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**Federal Register**

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**Part XII**

**Environmental  
Protection Agency**

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**40 CFR Parts 141, 142, and 143  
National Primary Drinking Water  
Regulations; Final Rule**





**ENVIRONMENTAL PROTECTION  
AGENCY**
**40 CFR Part 141, 142 and 143**
**RIN 2040-AA55**
**[FRL-3960-1]**

**Drinking Water; National Primary Drinking Water Regulations; Monitoring for Volatile Organic Chemicals; MCLGs and MCLs for Aldicarb, Aldicarb Sulfoxide, Aldicarb Sulfone, Pentachlorophenol, and Barium**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** In this notice, EPA is revising monitoring requirements for eight volatile organic contaminants (VOCs) originally promulgated July 8, 1987. This change synchronizes requirements for these eight VOCs with monitoring requirements for VOCs promulgated on January 30, 1991 (56 FR 3526). EPA is also promulgating the MCLGs and MCLs for aldicarb, aldicarb sulfoxide, aldicarb sulfone, pentachlorophenol, and barium. This Notice also corrects errors and clarifies certain issues in the final rule promulgating 33 National Primary Drinking Water Regulations promulgated January 30, 1991 (56 FR 3526).

**EFFECTIVE DATE:** The amendments to § 141.6, paragraph (c) of the table in § 141.12, and § 141.62(b)(1) are effective July 1, 1991. The amendments to §§ 141.11(b), 141.23, 141.24, 142.57, 143.4(b)(12) and (b)(13), are effective July 30, 1992. The revisions to § 141.32(e)(16), (25) through (27) and (46); § 141.50(a)(15), (b)(4), (b)(5) and (b)(6); § 141.51(b)(3); § 141.61(c)(2), (c)3, (c)(4) and (c)(16); § 141.62(b)(3) are effective January 1, 1993.

The barium information collection requirements of § 141.23 are effective January 1, 1993, if the information Collection Request is cleared by the Office of Management and Budget (OMB). If not, EPA will publish a document delaying the effective date of the barium information collection requirements. Otherwise, the requirements will be effective when OMB clears the request at which time a document will be published in the Federal Register establishing the effective date.

In accordance with 40 CFR 23.7, this regulation shall be considered final Agency action for the purposes of judicial review at 1 p.m., Eastern time on July 15, 1991.

**ADDRESSES:** A copy of the public comments received, EPA responses, and all other supporting documents (including references included in this notice) are available for review at the U.S. Environmental Protection Agency (EPA), Drinking Water Docket, 401 M Street, SW., Washington, DC 20460. For access to the docket materials, call 202-382-3027 between 9 a.m. and 3:30 p.m. Any document referenced by an MRID number is available by contacting Susan Laurence, Freedom of Information Office, Office of Pesticide Programs, at 703-557-4454.

Copies of health criteria, analytical methods, and regulatory impact analysis documents are available for a fee from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-336-4700, local: 703-487-4650.

**FOR FURTHER INFORMATION, CONTACT:** Al Havinga, Standards Division, Office of Ground Water and Drinking Water (WH-550), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, 202/382-5555. General information may also be obtained from the EPA Drinking Water Hotline. The toll-free number is 800/426-4791, Alaska and local: 202/382-5533.

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**I. Statutory Authority**

The Safe Drinking Water Act ("SDWA" or "the Act"), as amended in 1986 (Pub. L. 99-339, 100 Stat. 642),

requires EPA to publish "maximum contaminant level goals" (MCLGs) for contaminants which, in the judgment of the Administrator, "may have any adverse effect on the health of persons and which [are] known or anticipated to occur in public water systems" (section 1412(b)(3)(A)). MCLGs are to be set at a level at which "no known or anticipated adverse effects on the health of persons occur and which [allow] an adequate margin of safety" (see section 1412(b)(4)).

At the same time EPA publishes an MCLG, which is a non-enforceable health goal, it must also promulgate a National Primary Drinking Water Regulation (NPDWR) which includes either (1) a maximum contaminant level (MCL), or (2) a required treatment technique (section 1401(1), 1412(a)(3), and 1412(b)(7)(A)). A treatment technique may be set only if it is not "economically or technologically feasible" to ascertain the level of a contaminant (sections 1401(1) and 1412(b)(7)(A)). An MCL must be set as close to the MCLG as feasible (section 1412(b)(4)). Under the Act, "feasible" means "feasible with the use of the best technology, treatment techniques and other means which the Administrator finds are available, after examination for efficacy under field conditions and not solely under laboratory conditions (taking cost into consideration)" (section 1412(b)(5)). NPDWRs also include monitoring, analytical and quality assurance requirements, specifically, "criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels \* \* \*" (section 1401(1)(D)). Section 1445 of SDWA also authorizes EPA to promulgate monitoring requirements.

**II. Regulatory Background**

On July 8, 1987 EPA promulgated NPDWRs for eight volatile organic contaminants (VOC rule, 52 FR 25690). On May 22, 1989 EPA proposed VOC monitoring requirements for 10 contaminants and MCLGs and MCLs for 38 contaminants including aldicarb, aldicarb sulfoxide, aldicarb sulfone, pentachlorophenol, and barium. The MCLGs and MCLs for these five chemicals were repropoed on January 30, 1991 (56 FR 3600) at different levels due to information which was received and/or analyzed by the Agency subsequent to the May 22, 1989 proposal.

The monitoring requirements outlined in today's rule for the most part mirror (with several exceptions, as noted below) the VOC requirements published



on January 30, 1991 for the 10 VOCs in the Phase II rule. EPA stated in the reproposal that changes to the proposal incorporated in the final rule would apply to monitoring requirements for both the 10 VOCs promulgated January 30, 1991 and the 8 VOCs included in today's rule. This ensures the monitoring requirements for the 18 VOCs (the 8 Phase I VOCs and the 10 Phase II VOCs) remain identical. Consequently, the changes published today will also apply to the monitoring requirements for the 10 Phase II VOCs published January 30, 1991.

### III. Explanation of Today's Action

#### A. VOC Monitoring Requirements

##### 1. Standardized Monitoring Framework

In response to comments received on the May 22, 1989 Phase II proposed rule, EPA developed a standardized monitoring framework to address the issues of complexity, coordination between various regulations, and synchronization of monitoring schedules. EPA stated that this framework would serve as a guide for future source-related monitoring requirements adopted by the Agency.

Comments submitted to EPA during the comment period revealed support for the standardized monitoring framework. Within this standardized framework each State must designate approximately one-third of the systems to conduct initial monitoring during each year of the initial compliance period (i.e. one-third in 1992, one-third in 1994 and one-third in 1995). This arrangement is intended to level the anticipated workload.

Most commenters believed that the framework does achieve the goals of synchronization of monitoring schedules. Most comments received by the Agency addressed specific issues related to changes in the VOC monitoring requirements and how the 1987 VOC requirements will be coordinated with the Phase II requirements promulgated January 30, 1991.

The monitoring requirements outlined in today's rule for the most part mirror (with several exceptions as discussed below) the VOC requirements promulgated in January 1991 for 10 VOCs. EPA stated in the proposal for today's rule that if comments and information received during the comment period result in changes to this proposal, EPA will promulgate a final rule which will also apply to monitoring requirements for the 10 VOCs promulgated on January 30, 1991. This ensures that the monitoring requirements for the 18 VOCs (the 8 Phase I and 10 Phase II

VOCs) remain identical. Consequently, the changes promulgated today will also apply to the monitoring requirements for the 10 VOCs published January 30, 1991.

##### 2. Sampling Points

In the proposal EPA stated that the Agency had received information suggesting that petroleum and hazardous material spills and leaks have contributed to drinking water contamination in systems using plastic pipe. EPA stated that it is concerned about this issue because this contamination typically occurs after the designated sampling point and consequently would not be detected. As a result EPA proposed in § 141.24 (f) (1) and (2) that "if conditions warrant, the State may designate additional sampling points within the distribution system or at the consumer's tap, which more accurately determines consumer exposure."

Most comments received on the proposed change to the sampling points opposed the concept. Objections raised by commenters addressed three major issues: (1) Whether the SDWA granted EPA the legal authority to require sampling at the consumer's tap; (2) permeation of plastic pipe typically occurs in service lines and thus is generally within the consumer's control; and (3) the Agency failed to specify best available technology to address this problem. While not agreeing with these comments, the Agency has decided to give further consideration to options addressing the issue of VOC permeation of plastic pipe. Accordingly, EPA has dropped this proposed monitoring provision in the final rule. As noted above, because the Agency intends that the VOC monitoring requirements are identical, this decision to withdraw the changes in the sampling points will also apply to the final rule published January 30, 1991. The Agency intends to address this issue in a subsequent rulemaking seeking additional information and solutions to the permeation issue.

##### 3. Initial and Repeat Base Monitoring Requirements

In the VOC regulations promulgated in July 1987, distinctions in base (or minimum) requirements were made between ground and surface water systems, systems which have more than or less than 500 service connections, and vulnerable/non-vulnerable systems. In streamlining the requirements, EPA proposed that all systems (regardless of system size) take four quarterly samples each compliance period. After the initial round of four quarterly samples, all systems which do not detect VOCs in the initial round of quarterly sampling

would monitor annually beginning in the next calendar year after quarterly sampling is completed. Ground water systems which conducted at least three years of annual and/or quarterly sampling and did not detect any VOCs would be allowed to reduce the sampling frequency to a single sample every three years. EPA also proposed that systems could grandfather sampling results from the Section 1445 monitoring for unregulated contaminants for the initial compliance period even if only one sample rather than 4 quarterly samples were analyzed in the initial compliance period.

EPA received several comments disagreeing with the requirement that systems take four quarterly samples during the initial compliance period. These commenters cited the regulatory impact on small systems and non-transient water systems. In addition, one commenter suggested that "use" should be considered in determining the initial sampling frequency. Another commenter stated that increasing the sampling frequency to annual (rather than every 3 years) was a major policy shift and would have an adverse impact on small systems.

EPA continues to believe that 4 quarterly samples are necessary to establish a baseline of analytical results for any VOCs which occur with sufficient frequency. However, we note that because all systems must have completed their initial round of monitoring by January 1992 under existing requirements in § 141.24(g) (monitoring for 8 regulated contaminants) and § 141.40 (monitoring for unregulated VOC contaminants), the initial monitoring requirements (i.e., 4 quarterly samples) will only apply to new systems or those systems which have a new source. Most systems will be able to begin annual monitoring in January 1993 if the initial sampling results are grandfathered. We feel that initial sampling frequency based upon "use" is not practical or protective of public health because available occurrence data indicate that VOCs are found in virtually all geographic areas in the United States.

##### 4. Increased Monitoring

In the 1987 VOC rule, systems which detect VOCs (defined as any analytical result greater than 0.0005 mg/l) were required to monitor quarterly. Several commenters believed that this regulatory minimum detection limit was too low and should alternately be 30% or 80% of the MCL.

EPA notes that the 0.0005 mg/l requirement has been in effect since the



1987 VOC rule. This requirement serves to give early indication that contamination has occurred before a violation occurs. EPA acknowledges that false positives might rarely occur (i.e., less than one percent of the time) with a detection limit of 0.0005 mg/l. However, we note that requirements in § 141.24 (f)(13) also allow the State to require confirmation samples for positive or negative results. In addition, the State has the option to delete results of obvious sampling errors. EPA believes that States have sufficient discretion to address the issue of false positives through these provisions.

Another commenter argues that waivers will be difficult to obtain because of unreasonably low detection limits. EPA regulations do not allow systems which have detected VOCs to receive waivers because even detecting contamination is evidence that the system is vulnerable. This contamination should be further examined by additional monitoring.

Several commenters objected to the provision which allows States to reduce the sampling frequency of systems which detect contamination. One commenter believed that this determination should not be made for ground water systems until four quarters of monitoring have elapsed. EPA believes that the proposed requirement that the State determine the system is "reliably and dependably" below the MCL is protective of health. The two quarter requirement is sufficient as a minimum standard but we note that there may be situations where additional monitoring (beyond the two quarter/four quarter minimum) will be necessary to establish a baseline. In these cases, if the State does not make the "reliably and dependably" determination, systems will be required to continue to monitor quarterly.

#### 5. Vulnerability Assessments and Waivers

Most commenters agreed with the concept of vulnerability assessments and waivers particularly the provision for a separate vulnerability decision by consideration of use and susceptibility. Several commenters noted that the shift of responsibility from States to water systems to conduct vulnerability assessments could result in waivers being unavailable for small systems. Several commenters stated that additional guidance was necessary to ensure systems know how to conduct vulnerability assessments.

As stated in the proposal, EPA shifted the responsibility to conduct vulnerability assessments from States to water systems because we believe that

these assessments are part of the systems' monitoring responsibilities. In addition, previous comments indicated that State resource constraints precluded the conduct of vulnerability assessments. Consequently, EPA shifted the responsibility to conduct vulnerability assessments to water systems. EPA agrees with the commenters that additional guidance on how to conduct vulnerability assessments is needed and is currently developing such guidance. This guidance will be completed and made available to water systems and States prior to the compliance period which begins January 1, 1993.

Our goals are to efficiently utilize State and PWS resources and to be consistent with Phase II monitoring requirements. EPA believes that today's rule furthers these goals.

#### B. Aldicarb, Aldicarb Sulfoxide and Aldicarb Sulfone

##### 1. Aldicarb, Aldicarb Sulfoxide and Aldicarb Sulfone MCLGs

On January 30, 1991 EPA repropoed MCLGs for aldicarb, aldicarb sulfoxide, and aldicarb sulfone at 0.001, 0.001, and 0.002 mg/kg/day. The MCLG for each of the three chemicals was based on a revised RfD adopted in August 1990 that reflected non-cancer endpoints of toxicity, cholinesterase inhibition (ChEI), and, for the parent compound (aldicarb), clinical signs in animals (soft mucoid stool and diarrhea) and humans (nausea, vomiting and diarrhea in some sensitive individuals were noted in epidemiological data). Cancer classification is Group D (inadequate human evidence of carcinogenicity).

#### Public Comments

EPA has previously addressed the public comments received in response to the proposals of November 13, 1985 and May 22, 1989 in the Federal Register notice of January 30, 1991 (56 FR 3600). Four commenters responded to the January 1991 proposal. One commenter argued that EPA's RfD of 0.0002 mg/kg/day used in developing the proposed aldicarb MCLG is legally and scientifically unsupportable. In support of this position, the commenter cited the May 23, 1990 recommendation of the joint study group of the Agency's Science Advisory Board and Scientific Advisory Panel (SAB/SAP) that ChEI is not an adverse effect and therefore should not be the basis of EPA regulation for aldicarb. One commenter advised that the Agency establish the MCLG and MCL for aldicarb and the sulfoxide metabolite based on the Haines (1971) human study. This

commenter suggested using the NOAEL for clinical signs in this study, 0.05 mg/kg, and a 10-fold uncertainty factor (UF) to establish the MCLG. For aldicarb sulfone, this commenter indicated that the lowest dose tested in the one-year dog feeding study (Hazleton Labs, 1987), 0.11 mg/kg/day, is the NOAEL and should be used with a 10-fold UF to establish the MCLG for aldicarb sulfone.

Two additional commenters agreed with the position expressed by the first commenter relative to the SAB/SAP recommendation on ChEI as only a marker of exposure, and that the Agency should not lower the RfD for aldicarb. However, one of these two commenters noted that the MCLG should be based on child exposure.

A fourth commenter indicated that the repropoed MCLGs for aldicarb, aldicarb sulfoxide, and aldicarb sulfone, based on the revised RfD of 0.0002 mg/kg/day, may not provide a sufficient margin of safety against acute toxic symptoms in the general population at levels as low as 0.0011 mg/kg/day.

The first commenter also noted that establishing an MCLG based on ChEI is inconsistent with the Agency regulation for fluoride and silver.

#### Response to Public Comments

Aldicarb and aldicarb sulfoxide. The Agency repropoed an MCLG of 0.001 mg/l for aldicarb and aldicarb sulfoxide based on a revised RfD of 0.0002 mg/kg/day (July, 1990), as described in the January 30, 1991 Notice (56 FR 3604). This RfD was based on clinical effects and cholinesterase inhibition (ChEI) in animals and humans following exposure to aldicarb. The Agency sought public comment on considering both clinical signs and ChEI in setting the RfD and, in turn, the MCLG.

Many of the studies considered in the risk assessment for both aldicarb and aldicarb sulfoxide reported ChEI in exposed humans or animals. Consideration of blood ChEI as an adverse effect has been and remains controversial among the scientific community. ChEI may be significantly inhibited in the blood without apparent signs of impaired function, histological damage or other clinical effects in exposed individuals. There are instances, though, where low levels of ChEI are observed along with clinical manifestations. A more detailed discussion of the levels of ChEI for the studies considered in the risk assessment of aldicarb and its sulfoxide is given in the January 30, 1991 Notice.

The Agency agrees with the public comments in that blood ChEI can be considered as a biomarker of exposure.



However, to be protective of public health, the Agency considers that ChEI can not be totally discounted in the risk assessment for aldicarb, aldicarb sulfoxide, and aldicarb sulfone. The Agency is currently evaluating the correlation between ChEI and clinical signs of toxicity. If the conclusions of this evaluation alter the basis presented for the MCLG in this notice, then the Agency will initiate a process for determining whether the MCLG should be revised. Thus, after consideration of public comments, the Agency has decided to base the final MCLG for aldicarb, aldicarb sulfoxide, and aldicarb sulfone, on clinical signs. EPA will continue to examine the relevance of using ChEI in establishing an MCLG. Over a period of time this effort is expected to resolve the questions related to the significance of ChEI.

Because the controversy has not yet been fully resolved, EPA developed an alternative approach for setting the MCLG, using clinical signs.

Since both the Agency-verified RfD and the alternative derivation of the MCLG result in an MCLG value of 0.001 mg/l, the Agency is promulgating the MCLG at this level. An MCLG of 0.001 mg/l will be sufficiently protective of public health.

The final MCLG of 0.001 mg/l is based on signs of clinical toxicity in dogs and humans exposed to aldicarb. The quantitative assessment stems from a no-effect level for clinical effects of 0.02 mg/kg/day as determined in a 1-year dog study (Hazelton Labs. Inc., 1988). At higher doses, effects such as diarrhea and soft stools were observed. The Agency has determined that these signs are representative of clinical signs of toxicity. In keeping with general Agency practice (56 FR 3532), an uncertainty factor of 100 was used to account for a no-effect level from an animal study that considers intra- and interspecies differences in response to toxicity. The resulting value, 0.0002 mg/kg/day, is numerically the same as the RfD which considers both clinical effects and ChEI. This was adjusted by the assumption of a 70 kg adult drinking an average of 2 liters water per day and a relative source contribution of 20% to yield an MCLG of 0.001 mg/l.

The no-effect level of 0.02 mg/kg/day and resulting MCLG of 0.001 mg/l is supported qualitatively by a controlled human study (Haines, 1971) and takes into consideration the observation reported in the Goldman study (1990). In the Haines study, no significant clinical effects were observed in four healthy males given doses of 0.025 or 0.05 mg/kg/day. A higher dose of 0.1 mg/kg/day resulted in neurological effects. The no-

effect level of 0.05 mg/kg/day was not used as the sole basis for the MCLG because of the limited scope of the study such that a sensitive population may not have been studied, and the narrow range between the no-effect level and the effect level. Moreover, Goldman et al. reported clinical effects at estimated doses lower than those reported by Haines.

Goldman et al. reported clinical effects in humans (including women and children) following three separate incidents involving aldicarb/aldicarb sulfoxide in California. Exposure to aldicarb sulfoxide from the contaminated watermelons and cucumbers were estimated to range from 0.002 to 0.08 mg/kg body weight. A low effect level for clinical effects was estimated at 0.002 mg/kg. This study is not used as the sole basis for the MCLG, however, since the authors noted that the dosage calculations were uncertain and because of the wide range of human sensitivity demonstrated by these individuals. The authors relied on self-reports of food consumption, estimates of weight consumed and estimates of body weight.

Although each of the studies has limitations, as described above, the Agency has determined that the dog and human studies taken together support the calculation of an MCLG of 0.001 mg/l.

In summary, the Agency is promulgating an MCLG of 0.001 mg/l for aldicarb and aldicarb sulfoxide based on a weight of evidence of clinical signs of toxicity observed in humans and animals.

#### *Aldicarb sulfone.*

The Agency repropoed an MCLG of 0.002 mg/L for aldicarb sulfone in the January 30, 1991 notice. This level was based on a no-observed-adverse-effect level for ChEI in blood of 0.1 mg/kg/day and an uncertainty factor of 300. Information on clinical effects in the study was not reported.

Aldicarb sulfone is considered less toxic than the parent based on a 25-fold difference in acute toxicity; the LD<sub>50</sub> for the sulfone is 25 mg/kg/day compared to the LD<sub>50</sub> for aldicarb of 1 mg/kg/day. No data are available to determine clinical effects or chronic toxicity associated with exposure to aldicarb sulfone. As stated above, the Agency is currently evaluating the correlation between ChEI and clinical signs of toxicity. Thus, the Agency will not use the MCLG of 0.002 mg/L proposed for the sulfone in the reproposal. Rather, to be protective of public health, the Agency is promulgating the MCLG of 0.001 mg/L established for aldicarb and

aldicarb sulfoxide, based on clinical signs of toxicity as a surrogate for the sulfone. If the conclusions of the Agency evaluation of ChEI alter the basis for the MCLG, then the Agency will initiate a process for determining whether the MCLG for aldicarb sulfone should be revised.

In summary, the Agency is promulgating an MCLG of 0.001 mg/l for aldicarb sulfone.

#### 2. Aldicarb, Aldicarb Sulfoxide, and Aldicarb Sulfone MCLs

The proposed MCLs for aldicarb, aldicarb sulfoxide, and aldicarb sulfone were based upon an analysis of several factors including: (1) The effectiveness of the best available technology (BAT—granular activated carbon) in removing aldicarb, aldicarb sulfoxide, and aldicarb sulfone to levels at or below the proposed MCLs of 0.003 mg/l; (2) the feasibility (including costs) of applying BAT for large systems. EPA estimated that the cost to remove aldicarb, aldicarb sulfoxide and aldicarb sulfone using GAC to be \$10-14 per household and thus feasible; and (3) the performance of analytical methods as reflected in the practical quantification level (PQL) for each contaminant. In the proposed notice EPA stated that data from Water Supply Studies showed that the PQLs for aldicarb, aldicarb sulfoxide, and aldicarb sulfone could be set at 0.003 mg/l by broadening the acceptance limits to ±55%.

The pivotal comments concerned establishing the PQL for aldicarb, aldicarb sulfoxide, and aldicarb sulfone. One commenter noted that Water Supply Studies #22-25 which were used to calculate the PQL did not "bracket" the proposed levels. This commenter noted that the lowest levels in Water Supply Studies #22-25 were 0.00947 mg/l for aldicarb, 0.00867 mg/l for aldicarb sulfoxide, and 0.00833 mg/l for aldicarb sulfone. Several commenters objected to EPA's adjustment of PQL acceptance limits to achieve lower MCLs. These commenters noted that the usual Agency practice is to use ± 20% or ± 40% of the true value. These commenters objected to the Agency's broadening the acceptance limits to ± 55% arguing instead that EPA should use a single fixed acceptance limit.

After considering the comments, EPA decided to revisit the rationale on which the PQLs were based. As a result, the Agency concluded that the elements of the rationale that involved extrapolating data were inappropriate for this compound.

EPA set the proposed PQLs of 0.003 mg/l by extrapolating from the lowest



levels in Water Supply Studies #22-25 to the point at which 75 percent of the participating laboratories would be able to analyze within +55 percent of the true value. EPA used this extrapolation technique because the Water Supply Studies #22-25 study designs did not include the levels of concern, i.e., MCLGs of 0.001 and 0.002 mg/l proposed in the January 1991 Notice (56 FR 3606).

The existing Water Supply Studies were designed to provide data for assessment of laboratory performance at levels of concern which were higher (i.e., MCLGs of 0.003 mg/l proposed in November 1985 (50 FR 46986) and 0.01 and 0.04 mg/l proposed in May 1989 (54 FR 22080)). In this case, the levels evaluated in the Water Supply Studies were above the toxicological levels of concern (0.001 mg/l) for aldicarb, aldicarb sulfoxide and aldicarb sulfone as proposed in January 1991. For this reason we decided to use an alternate procedure for setting the PQL for aldicarb, which sets the PQL at five times the interlaboratory method detection limit (IMDL), was first discussed in setting the MCL for vinyl chloride (52 FR 25690, July 1987). This procedure is used to set the PQL when there is not water supply study data at the level of concern or when the usual procedure would result in a PQL which poses a greater than 10<sup>-4</sup> cancer risk.

The aldicarb, aldicarb sulfoxide and aldicarb sulfone PQLs were determined using the range of 5 to 10 times the IMDL. The PQLs of 0.003, 0.004 and 0.002 mg/l for aldicarb, aldicarb sulfoxide and aldicarb sulfone, respectively, are based on the lower factor of 5 times the respective IMDLs (i.e., 0.0005, 0.0008 and 0.0003 mg/l). EPA has previously stated (i.e., EDB (56 FR 3526)) that the use of 5 times the IMDL instead of 10 times the MDL to set the PQL may be appropriate when other considerations suggest the PQL should be lower (i.e., where there is a lack of performance evaluation data at the level of concern for a particular contaminant). In the case of aldicarb and its metabolites, the Agency has decided to base the PQL on 5 times the IMDL because (a) it is feasible and (b) it is closer to the MCLG than the 10 multiplier.

The validation study for Method 531.1 (the approved method for the aldicarbs) provides evidence that a PQL of 3.0 mg/l is achievable for aldicarb. The design for this study is comparable to that of the Water Supply Studies (i.e., unknown concentrations, reagent grade water, collaborative). The level of 0.003 mg/l (3.24 µg/l, was analyzed for aldicarb in the study and resulted in good precision and accuracy with a mean recovery of

3.24 µg/l and a standard deviation of 0.33 µg/l. Results of analyses for aldicarb sulfoxide and aldicarb sulfone also had good precision and accuracy but the levels analyzed were at levels of 6.40 and 6.44 µg/l, respectively. EPA believes that these method validation results give additional support for the PQLs.

EPA recognizes that, at the PQL levels chosen, slightly less precision and accuracy will occur. However, EPA believes that it is appropriate to accept less precision in order to obtain more stringent levels of control. Because of the lack of performance evaluation studies at the MCLG, the acceptance limits for aldicarb, aldicarb sulfoxide and aldicarb sulfone will be based on two standard deviations using Water Supply Study statistics. EPA will reevaluate this when it acquires the appropriate data at levels below or at the PQLs, from ongoing Water Supply Study data to assess "fixed true-value" acceptance limits. EPA also believes that the precision and accuracy at these levels will improve after more use of the relatively new methodology.

EPA has examined the health risks of setting the MCLs above the MCLGs of 0.001 mg/l. Children are the most sensitive population for these compounds. However, a child likely would not consume a whole liter at one time. More typically children consume water throughout the day and this would mitigate against adverse effects at the MCLs and below. The adverse effects of aldicarb are thought to be reversible within 4 to 6 hours at higher levels of exposure. Therefore, EPA believes that the MCLs of 0.003 mg/l for aldicarb, 0.004 mg/l for aldicarb sulfoxide and 0.002 mg/l for aldicarb sulfone are protective for children. Until the analytical chemistry and laboratory performance improve, EPA believes the MCLs for aldicarb, aldicarb sulfoxide, and aldicarb sulfone are set at the lowest level feasible. Consequently, for the reasons cited above the MCL for aldicarb, aldicarb sulfoxide and aldicarb sulfone are established at 0.003 mg/l, 0.004 mg/l and 0.002 mg/l, respectively.

### C. Pentachlorophenol

#### 1. Pentachlorophenol MCLG

On January 30, 1991, EPA proposed an MCLG of zero, based on a drinking water contaminant classification of Category I for pentachlorophenol (PCP). This proposal was based on the classification of PCP as a Class B2 carcinogen under EPA's cancer classification system (i.e., probable human carcinogen). EPA, in reaching the B2 classification, determined that there

is sufficient evidence of carcinogenicity for pentachlorophenol from animal studies. This decision was supported by the Science Advisory Board in April 1990. Two grades of pentachlorophenol (purified commercial and technical grades) both induced multiple tumor types at different dose levels in male and female mice.

#### Summary of Comments

Three organizations submitted comments on the Agency's carcinogen classification for PCP. All three commenters believe that the carcinogenic evidence from animal studies is limited. These commenters argued that PCP should be classified in Class C (with an MCLG of 0.2 mg/l), based on a National Toxicology Program bioassay which detected a response in only one species of B6C3F1 mice. These commenters cited other negative rodent studies. One commenter calculated the cancer risk and claimed that EPA overestimated the cancer risk by a factor of 10.

#### EPA's Response to the Comments

After careful review of the comments, EPA reaffirmed that pentachlorophenol should be classified as B2 carcinogen (probable human carcinogen). The studies cited by the commenters were previously considered by the Agency and no new information was provided by the commenter.

EPA's B2 classification is based on inadequate human data and sufficient evidence of carcinogenicity in animals: statistically significant increases in the incidences of multiple biologically significant tumor types (hepatocellular adenomas and carcinomas, adrenal medulla pheochromocytomas and malignant pheochromocytomas, and/or hemangiosarcomas and hemangiomas), in one or both sexes of B6C3F1 mice using two different preparations of pentachlorophenol. In addition, a high incidence of two uncommon tumors (hemangiomas/hemangiosarcomas and adrenal medulla pheochromocytomas) was observed with both preparations. This classification is supported by mutagenicity data, which provide some indication that PCP has clastogenic potential.

Several studies in rodents cited by commenters were unable to demonstrate the carcinogenicity of PCP. However, these studies were all judged by EPA to be limited and not useful for drawing conclusions concerning the carcinogenicity of PCP. The study reported by Innes et al. (1969) used only one dose with an insufficient number of animals. The study by Catilina (1981)



used an inappropriate route of administration with only one dose, and there was excessive mortality. The study by Schwetz et al. (1978) used an inadequate number of animals, and it is not clear whether the maximum tolerated dose (MTD) had been met. Finally, the dose level, frequency and duration of exposure were limited in the study by Boutwell and Bosch (1959).

In quantifying the cancer risk, EPA used pooled tumor incidence of hemangiosarcoma/hemangioma, pheochromocytomas and liver neoplasm in the female mice to obtain a slope factor of 0.12 per (mg/kg) /day. This slope factor results in a unit risk of  $3 \times 10^{-6}$  per ( $\mu\text{g/l}$ ). This means an adult person who drinks 2 liters of contaminated water per day for life (70 years), is expected to have an upper bound cancer risk of 3 in a million at a concentration of 1  $\mu\text{g/l}$  water. Thus, at the proposed MCL of 1  $\mu\text{g/l}$ , the upper bound risk of cancer is within the  $10^{-4}$  to  $10^{-6}$  range. The statement in the January 30 Federal Register (page 3608) that "A cancer unit risk estimate of 4.76 E-08 cases/person ( $\mu\text{g/l}$ ) /yr" should be deleted.

#### EPA Conclusion

EPA reaffirms the Class B2 classification for pentachlorophenol and places pentachlorophenol in drinking water contaminant Category I. Consequently, the MCLG is set at zero.

#### 2. Pentachlorophenol MCL

The proposed MCL for pentachlorophenol was based upon an analysis of several factors including: (1) The effectiveness of the best available technology, granular activated carbon, in reducing influent concentrations to the proposed MCL of 0.001 mg/l or less; (2) the feasibility (including costs) of applying BAT for large systems at approximately \$10 per household per year; (3) the performance of available analytical methods as reflected in the PQL. Data from Water Supply Studies #22-25 indicated that the PQL could be established at 0.001 mg/l with an acceptance limit of  $\pm 50\%$ ; and (4) comparison of the individual lifetime carcinogenic risk of  $3 \times 10^{-6}$  for the MCL to EPA's target risk range of  $10^{-4}$  to  $10^{-6}$ . EPA requested comment on whether the MCL should be established at a level below the  $10^{-6}$  risk level.

EPA received numerous comments on the PQL. Commenters noted (1) that EPA failed to identify the procedures it used to derive the PQL; (2) that EPA underestimated the analytical variability at the MCL; and (3) that the proposed MCL will yield unacceptably large laboratory performance

variability. Several organizations commented on the question of whether the PQL should be established at a level below the 10/ $-6$ / risk range. These commenters stated that health risk should not be part of the PQL determination. Several commenters noted that EPA has yet to establish a consistent approach to establishing PQLs. These commenters stated that the PQL should be determined independently and not set to achieve an MCL that is within EPA's acceptable risk range. Several commenters stated that they do not favor development of MCLs below the 10/ $-6$ / risk range. One commenter argued that EPA should establish the MCL at the 10/ $-6$ / risk range (i.e., 0.0003 mg/l).

The procedures EPA used to establish the PQL for pentachlorophenol are similar to those used in the PQL assessments for prior regulated contaminants, i.e., the eight VOCs on July 8, 1987 (52 FR 25690) and 33 pesticides, VOCs and IOCs on January 30, 1991 (56 FR 3526). The procedures EPA uses to establish PQLs are described in the July 8, 1987 Notice on pp. 25699-25700. EPA believes that its establishment of the pentachlorophenol PQL is consistent with its policy as articulated in those prior Notices.

As stated in the January 1991 proposed rule, EPA in May 1989 estimated the PQL to be 0.001 mg/l, which was based on 10 times the IMDL, because of the lack of Water Supply Study data. EPA has previously used this estimation technique for several contaminants. This level is typically a higher level than the MDL and represents a practical and routinely achievable level with reasonable certainty that the reported value is reliable. EPA subsequently received and analyzed Water Supply Study data to determine the proposed PQL with accompanying acceptance limits.

Based on our reanalysis of the Water Supply Study data, the Agency concluded that the data did not support the proposed PQL of 0.0001 mg/l. This was evident by the erratic laboratory performance for concentrations that were less than 0.0001 mg/l. Consequently, a revised PQL was assessed using the procedures described above. The pentachlorophenol PQL is based upon the results of EPA and State laboratory data from Water Supply Studies #22-25. EPA calculated the  $\pm 50$  percent acceptance limits (i.e., true value of the sample  $\pm 50$  percent) based upon these Water Supply Study statistics. The "plus or minus percent of the true value" acceptance limits were derived taking into consideration the expected precision and accuracy. This

range closely approximates the 95 percent confidence limit estimated from the regression equation determined from the Water Supply Study data. EPA believes a PQL is achievable if the Water Supply Studies show that more than 75 percent of the laboratories are within the target range. In the case of pentachlorophenol, the PQL was set at a concentration where at least 75 percent of the EPA and State laboratories were within the specified acceptance range. A plot of the percent of laboratories passing (within the  $\pm 50$  percent acceptance range) versus true concentration of the samples demonstrated that the PQL should be set at 0.001 mg/l. EPA subsequently included data from Water Supply Studies #26 and #27 in its analysis. These data confirm that concentrations equal to or greater than the PQL of 0.001 mg/l with an acceptance limit of  $\pm 50$  percent provides a performance target for laboratories that is achievable by 75 percent of the EPA and State laboratories.

Several commenters noted that a  $\pm 50$  percent acceptance limit will result in unacceptable analytical variability among laboratories. These commenters argued that EPA must establish a lower fixed acceptance range (i.e.,  $\pm 20\%$  or  $\pm 40\%$ ). Though EPA agrees with these commenters that a single fixed acceptance limit is desirable, EPA has not established these limits because (1) many of the methods are relatively new and require sophisticated equipment and highly trained analysts which still results in variable laboratory performance and (2) the analysis of Water Supply Study data demonstrates that laboratory performance can in fact vary for some of the contaminants. As laboratories gain experience with the instrumentation and methodology, EPA anticipates improvements in laboratory performance. EPA is continually evaluating ongoing Water Supply Study data as it becomes available. These evaluations help determine whether the acceptance limits for regulated contaminants should be amended as laboratory performance improves.

As indicated previously, several commenters stated that they do not favor establishing MCLs below 10/ $-6$ / risk. This view is consistent with the Agency's policy of setting drinking water standards within the 10/ $-4$ / to 10/ $-6$ / lifetime risk range. In response to the commenter who supported setting the MCL for PCP at 0.0003 mg/l (i.e., 10/ $-6$ / lifetime risk), we note this regulatory level is not feasible at this time because it is less than the PQL of 0.001 mg/l.



## D. Barium

### 1. Barium MCLG

In May, 1989 EPA proposed an MCLG of 5 mg/l based upon the Wones et al. (1987) human clinical study which failed to detect adverse effects at 10.0 mg/l. EPA applied an uncertainty factor of 2 to derive an MCLG of 5 mg/l. Subsequent to the May, 1989 proposal, the Agency adopted an RfD of 0.07 mg/kg/day which was based on the Wones 1990 study (an update of the Wones 1987 study). This RfD was adjusted for the use of 1.5 liters per day in the study by using a NOAEL of 7.5 mg/l rather than the proposed 10.0 mg/l. In addition, the uncertainty factor changed from 2 to 3. The MCLG was calculated as follows:

$$\frac{(0.07 \text{ mg/kg/day})(70 \text{ kg})}{2 \text{ liters/day}} = 2.45 \text{ mg/l}$$

which was rounded to 2 mg/l. EPA did not factor the relative source contribution into this calculation since the basis for the RfD is a human study in which contributions from food and air were taken into account.

EPA received four comments from the public concerning the proposed 2 mg/l barium MCLG; all were opposed. One commenter argued that EPA was unreasonably conservative when it used an uncertainty factor (UF) of 3 in the calculations that were used to determine the proposed 2 mg/l barium MCLG. This comment recommended an MCLG of 10 mg/l based on the use of an UF of 1. Other comments recommended a higher MCLG, based on the use of an UF of 2. Two commenters argued that EPA should not have mathematically rounded down in the calculations that were used to arrive at the proposed 2 mg/l MCLG. Rather, this commenter recommended that EPA mathematically round up to yield an MCLG of 3 mg/l. One commenter argued that EPA should set separate standards for insoluble (e.g., barium sulfate) and soluble barium compounds (e.g., barium chloride) because the toxicity of these two species is different.

EPA realizes that there are valid arguments for an UF less than 3. Prior to the 2 mg/l proposal in January 1991, EPA considered an UF of 2. EPA believes that the UF should reflect the uncertainty in the data base—the greater the uncertainty in the data base, the greater the UF that should be used to determine the MCLG. That is, the greater the uncertainty about the human toxicity of a chemical, the more cautious the Agency should be in determining the UF. In EPA's judgment, the uncertainty in

the relevant barium data base is such as to require an UF of 3. Thus, EPA disagrees with those who recommend an UF less than 3.

EPA policy is to use the "rounded" RfD value in its calculation of the MCLG. In this case, the MCLG calculation noted previously based on the Agency RfD of 0.07 mg/kg/day yields an MCLG of 2.45 mg/l. This value is then rounded to a single significant figure of 2 mg/l.

We agree that an aqueous suspension of relatively insoluble barium sulfate is much less toxic than a solution of relatively soluble barium chloride. However, we do not believe that this fact is relevant to the MCLG determination. All available evidence indicates that at the same dissolved level in drinking water (i.e., mg/l dissolved barium), one barium salt should present the same toxicity as the other. Once dissolved in water, the barium ions produced by barium sulfate or barium chloride are indistinguishable and thus so is the resulting toxicity. Thus EPA disagrees with the recommendation that separate standards should be set for soluble and insoluble barium compounds.

For the reasons stated above, EPA continues to place barium in Category III and promulgates an MCLG of 2 mg/l.

### 2. Barium MCL

The current barium MCL of 1 mg/l was promulgated in 1975 (40 FR 59570). EPA notes the proposed MCL would raise the level from 1 mg/l to 2 mg/l. EPA continues to believe the current standard is feasible and consequently believes the revised standard of 2 mg/l is likewise feasible. Consequently, the MCL for barium is promulgated as proposed at 2 mg/l.

### E. 1415 Variance Option

In the proposal EPA stated that there may be some water supplies that serve more than 1,500 people (500 service connections) but fewer than 3,300 people (1,000 service connections) that face high compliance costs. Consequently, EPA proposed an option to allow variances to those systems not eligible for additional exemptions beyond the initial three-year exemption (i.e., systems serving more than 1,500 people but fewer than 3,300 people). EPA is not finalizing that proposal today but instead may repropose this option in the future.

### F. Analytical Methods

In the January 30, 1991 notice, EPA cited an improvement to EPA Method 525 evaluated by the EPA Environmental Monitoring and Support

Laboratory (56 FR 3550). The improved method uses C-18 LSE discs as well as the C-18 LSE cartridges. In addition, EPA noted in the January 30 notice that several commenters complained about the use of diazomethane as the esterifying agent in Method 515.1 for 2,4-D, 2,4,5-TP, and pentachlorophenol. While EPA laboratories have used this reagent safely for years, EPA agreed that this is a matter of concern. In the January notice, EPA recommended that in the interim those laboratories that do not wish to use diazomethane can use the derivation procedure in the packed column methods currently cited in 40 CFR 141.24(f) for 2,4-D and 2,4,5-TP. Pentachlorophenol can be analyzed by Method 525.

EPA has received several comments which questioned whether the procedures cited above (i.e., the disc cartridge for Method 525 and the derivation procedure for Method 515.1) are approved as EPA methods. EPA is removing this ambiguity by citing revised methods dated May, 1991 which allow the use of these procedures.

### G. Corrections to the January 30, 1991 Notice

This notice also corrects errors contained in the January 30, 1991 Notice (56 FR 3528) and adds clarifications to the regulatory language. These corrections and clarifications are described below.

In § 141.12(c) the maximum contaminant level for total trihalomethanes is changed from 0.1 mg/l to 0.10 mg/l.

In § 141.23(a)(4)(i) EPA has added language to clarify that a system which composites samples can use the original sample. It is not necessary for the system to retake the sample when contaminants are detected.

In § 141.23(i)(1) EPA added the word "method" in the last sentence to clarify which detection level applies for calculation of samples below zero.

In § 141.23(k)(1) the date in footnote 4 for "Methods for Determination of Inorganic Substances in Water Fluvial Sediments" is changed from 1985 to 1989. Also in (3c)(1), Method 270.3 is deleted from the approved list of methods. EPA discussed deleting this method on page 3548 of the January 30, 1991 notice.

In § 141.23(k)(2) Method 209.7a, Inductively Coupled Plasma, was an approved method and is added.

The table in § 141.23(k)(4) which lists holding times for mercury is changed to read 28 days for plastic and glass. This is consistent with Table 17 on page 3549 of the January 30, 1991 Notice.



In § 141.23(k)(5)(ii), the second nitrate in the table with an acceptance limit of ±15 percent, ≥0.4 mg/l is changed to nitrite ±15 percent ≥0.4 mg/l.

Revisions to § 141.23 Inorganic Chemical Sampling and Analytical Requirements inadvertently eliminated inorganic sampling and analytical requirements for the 9 inorganics listed in § 141.11. EPA is reinserting the previous inorganic monitoring and analytical requirements by adding paragraphs (l) through (q) to § 141.23 (previously § 141.23 (a) through (e)). This correction has the effect of retaining the previous inorganic requirements for cadmium, chromium, mercury, nitrate, and selenium until July 30, 1992; for barium until January 1, 1993; and beyond July 30, 1992 for arsenic.

Any alternate test procedures previously approved under § 141.27 for both inorganic and organic contaminants continue to be effective until July 30, 1992 and January 1, 1993, for barium.

In § 141.24(e), Method 505 can also be used to analyze for endrin and is added to the list of acceptable methods.

In § 141.24(h)(6) the sentence "After a maximum of four quarterly samples show the system is in compliance \* \* \*" is changed to read "After a minimum of four quarterly samples show the system is in compliance \* \* \*" (emphasis added). The reference to paragraph (h)(12) is changed to (h)(11).

In § 141.24(h)(12)(iv) toxaphene is added to the list of contaminants which can be analyzed using EPA Method 508.

In § 141.24(h)(13)(i) the reference to paragraph (h)(13) is changed to paragraph (h)(12).

The laboratory certification requirements for the pesticides were not included in the final rule. In § 141.24(h)(19) EPA is including laboratory certification requirements. The performance requirements were discussed and listed on pages 3550 to 3552 of the January 30, 1991 Notice.

In § 141.62(b) the MCL for fluoride is changed from 4 mg/l to 4.0 mg/l.

In § 141.57(b) the reference to § 141.52(h) should be changed to § 141.62(b).

In the footnotes to § 143.4 (12) and (13) the updated versions of the methods should have been cited. In footnote 2,

EPA Method 200.7, version 3.1, April 1990 is changed to version 3.2, August, 1990; In footnote 5, EPA Method 200.8, version 4.1, March 1990, is changed to version 4.3, August 1990; in footnote 6, EPA Method 200.9, version 1.0, April 1990, is changed to version 1.1, August 1990.

In § 143.4(12) a later version of the method is cited. EPA changes Method I-305i-84 to Method I-305i-85.

In § 143.4(13) a later version of the method is cited. EPA changes Method I-3720-84 to I-3720-85.

**IV. Economic Analysis**

Executive Order 12291 requires EPA and other regulatory agencies to perform a regulatory impact analysis (RIA) for all "major" regulations, which are defined as those regulations which impose an annual cost to the economy of \$100 million or more, or meet other criteria. The Agency has determined that the proposed rule is a minor rule for purposes of the Executive Order. This regulation has been reviewed by the Office of Management and Budget as required by the Executive Order and any comments they make will be available in the public docket.

In accordance with the Executive Order, the Agency previously conducted an assessment of the benefits and costs of regulatory alternatives as part of the Phase II rule which was promulgated in the January 30, 1991 Federal Register. This assessment in the Phase II rule determined the impacts of this regulation as part of the Phase II rule and consequently these impacts are not separately reconsidered in this notice.

**A. Regulatory Impact**

EPA's analysis conducted under the proposed rule for 38 contaminants (54 FR 22062, May 22, 1989) indicates that approximately 378 systems would violate the aldicarb MCL of 0.003 mg/l based on the uncertainty in the data base. EPA does not believe MCLs of 0.004 mg/l for aldicarb sulfoxide and 0.002 mg/l for aldicarb sulfone will change this estimate. An additional 825 systems would violate the MCL for pentachlorophenol.

One commenter provided information disputing EPA's estimate of the 378 systems which would violate the MCLs for aldicarb, aldicarb sulfoxide and

aldicarb sulfone. This commenter noted the relative lack of occurrence data to estimate regulatory impact. This commenter assumed 1% of the systems (654 systems) would exceed the MCL for aldicarb which is almost double the EPA estimate. EPA acknowledges the uncertainty in determining the regulatory impact and stated in the Proposed Notice that ±50% of its estimate of 378 systems (189 to 567) systems may violate the MCL. Though it is conceivable that 654 systems may violate the aldicarb MCL, EPA points out that the recently completed National Pesticide Survey did not detect aldicarb in any well at levels exceeding 0.00071 mg/l.

Several commenters stated that EPA should consider the impact of these regulatory requirements on the collateral effects which trickle down through other regulatory programs such as Superfund, the Clean Air Act (CAA), stream water quality standards under the Clean Water Act and requirements under the Resource Conservation and Recovery Act (RCRA). While EPA acknowledges that these secondary impacts may occur, the purpose of today's action is solely to establish drinking water standards that public water systems must comply with. Consequently, EPA does not consider the cost of secondary impacts which may occur under the CAA, Superfund, or RCRA. One commenter also noted that these secondary impacts also affect the water supply industry by increasing the waste and disposal costs of treatment. EPA is aware of this issue and did include the cost of disposal in the Regulatory Impact Analysis accompanying the January 30, 1991 final rule.

As stated earlier, EPA did not reconsider the costs for the proposed VOC monitoring requirements because those costs were considered in the final Phase II rule promulgated on January 30, 1991. The costs of today's VOC monitoring requirements have virtually no impact on the total cost of VOC monitoring primarily because a single analytical method can analyze a range of contaminants. Sampling for all VOC contaminants can be conducted at the same time.

TABLE 1.—REGULATORY IMPACT

Contaminant	Systems in violation	Annual treatment cost (\$million/yr)	Typical HH <sup>1</sup> treatment cost/system/year		
			Small <sup>2</sup>	Medium <sup>3</sup>	Large <sup>4</sup>
Aldicarb (including sulfoxide and sulfone)	378	\$6.7	600	39	10-14
Pentachlorophenol	825	\$19	600	39	10



TABLE 1.—REGULATORY IMPACT—Continued

Contaminant	Systems in violation	Annual treatment cost (\$million/yr)	Typical HH <sup>1</sup> treatment cost/system/year		
			Small <sup>2</sup>	Medium <sup>3</sup>	Large <sup>4</sup>
Barium .....	0	0	<sup>5</sup> \$230-460	<sup>5</sup> \$54-160	<sup>5</sup> \$26-110

<sup>1</sup> HH=household.  
<sup>2</sup> Small system serving 25-100 people.  
<sup>3</sup> Medium system serving 10,000-25,000 people. For Barium medium system serves 3,300-10,000 people.  
<sup>4</sup> Large systems serving more than 1,000,000 people.  
<sup>5</sup> Cost dependent upon BAT chosen.

We estimate that approximately 280,000 people will experience reduced exposure to aldicarb, aldicarb sulfoxide and aldicarb sulfone. Approximately 960,000 people will have reduced exposure to pentachlorophenol.

**B. Regulatory Flexibility Analysis**

The Regulatory Flexibility Act requires EPA to consider the effect of regulations on small entities. 5 U.S.C. 602 *et seq.* If there is a significant effect on a substantial number of small systems, the Agency must prepare a Regulatory Flexibility Analysis which describes significant alternatives which would minimize the impact on small entities. An analysis of the impact on small systems due to the MCL for aldicarb is included in the RIA which supported the final Phase II rule promulgated January 30, 1991. The Administrator has determined that the proposed rule, if promulgated, will not have a significant effect on a substantial number of small entities.

**C. Paperwork Reduction Act**

The information collection requirements in this rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* as part of the information collection requirements supporting the final Phase II rule on January 30, 1991. The information collection requirements are not effective until OMB approves them and a technical amendment to that effect is published in the Federal Register.

**List of Subjects in 40 CFR Parts 141, 142, and 143**

Chemicals, Reporting and recordkeeping requirements, Water supply, Administrative practice and procedure.

Dated: June 17, 1991.

William K. Reilly,  
 Administrator, Environmental Protection Agency.

For the reasons set forth in the preamble, title 40 of the Code of Federal Regulations is amended as follows:

**PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS**

1. The authority citation for part 141 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4 and 300j-9.

2. In § 141.6, paragraph (a) is revised and paragraph (g) is added to read as follows:

**§ 141.6 Effective dates.**

(a) Except as provided in paragraphs (b) through (g) of this section, the regulations set forth in this part shall take effect on June 24, 1977.

(g) The regulations contained in Section 141.6, paragraph (c) of the table in 141.12, and 141.62(b)(1) are effective July 1, 1991. The regulations contained in §§ 141.11(b), 141.23, 141.24, 142.57(b), 143.4(b)(12) and (b)(13), are effective July 30, 1992. The regulations contained in the revisions to §§ 141.32(e)(16), (25) through (27) and (46); 141.50(a)(15), (b)(4), (b)(5) and (b)(6); 141.51(b)(3); 141.61(c)(2), (c)(3), (c)(4) and (c)(16); 141.62(b)(3) are effective January 1, 1993.

3. Section 141.11 is amended by revising the introductory text of paragraph (b) to read as follows:

**§ 141.11 Maximum contaminant levels for inorganic chemicals.**

(b) The Maximum contaminant levels for cadmium, chromium, mercury, nitrate and selenium shall remain effective until July 30, 1992; the maximum contaminant level for lead shall remain effective until December 7, 1992; the maximum contaminant level for barium shall remain effective until January 1, 1993.

4. In § 141.12, paragraph (c) in the table is revised to read as follows:

**§ 141.12 Maximum contaminant levels for organic chemicals.**

	Level milli-grams per liter
(c) Total trihalomethanes (the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform)).....	0.10

\* \* \* \* \*  
 5. Section 141.23 which was published January 30, 1991 [56 FR 3526] and which will become effective July 30, 1992, is amended by revising paragraphs (a)(4)(i) (excluding the table) and (i)(1); revising the table in (k)(1); revising paragraph (k)(2); revising the table in (k)(4); revising the table in (k)(5)(ii); and adding paragraphs (l), (m), (n), (o), (p), and (q) to read as follows:

**§ 141.23 Inorganic chemical sampling and analytical requirements.**

- (a) \* \* \*
- (4) \* \* \*
- (i) If the concentration in the composite sample is greater than or equal to the detection limit of any inorganic chemical, then a follow-up sample must be analyzed within 14 days from each sampling point included in the composite. These samples must be analyzed for the contaminants which were detected in the composite sample. Detection limits for each analytical method are the following:
  - (i) \* \* \*

(1) For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for asbestos, barium, cadmium, chromium, fluoride, mercury, and selenium is determined by a running annual average at each sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the method detection limit shall



be calculated at zero for the purpose of determining the annual average.

(k) Inorganic analysis:

(1) \* \* \*

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology <sup>1,11</sup>	EPA <sup>1</sup>	Reference (Method No.)		
			ASTM <sup>2</sup>	SM <sup>3</sup>	Other
Asbestos	Transmission Electron Microscopy	EPA <sup>9</sup>			
Barium	Atomic absorption; furnace technique	208.2		304	
	Atomic absorption; direct aspiration	208.1		303C	
	Inductively-coupled plasma	200.7 <sup>1,6</sup>			
Cadmium	Atomic absorption; furnace technique	213.2		304	
	Inductively-coupled plasma	200.7A <sup>6</sup>			
Chromium	Atomic absorption; furnace technique	218.2		304 <sup>7</sup>	
	Inductively-coupled plasma	200.7 <sup>1,6</sup>			
Mercury	Manual cold vapor technique	245.1	D3223-86	303F	
	Automated cold vapor technique	245.2			
Nitrate	Manual cadmium reduction	353.3	D3867-90	418C	
	Automated hydrazine reduction	353.1			
	Automated cadmium reduction	353.2	D3867-90	416F	
	Ion selective electrode				WeWWG/5880 <sup>5</sup> B-1011 <sup>10</sup>
Nitrite	Ion chromatography	300.0			
	Spectrophotometric	354.1			
	Automated cadmium reduction	353.2	D3867-90	418F	
	Manual cadmium reduction	353.3	D3867-90	418C	
Selenium	Ion chromatography	300.0			B-1011 <sup>10</sup>
	Atomic absorption; gaseous hydride				
	Atomic absorption; furnace technique	270.2	D3859-88	304 <sup>8</sup>	

<sup>1</sup> Methods of Chemical Analysis of Water and Wastes, EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268 (EPA-600/4-79-020), March 1983. Available from ORD Publications, CERL, EPA, Cincinnati, OH 45268.

<sup>2</sup> Annual Book of ASTM Standards, Vol. 11.01 American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

<sup>3</sup> Standard Methods for the Examination of Water and Wastewater, 16th edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.

<sup>4</sup> Methods for Determination of Inorganic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey Books, Chapter A1, 1989, Open-File Report 85-495. Available from Open-File Services Section, Western Distribution Branch, U.S. Geological Survey, MS 306 Box 24525, Denver Federal Center, Denver, CO 80225.

<sup>5</sup> Orion Guide to Water and Wastewater Analysis, Form WeWWG/5880, p. 5, 1985. Orion Research, Inc., Cambridge, MA.

<sup>6</sup> 200.7A Inductively-Coupled Plasma Atomic Emission Analysis of Drinking Water, Appendix to Method 200.7, March, 1987, U.S. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268.

<sup>7</sup> The addition of 1 mL of 30% H<sub>2</sub>O<sub>2</sub> to each 100 mL of standards and samples is required before analysis.

<sup>8</sup> Prior to dilution of the Se calibration standard, add 2 mL of 30% H<sub>2</sub>O<sub>2</sub> for each 100 mL of standard.

<sup>9</sup> Analytical Method for Determination of Asbestos Fibers in Water, EPA-600/4-83-043, September 1983, U.S. EPA, Environmental Research Laboratory, Athens, GA 30613.

<sup>10</sup> Waters Test Method for the Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography, Method B-1011, Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

<sup>11</sup> For approved analytical procedures for metals, the technique applicable to total metals must be used.

(2) Analyses for arsenic shall be conducted using the following methods:

Method <sup>1</sup> 206.2, Atomic Absorption Furnace Technique; or Method <sup>1</sup> 206.3, or Method <sup>4</sup> D2972-88B, or Method <sup>2</sup>

307A, or Method <sup>3</sup> I-1062-85, Atomic Absorption—Gaseous Hydride; or Method <sup>1</sup> 206.4, or Method <sup>4</sup> D-2972-88A, or Method <sup>2</sup> 307B, Spectrophotometric, Silver Diethyl-

dithiocarbamate; or Method 200.7A, Inductively Coupled Plasma Technique <sup>5</sup>.

\* \* \* \* \*

(k)(4) \* \* \*

<sup>1</sup> Methods of Chemical Analysis of Water and Wastes, EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-600/4-79-020), March 1979. Available from ORD Publications, CERL, EPA, Cincinnati, Ohio 45268. For approved analytical procedures for metals, the technique applicable to total metals must be used.

<sup>2</sup> Standard Methods for the Examination of Water and Wastewater, 16th Edition, American

Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.

<sup>3</sup> Techniques of Water-Resources Investigation of the United States Geological Survey, Chapter A-1, "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Book 5, 1979, Stock #014-001-03177-9. Available from

Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

<sup>4</sup> Annual Book of ASTM Standards, part 31 Water, American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

<sup>5</sup> Appendix to Method 200.7, March 1987, U.S. EPA, Environmental Monitoring Systems Laboratory, Cincinnati, OH 45268.

Contaminant	Preservative	Container <sup>2</sup>	Time <sup>3</sup>
Asbestos	Cool, 4°C	P or G	
Barium <sup>1</sup>	Con HO <sub>2</sub> to pH <2	P or G	6 months.
Cadmium <sup>1</sup>	Con HO <sub>2</sub> to pH <2	P or G	6 months.
Chromium <sup>1</sup>	Con HO <sub>2</sub> to pH <2	P or G	6 months.
Fluoride <sup>1</sup>	None	P or G	1 month.
Mercury <sup>1</sup>	Con HO <sub>2</sub> to pH <2	P or G	28 days.
Nitrate:			
Chlorinated	Cool, 4°C	P or G	28 days.
Non-chlorinated	Con H <sub>2</sub> SO <sub>4</sub> to pH <2	P or G	14 days.
Nitrite	Cool, 4°C	P or G	48 hours.



Contaminant	Preservative	Container <sup>2</sup>	Time <sup>3</sup>
Selenium <sup>1</sup>	Con HNO <sub>3</sub> to pH <2	P or G	6 months.

<sup>1</sup> If HNO<sub>3</sub> cannot be used because of shipping restrictions, sample may be initially preserved by icing and immediately shipping it to the laboratory. Upon receipt in the laboratory, the sample must be acidified with con HCl to pH <2. At time of analysis, sample container should be thoroughly rinsed with 1:1 HNO<sub>3</sub>; washings should be added to sample.

<sup>2</sup> P=plastic, hard or soft; G=glass, hard or soft.

<sup>3</sup> In all cases, samples should be analyzed as soon after collection as possible.

- (5) \* \* \*
- (i) \* \* \*
- (ii) \* \* \*

Contaminant	Acceptance limit
Asbestos.....	2 standard deviations based on study statistics
Barium.....	±15% at ≥ 0.15 mg/l
Cadmium.....	±20% at ≥ 0.002 mg/l
Chromium.....	±15% at ≥ 0.01 mg/l
Fluoride.....	±10% at 1 to 10 mg/l
Mercury.....	±30% at ≥ 0.0005 mg/l
Nitrate.....	±10% at ≥ 0.4 mg/l
Nitrite.....	±15% at ≥ 0.4 mg/l
Selenium.....	±20% at ≥ 0.01 mg/l

(l) Analyses for the purpose of determining compliance with § 141.11 shall be conducted using the requirements specified in paragraphs (l) through (q) of this section.

(1) Analyses for all community water systems utilizing surface water sources shall be completed by June 24, 1978. These analyses shall be repeated at yearly intervals.

(2) Analyses for all community water systems utilizing only ground water sources shall be completed by June 24, 1979. These analyses shall be repeated at three-year intervals.

(3) For non-community water systems, whether supplied by surface or ground sources, analyses for nitrate shall be completed by December 24, 1980. These analyses shall be repeated at intervals determined by the State.

(4) The State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

(m) If the result of an analysis made under paragraph (l) of this section indicates that the level of any contaminant listed in § 141.11 exceeds the maximum contaminant level, the supplier of the water shall report to the State within 7 days and initiate three additional analyses at the same sampling point within one month.

(n) When the average of four analyses made pursuant to paragraph (m) of this section, rounded to the same number of significant figures as the maximum contaminant level for the substance in

question, exceeds the maximum contaminant level, the supplier of water shall notify the State pursuant to § 141.31 and give notice to the public pursuant to § 141.32. Monitoring after public notification shall be at a frequency designated by the State and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(o) The provisions of paragraphs (m) and (n) of this section notwithstanding, compliance with the maximum contaminant level for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the maximum contaminant level for nitrate is found, a second analysis shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum contaminant level, the supplier of water shall report his findings to the State pursuant to § 141.31 and shall notify the public pursuant to § 141.32.

(p) For the initial analyses required by paragraph (l) (1), (2) or (3) of this section, data for surface waters acquired within one year prior to the effective date and data for ground waters acquired within 3 years prior to the effective date of this part may be substituted at the discretion of the State.

(q) Analyses conducted to determine compliance with § 141.11 shall be made in accordance with the following methods, or their equivalent as determined by the Administrator.

(1) Arsenic-Method <sup>1</sup> 206.2, Atomic Absorption Furnace Technique; or Method <sup>1</sup> 206.3, or Method <sup>4</sup> D2972-88B

<sup>1</sup> "Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-660/4-79-020), March 1983. Available from ORD Publications, CERL, EPA, Cincinnati, Ohio 45268. For approved analytical procedures for metals, the technique applicable to total metals must be used.

<sup>2</sup> "Standard Methods for the Examination of Water and Wastewater," 16th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.

or Method <sup>2</sup> 307A, or Method <sup>3</sup> I-1062-85, Atomic Absorption—Gaseous Hydride; or Method <sup>1</sup> 206.4, or Method <sup>4</sup> D-2972-88A, or Method <sup>2</sup> 307B, Spectrophotometric, Silver Diethyldithiocarbamate; or Method <sup>8</sup> 200.7, Inductively Coupled Plasma Technique.

(2) Barium-Method <sup>1</sup> 208.1 or Method <sup>2</sup> 308, Atomic Absorption—Direct Aspiration; or Method <sup>1</sup> 208.2, Atomic Absorption Furnace Technique; or Method <sup>8</sup> 200.7, Inductively Coupled Plasma Technique.

(3) Cadmium-Method <sup>1</sup> 213.1 or Method <sup>4</sup> D 3557-78A or B, or Method <sup>2</sup> 310A, Atomic Absorption—Direct Aspiration; or Method <sup>1</sup> 213.2 Atomic Absorption Furnace Technique; or Method <sup>8</sup> 200.7, Inductively Coupled Plasma Technique.

(4) Chromium-Method <sup>1</sup> 218.1 or Method <sup>4</sup> D 1687-77D, or Method <sup>2</sup> 312A, Atomic Absorption—Direct Aspiration; or Chromium-Method <sup>1</sup> 218.2 Atomic Absorption Furnace Technique; or Method <sup>8</sup> 200.7, Inductively Coupled Plasma Technique.

(5) Mercury-Method <sup>1</sup> 245.1, or Method <sup>4</sup> D-3223-69, or Method <sup>2</sup> 320A, Manual Cold Vapor Technique; or Method <sup>1</sup> 245.2, Automated Cold Vapor Technique.

(6) Nitrate-Method <sup>1</sup> 352.1, or Method <sup>4</sup> D-992-71, or Method <sup>1</sup> 353.3, or Method <sup>4</sup> D-3867-79E, or Method <sup>2</sup> 418-C, Spectrometric, Cadmium Reduction; Method <sup>1</sup> 353.1, Automated Hydrazine Reduction; or Method <sup>1</sup> 353.2, or Method <sup>4</sup> D-3867-79A, or Method <sup>2</sup> 418F, Automated Cadmium Reduction.

<sup>3</sup> Techniques of Water-Resources Investigation of the United States Geological Survey, Chapter A-1, "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Book 5, 1979, Stock #024-001-03177-9. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

<sup>4</sup> Annual Book of ASTM Standards, part 31 Water, American Society for Testing and Materials, 1976 Race Street, Philadelphia, Pennsylvania 19103.

<sup>5</sup> [Reserved].

<sup>8</sup> "Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes—Method 200.7" with Appendix to Method 200.7 entitled, "Inductively Coupled Plasma-Atomic Emission Analysis of Drinking Water." March 1987. Available from EPA's Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.



(7) Selenium-Method <sup>1</sup> 270.2, Atomic Absorption Furnace Technique; or Method <sup>1</sup> 270.3; or Method <sup>3</sup> I-1667-85, or Method <sup>2</sup> D-3859-79, or Method <sup>2</sup> 303F, Hydride Generation—Atomic Absorption Spectrophotometry.

(8) Lead-Method <sup>1</sup> 239.1 or Method <sup>4</sup> D3559-78A or B, or Method <sup>2</sup> 301-A II or III, pp. 148-152, Atomic Absorption—Direct Aspiration; or Method <sup>1</sup> 239.2, Atomic Absorption Furnace Technique; or Method <sup>2</sup> 200.7, Inductively Coupled Plasma Technique.

6. In § 141.24, which was published January 30, 1991 (56 FR 3526) and which will become effective July 30, 1992, paragraphs (e) and (f) are revised; paragraphs (h)(8), (h)(12) (iv), (vi), (vii), and (h)(13)(i) are revised; and paragraph (h)(19) is added to read as set forth below. In addition, paragraph (g), which was not affected by the Jan. 30, 1991 amendment, is amended by revising paragraph (g) introductory text and adding (g)(8) to become effective July 30, 1992.

§ 141.24 Organic chemicals other than total trihalomethanes, sampling and analytical requirements.

(e) Analysis made to determine compliance with the maximum contaminant level for endrin in § 141.12(a) shall be made in accordance with EPA Methods 505, "Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl Products (Aroclors) in Water by Microextraction and Gas Chromatography" and 508, "Determination of Chlorinated Pesticides in Water by Gas Chromatography With an Electron Capture Detector." The Methods are contained in "Methods for the Determination of Organic Compounds in Drinking Water," ORD Publications, CERL, EPA/600/4-88/039, December 1988. These methods are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The toll-free number is 1-800-336-4700.

(f) Beginning on January 1, 1993, analysis of the contaminants listed in § 141.61(a) (1) through (18) for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:

(1) Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more

representative of each source, treatment plant, or within the distribution system.

(2) Surface water systems (or combined surface/ground) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

(3) If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

(4) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in § 141.61(a) (2) through (18) during each compliance period, beginning in the compliance period starting January 1, 1993.

(5) If the initial monitoring for contaminants listed in § 141.61(a) (1) through (8) and the monitoring for the contaminants listed in § 141.61(a) (9) through (18) as allowed in paragraph (f)(18) has been completed by December 31, 1992, and the system did not detect any contaminant listed in § 141.61(a) (1) through (18), then each ground and surface water system shall take one sample annually beginning January 1, 1993.

(6) After a minimum of three years of annual sampling, the State may allow groundwater systems with no previous detection of any contaminant listed in § 141.61(a) to take one sample during each compliance period.

(7) Each community and non-transient groundwater system which does not detect a contaminant listed in § 141.61(a) (1) through (18) may apply to the State for a waiver from the requirements of paragraphs (f)(5) and (f)(6) of this section after completing the initial monitoring. (For the purposes of this section, detection is defined as  $\geq 0.0005$  mg/l.) A waiver shall be effective for no more than six years (two compliance periods).

(8) A State may grant a waiver after evaluating the following factor(s):

(i) Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the State reveals no previous use of the contaminant within the watershed or

zone of influence, a waiver may be granted.

(ii) If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

(A) Previous analytical results.

(B) The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

(C) The environmental persistence and transport of the contaminants.

(D) The number of persons served by the public water system and the proximity of a smaller system to a larger system.

(E) How well the water source is protected against contamination, such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.

(9) As a condition of the waiver a groundwater system must take one sample at each sampling point during the time the waiver is effective (i.e., one sample during two compliance periods or six years) and update its vulnerability assessment considering the factors listed in paragraph (f)(8) of this section. Based on this vulnerability assessment the State must reconfirm that the system is non-vulnerable. If the State does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in paragraph (5) of this section.

(10) Each community and non-transient surface water system which does not detect a contaminant listed in § 141.61(a) (1) through (18) may apply to the State for a waiver from the requirements of (f)(5) of this section after completing the initial monitoring. Systems meeting this criteria must be determined by the State to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the State (if any).

(11) If a contaminant listed in § 141.61(a) (2) through (18) is detected at a level exceeding 0.0005 mg/l in any sample, then:



(i) The system must monitor quarterly at each sampling point which resulted in a detection.

(ii) The State may decrease the quarterly monitoring requirement specified in paragraph (f)(11)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

(iii) If the State determines that the system is reliably and consistently below the MCL, the State may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.

(iv) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the State for a waiver as specified in paragraph (f)(7) of this section.

(v) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the State may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride as specified by the State.

(12) Systems which violate the requirements of § 141.61(a) (1) through (18), as determined by paragraph (f)(15) of this section, must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in paragraph (f)(15) of this section the system and the State determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in paragraph (f)(11)(iii) of this section.

(13) The State may require a confirmation sample for positive or negative results. If a confirmation sample is required by the State, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified by paragraph (f)(15). States

have discretion to delete results of obvious sampling errors from this calculation.

(14) The State may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.

(i) If the concentration in the composite sample is  $\geq 0.0005$  mg/l for any contaminant listed in § 141.61(a), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

(ii) If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the State within 14 days of collection.

(iii) Compositing may only be permitted by the State at sampling points within a single system, unless the population served by the system is  $\geq 3,300$  persons. In systems serving  $\geq 3,300$  persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.

(iv) Compositing samples prior to GC analysis.

(A) Add 5 ml or equal larger amounts of each sample (up to 5 samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.

(B) The samples must be cooled at 4°C during this step to minimize volatilization losses.

(C) Mix well and draw out a 5-ml aliquot for analysis.

(D) Follow sample introduction, purging, and desorption steps described in the method.

(E) If less than five samples are used for compositing, a proportionately small syringe may be used.

(v) Compositing samples prior to GC/MS analysis.

(A) Inject 5-ml or equal larger amounts of each aqueous sample (up to 5 samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.

(B) The total volume of the sample in the purging device must be 25 ml.

(C) Purge and desorb as described in the method.

(15) Compliance with § 141.61(a) (1) through (18) shall be determined based on the analytical results obtained at each sampling point.

(i) For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately.

(ii) If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the State, the determination of compliance will be based on the average of two samples.

(iii) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the State may allow the system to give public notice to only that area served by that portion of the system which is out of compliance.

(16) Analysis for the contaminants listed in § 141.61(a) (1) through (18) shall be conducted using the following EPA methods or their equivalent as approved by EPA. These methods are contained in Methods for the Determination of Organic Compounds in Drinking Water, ORD Publications, CERL, EPA/600/4-88/039, December 1988. These documents are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-336-4700.

(i) Method 502.1, "Volatile Halogenated Organic Chemicals in Water by Purge and Trap Gas Chromatography."

(ii) Method 502.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series."

(iii) Method 503.1, "Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography."

(iv) Method 524.1, "Measurement of Purgeable Organic Compounds in Water by Purged Column Gas Chromatography/Mass Spectrometry."

(v) Method 524.2, "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry."

(17) Analysis under this section shall only be conducted by laboratories that are certified by EPA or the State according to the following conditions:

(i) To receive certification to conduct analyses for the contaminants in



§ 141.61(a) (2) through (18) the laboratory must:

(A) Analyze Performance Evaluation samples which include these substances provided by EPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the State.

(B) Achieve the quantitative acceptance limits under paragraphs (f)(17)(i) (C) and (D) of this section for at least 80 percent of the regulated organic chemicals listed in § 141.61(a) (2) through (18).

(C) Achieve quantitative results on the analyses performed under paragraph (f)(17)(i)(A) of this section that are within ±20 percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/l.

(D) Achieve quantitative results on the analyses performed under paragraph (f)(17)(i)(A) of this section that are within ±40 percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is less than 0.010 mg/l.

(E) Achieve a method detection limit of 0.0005 mg/l, according to the procedures in appendix B of part 136.

(ii) To receive certification for vinyl chloride, the laboratory must:

(A) Analyze Performance Evaluation samples provided by EPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the State.

(B) Achieve quantitative results on the analyses performed under paragraph (f)(17)(ii)(A) of this section that are within ±40 percent of the actual amount of vinyl chloride in the Performance Evaluation sample.

(C) Achieve a method detection limit of 0.0005 mg/l, according to the procedures in appendix B of part 136.

(D) Obtain certification for the contaminants listed in § 141.61(a) (2) through (18).

(18) States may allow the use of monitoring data collected after January 1, 1988, required under section 1445 of the Act for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements in this section, the State may use these data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of paragraph (f)(4) of this section. Systems which use grandfathered samples and did not detect any contaminant listed in § 141.61(a) (1) through (18) shall begin monitoring annually in accordance with paragraph (f)(5) of this section beginning January 1, 1993.

(19) States may increase required monitoring where necessary to detect variations within the system.

(20) Each approved laboratory must determine the method detection limit (MDL), as defined in appendix B to part 136, at which it is capable of detecting VOCs. The acceptable MDL is 0.0005 mg/l. This concentration is the detection concentration for purposes of this section.

(21) Each public water system shall monitor at the time designated by the State within each compliance period.

(g) For systems in operation before January 1, 1993, for purposes of initial monitoring, analysis of the contaminants listed in § 141.61(a) (1) through (8) for purposes of determining compliance with the maximum contaminant levels shall be conducted as follows:

(8) Until January 1, 1993, the State may reduce the monitoring frequency in paragraphs (g)(1) and (g)(2) of this section, as explained in this paragraph.

(h) \* \* \*  
 (8) Systems which violate the requirements of § 141.61(c) as determined by paragraph (h)(11) of this section must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the State determines the system is reliably and consistently below the MCL, as specified in paragraph (h)(11) of this section, the system shall monitor at the frequency specified in paragraph (h)(7)(iii) of this section.

(12) \* \* \*  
 (iv) Method 508, "Determination of Chlorinated Pesticides in Water by Gas Chromatography with an Electron Capture Detector." Method 508 can be used to measure chlordane, heptachlor, heptachlor epoxide, lindane, methoxychlor and toxaphene. Method 508 can be used as a screen for PCBs.

(vi) Method 515.1, Revision 5.0, "Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron Capture Detector" as revised May 1991. Method 515.1 can be used to measure 2,4-D, 2,4,5-TP (Silvex) and pentachlorophenol.

(vii) Method 525.1, Revision 3.0 "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry" as revised May 1991. Method 525.1 can be used to measure alachlor, atrazine, chlordane, heptachlor, heptachlor epoxide, lindane, methoxychlor, and pentachlorophenol.

(13) \* \* \*

(i) Each system which monitors for PCBs shall analyze each sample using either Method 505 or Method 508 (see paragraph (h)(12) of this section).

(19) Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the State and have met the following conditions:

(i) To receive certification to conduct analyses for the contaminants in § 141.61(c) the laboratory must:

(A) Analyze Performance Evaluation samples which include those substances provided by EPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the State.

(B) Achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance limits (percent)
DBCP.....	± 40.
EDB.....	± 40.
Alachlor.....	± 45.
Atrazine.....	± 45.
Carbofuran.....	± 45.
Chlordane.....	± 45.
Heptachlor.....	± 45.
Heptachlor Epoxide.....	± 45.
Lindane.....	± 45.
Methoxychlor.....	± 45.
PCBs (as Decachlorobiphenyl).....	0-200.
Toxaphene.....	± 45.
Aldicarb.....	2 standard deviations.
Aldicarb sulfoxide.....	2 standard deviations.
Aldicarb sulfone.....	2 standard deviations.
Pentachlorophenol.....	± 50.
2,4-D.....	± 50.
2,4-TP.....	± 50.

(ii) [Reserved]

7. In § 141.32, paragraphs (e)(16), (25) through (27), and (46) are added to read as follows:

§ 141.32 Public notification.

(e) \* \* \*

(16) *Barium*. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that barium is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in some aquifers that serve as sources of ground water. It is also used in oil and gas drilling muds, automotive paints, bricks, tiles and jet fuels. It generally gets into drinking water after dissolving from naturally occurring minerals in the ground. This chemical may damage the heart and cardiovascular system, and is associated with high blood pressure in laboratory animals such as rats exposed



to high levels during their lifetimes. In humans, EPA believes that effects from barium on blood pressure should not occur below 2 parts per million (ppm) in drinking water. EPA has set the drinking water standard for barium at 2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to barium.

(25) *Aldicarb*. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb at 0.003 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb.

(26) *Aldicarb sulfoxide*. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfoxide is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfoxide in ground water is primarily a breakdown product of aldicarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfoxide may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfoxide at 0.004 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfoxide.

(27) *Aldicarb sulfone*. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfone is

a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfone is formed from the breakdown of aldicarb and is considered for registration as a pesticide under the name aldoxycarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfone may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfone at 0.002 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfone.

(46) *Pentachlorophenol*. The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that pentachlorophenol is a health concern at certain levels of exposure. This organic chemical is used as a wood preservative, herbicide, disinfectant, and defoliant. It generally gets into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to produce adverse reproductive effects and to damage the liver and kidneys of laboratory animals such as rats exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the liver and kidneys. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed to high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for pentachlorophenol at 0.001 parts per million (ppm) to protect against the risk of cancer or other adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to pentachlorophenol.

8. Section 141.50 is amended by adding paragraphs (a)(15), (b)(4), (b)(5), and (b)(6) to read as follows:

§ 141.50 Maximum contaminant level goals for organic chemicals.

- (a) \* \* \*
- (15) Pentachlorophenol
- (b) \* \* \*

Contaminant	MCLG (mg/l)
(4) Aldicarb.....	0.001
(5) Aldicarb sulfoxide.....	0.001
(6) Aldicarb sulfone.....	0.001

9. Section 141.51 is amended by adding paragraph (b)(3) as follows:

§ 141.51 Maximum contaminant level goals for inorganic contaminants.

- (b) \* \* \*

Contaminant	MCLG (mg/l)
(3) Barium.....	2

10. Section 141.61 is amended by adding to the table paragraphs (c)(2), (c)(3), (c)(4), and (c)(16) to read as follows:

§ 141.61 Maximum contaminant levels for organic contaminants.

- (c) \* \* \*

CAS No.	Contaminant	MCL (mg/l)
(2) 116-06-3.....	Aldicarb.....	0.003
(3) 1646-87-3.....	Aldicarb sulfoxide.....	0.004
(4) 1646-87-4.....	Aldicarb sulfone.....	0.003
(16) 87-86-5.....	Pentachlorophenol.....	0.001

11. In § 141.62, paragraph (b)(1) is revised and (b)(3) is added to read as follows:

§ 141.62 Maximum contaminant levels for inorganic contaminants.

- (b) \* \* \*

Contaminant	MCL (mg/l)
(1) Fluoride.....	4.0
(3) Barium.....	2



**PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION**

12. The authority citation for part 142 continues to read as follows:

Authority: 42 U.S.C. 300g, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4 and 300j-9.

13. In § 142.57, which was published January 30, 1991 (56 FR 3526) and will become effective July 30, 1992, paragraph (b) is revised to read as follows:

**§ 142.57 Bottled Water, Point-of-Use.**

(b) Public water systems using bottled water as a condition of obtaining an exemption from the requirements of §§ 141.61 (a) and (c) and § 141.62(b) must meet the requirements in § 142.62(g).

**PART 143—NATIONAL SECONDARY DRINKING WATER REGULATIONS**

14. The authority citation for part 143 continues to read as follows:

Authority: 42 U.S.C. 300g-1(c), 300j-4 and 300j-9.

15. In § 143.4, which was published January 30, 1991 (56 FR 3526) and which will become effective July 30, 1992,

paragraphs (b) (12) and (13) are revised to read as follows:

**§ 143.4 Monitoring.**

\* \* \* \* \*

(b) \* \* \*  
 (12) Aluminum—Method <sup>1</sup> 202.1 Atomic Absorption Technique-Direct Aspiration; or Method <sup>2</sup> 306A; or Method <sup>3</sup> I-305i-85, or Method <sup>1</sup> 202.2 Atomic Absorption-Graphite Furnace Technique; or Method <sup>2</sup> 304; or Method <sup>4</sup>

<sup>1</sup> "Methods of Chemical Analysis of Water and Wastes," EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268, EPA 600/4-79-020, March, 1983. Available from ORD Publication, CERL, EPA, Cincinnati, OH 45268.

<sup>2</sup> "Standard Methods for the Examination of Water and Wastewater," 16th Ed., American Public Health Association, American Waterworks Association, Water Pollution Control Federation, 1985.

<sup>3</sup> "Methods for the Determination of Inorganic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the United States Geological Survey Books, Chapter A1, 1985. Available from Open File Services Section, Western Distribution Branch, U.S. Geological Survey, Denver Federal Center, Denver, CO 80255.

<sup>4</sup> "Determination of Metals and Trace Elements by Inductively Coupled Plasma-Atomic Emission Spectrometry," Method 200.7, version 3.2, August, 1990, EPA Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268.

200.7 Inductively-Coupled Plasma Technique; or Method <sup>5</sup> 200.8 Inductively Coupled Plasma-Mass Spectrometry or Method <sup>6</sup> 200.9 Platform Technique; or Method <sup>7</sup> 3120B Inductively-Coupled Plasma Technique.

(13) Silver—Method <sup>1</sup> 272.1 Atomic Absorption Technique-Direct Aspiration; or Method <sup>2</sup> 324A; or Method <sup>3</sup> I-3720-85; or Method <sup>1</sup> 272.2 Atomic Absorption-Graphite Furnace Technique; or Method <sup>2</sup> 304; or Method <sup>4</sup> 200.7 Inductively-Coupled Plasma-Technique; or Method <sup>5</sup> 200.8 Inductively-Coupled Plasma-Mass Spectrometry; or Method <sup>6</sup> 200.9 Platform Technique; or Method <sup>7</sup> 3120B Inductively-Coupled Plasma-Technique. [FR Doc. 91-15564 Filed 6-28-91; 8:45 am]

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<sup>5</sup> "Determination of and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Method 200.8, version 4.3, August, 1990, EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268. Available from ORD Publication, CERL, EPA, Cincinnati, OH 45268.

<sup>6</sup> "Determination of Metals and Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry," Method 200.9, version 1.1, August, 1990, EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268.

<sup>7</sup> "Standard Methods for the Examination of Water and Wastewater," 16th ed., American Public Health Association, American Waterworks Association, Water Pollution Control Federation, 1985.



