to 26.2	0.7	0.8	1.0	1.6
79.3 to 90.5	26.3 to 32.5	0.6	0.7	0.8	1.4

(b) The annual average of maximum daily air temperatures in Table 3 shall be obtained for a minimum of five years. The average concentration of fluoride during any month, if added, shall not exceed the upper concentration. Naturally occurring fluoride concentration shall not exceed the maximum contaminant level.

(c) The maximum contaminant level for nitrate shall be applicable to all public water systems. The maximum contaminant levels for the other inorganic chemical shall apply only to community and state small water systems.

(d) If any inorganic chemical, except for nitrate, exceeds the maximum contaminant level, the water supplier shall:

(1) Inform the Department within seven days from the receipt of the analysis.

(2) Collect three additional samples within one month for analysis to confirm the result. If the average of the four samples collected exceeds the maximum contaminant level, this information shall be reported to the Department within 48 hours.

(e) If a single nitrate sample exceeds the maximum contaminant level, the water supplier shall:

(1) Collect another sample within 24 hours from the receipt of the original analysis.

(2) Analyze the new sample and inform the Department within seven days from the receipt of the original analysis.

(3) Average the two nitrate samples. Any average which exceeds the maximum contaminant level shall be reported to the Department within 48 hours.

(f) Surface waters exposed to significant sewage hazards or significant recreational use shall receive, as a minimum,

pretreatment, filtration and disinfection. The filtered water turbidity, measured daily, shall be less than 0.5 turbidity units on a monthly average for an acceptable level of public health protection.

(1) The Department shall designate those public water systems subject to the requirements of this subsection.

(2) If a daily sample taken pursuant to this subsection exceeds 0.5 turbidity units, the water shall be resampled as soon as practicable, preferably within one hour.

(3) If the average of the resample and the original sample exceeds 0.5 turbidity units, the water supplier shall report this information to the Department within 48 hours.

(4) The repeat sample shall be the sample used for the purpose of calculating the monthly average.

(5) If the monthly average of the daily samples exceeds 0.5 turbidity units, or if the average of two samples taken on consecutive days exceeds two turbidity units, the water supplier shall report this information to the Department within 48 hours and may be required to notify the public.

(6) The water supplier shall report to the Department within 48 hours and shall notify the public pursuant to Section 64463 if the:

(A) Monthly average of the daily samples exceeds one turbidity Unit.

(B) Average of two samples taken on two consecutive days exceeds five turbidity units.

(g) The maximum contaminant level for turbidity in this subsection is applicable to all public water systems using surface water sources not exposed to significant sewage hazards or significant recreational use.

(1) The maximum contaminant level for turbidity in drinking water, measured daily at representative entry points to the distribution system is:

(A) One turbidity unit as determined by a monthly average, except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the satisfaction of the department that upstream waters are not subject to existing or potential sewage hazards or recreational uses and that the higher turbidity does not do any of the following:

1. Interfere with disinfection.
2. Prevent maintenance of an effective disinfectant agent through the distribution system.
3. Interfere with microbiological determinations.

(B) Five turbidity units based on an average for two consecutive days.

(2) The water shall be resampled as soon as practicable, preferably within one hour, if a daily sample taken for turbidity analysis exceeds one turbidity unit.

(A) Any average of the original sample and the repeat sample which exceeds one turbidity unit shall be reported to the Department within 48 hours.

(B) The repeat sample shall be the sample used for the purpose of calculating the monthly average.

(C) The water supplier shall report this information to the Department within 48 hours and shall notify the public if:

1. The monthly average of the daily samples exceeds one turbidity unit.

2. The average of two samples taken on two consecutive days exceeds five units.

Note: Authority cited: Sections 208 and 4026, Health and Safety Code.

Reference: Sections 4017 and 4024, Health and Safety Code.

PROPOSED MAXIMUM CONTAMINANT LEVEL
VINYL CHLORIDE
Community Toxicology Unit
Department of Health Services
State of California

The State Maximum Contaminant Level program provides information on health effects from contaminants in drinking water. The Proposed Maximum Contaminant Level (PMCL) describes concentrations of contaminants at which adverse health effects would not be anticipated to occur. The PMCLs are developed either from data describing non-carcinogenic end-points of toxicity, the physical characteristics of the compound, or incorporation of quantitative carcinogenicity risk estimates for drinking water containing trace amounts of chemicals. A margin of safety is included to protect members of the California population who may be particularly sensitive (pregnant or nursing mothers, children, the elderly, those with chronic diseases, etc.).

Projected excess cancer risks may be provided to give an estimate of the concentrations of the contaminant that may pose a negligible carcinogenic risk to humans.

The PMCLs are subject to change as new information on the toxicity of drinking water contaminants becomes available. These documents are to be used as technical assistance for Federal, State and local public officials.

PMCLs are calculated for a single chemical only. They do not address the toxicologic interactions of chemical mixtures.