

source waters in distribution.

EPA received a number of comments on the proposed method of determining compliance. Many commenters supported the methods, while other commenters believed that only that portion of the system exceeding the MCL should be considered out of compliance and that public notification should be limited to the affected consumers. EPA believes that it is often not possible to determine the specific subpopulation of consumers receiving water from a specific part of a water system, due to mixing of waters and changes in water feed pattern. However, it is recognized that certain systems may have a clearly definable distribution system from a source with no interconnections to any other source. To accommodate these different situations, EPA is promulgating the requirements for determining compliance and public notification as proposed, except that the State may determine that only one segment, i.e., the affected part of a public water system, is out of compliance and limit public notification to that one segment.

EPA received a number of comments suggesting that monitoring data from further back than the proposed three years be allowed in the "grandfather" provision. Since the 1986 Amendments to the SDWA allow use of data for unregulated contaminants back to January 1, 1983, EPA feels it appropriate to allow States discretion to also use monitoring data for the 8 VOCs back to that date. If a system is judged to be not vulnerable, the previous monitoring data can be used to represent the first round of monitoring. In addition, States can use the results of EPA's Ground Water Supply Survey for systems with single sources in the same manner; only single sources are appropriate because EPA sampled from points in the distribution system during the survey.

In conclusion, the final monitoring requirements for determination of compliance with the VOC MCLs are as follows:

(1) All CWS and NTNCW systems must monitor every three months for a year. The running average will determine compliance. If a system is not classified as "vulnerable" and the first quarterly sample does not detect VOCs, the State may waive the requirement for additional sampling.

The State may also reduce the total number of samples by the use of composite samples of multiple entry points (up to five entry points per sample) if the composites reflect operating characteristics. If VOCs are detected in a composite, follow-up sampling is required at each entry point included in the composite. This requirement will be phased in based on the size of the population served by the system as follows:

System size	Begin no later than
>10,000	Jan. 1, 1988.
3,300 to 10,000	Jan. 1, 1989.
<3,300	Jan. 1, 1991.

(2) Ground-water systems must sample at each entry point which is located after any treatment to the distribution system every three months.

(3) Surface water systems may sample at points in the distribution system that are representative of each source or at each entry point to the distribution system which is located after any treatment. The minimum number of samples is one sample per source, per quarter for one year. Composite samples representative of up to five sources are allowed. If VOCs are detected in the first or any subsequent sample, follow-up monitoring is required as specified by the State.

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(4) Additional samples, when required by the State, are to be taken at each entry point that was included in the composite sample. If it is possible to determine from the follow-up samples which entry point(s) is out of compliance, then only that entry point(s) need be sampled unless the State determines that other entry points are vulnerable.

(5) Monitoring for vinyl chloride is required only for ground water systems which detect another chlorinated two-carbon VOC (trichloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, 1,1-dichloroethylene, tetrachloroethylene, cis-1, 2-dichloroethylene, or trans-1, 2-dichloroethylene).

(6) All systems to which the regulations apply are required to conduct repeat monitoring except for surface water systems that the State has not classified as vulnerable and did not detect any VOCs in the first round of sampling. The frequency of such monitoring will be based on prior monitoring results, the vulnerability of the system, and for those cases where VOCs have not been detected but the system is vulnerable, by system size.

(7) These requirements are summarized in the table below:

TABLE 3. -- SCHEDULE OF REPEAT MONITORING REQUIREMENTS

Status	Ground water	Surface water n1
VOCs are not detected * in the first or any subsequent sample and the system is not vulnerable.	Repeat at least every 5 years	State discretion.
VOCs are not detected and system is vulnerable:		
Systems >500 connections	Repeat every 3 years	Repeat every 3 years.
Systems <=500 connections	Repeat every 5 years	Repeat every 5 years.
VOCs detected in any sample	Quarterly	Quarterly.

n1 Must sample for four consecutive quarters.

* Detected is 0.0005 mg/l.

(8) States must certify the vulnerability status of systems at least every three years (five years for smaller systems (i.e., <=500 connections)).

(9) States have the discretion to: Require confirmation samples for positive results,

Reduce the repeat monitoring requirements for systems detecting VOCs, but at levels consistently less than the MCL, from quarterly sampling to no less than annual sampling after a baseline of data is developed during at least a three-year period,

Allow the use of monitoring data collected after January 1, 1983, in lieu of new data for the first sample if the data are of an acceptable quality and will provide information equivalent to that required in the rule.

(10) Compliance with the MCL will be based upon a running annual average of quarterly samples for each sampling location (i.e., the previous four quarterly samples). If the annual average for any sampling location is above the MCL, the system is out of compliance, public notification of the system's customers is required.

If any one quarterly sample would cause the annual average to be exceeded, the system is out of compliance as of that quarter. For example, if the first quarterly sample exceeded four

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times the MCL, the system would be out of compliance. The intent of this provision is to provide early notification of potential health risks.

If the State reduces the monitoring to one sample, the compliance determination is based upon that one sample.

F. Laboratory Approval

EPA's existing rules in 40 CFR 141.28 require that analyses for compliance monitoring purposes be conducted only by State-approved laboratories. Laboratories wishing to obtain approval for conducting VOC analyses must successfully analyze performance evaluation samples within the limits established by EPA and meet other requirements. The acceptance limits for laboratory approval are derived from the performance evaluation study data, i.e., the Water Supply Study series.

EPA requested comment on the use of a "plus or minus percent of true value" approach for setting performance criteria (i.e., acceptance limits). Most commenters supported the use of a "plus or minus percent" approach to derive acceptance limits over generating them from study statistics based upon 95 percent confidence limits. Some commenters believed, however, that the specific acceptance limits proposed were too strict and there would be an insufficient number of laboratories available that could meet such standards. EPA disagrees with this comment because the most recent water supply performance evaluation study showed that about 85 percent of all data submitted to EPA and State laboratories and about 70 percent of the other participating laboratories were within the proposed acceptance limits. These results compare favorable with other regulated contaminants where, even after years of experience, only 80-85 percent of all the data submitted are within the acceptance limits for each study. A specific example is the trihalomethanes, where about 85 percent of the data submitted by EPA and State laboratories and about 75 percent of the data submitted by other participating laboratories are within the established limits. The actual percentage varies somewhat from study to study.

The acceptance limits were proposed to be +/-40 percent of the true value for concentrations less than 0.010 mg/l, and +/-20 percent of the true value for concentrations of 0.010 mg/l or above for all of the VOCs except vinyl chloride. More recently, data from Water Supply Study No. 17, at 51 FR 19077 (May 27, 1986) indicate that most of the better laboratories tested can successfully analyze performance evaluation within the proposed acceptance limits. EPA considered lowering the acceptance limits for the seven VOCs to +/-20 percent (excluding vinyl chloride). However, very few laboratories would be able to perform within these limits for all seven of the VOCs. Only three out of eighteen laboratories were able to analyze six out of seven VOCs within these limits in Water Supply Study #17. Therefore, in the final rule, the acceptance levels are +/-20 percent of the true value for concentrations of 0.010 mg/l or above, and +/-40 percent of the true value for concentrations below 0.010 mg/l for seven VOCs (trichloroethylene, carbon tetrachloride, 1,1,1-trichloroethane, 1,2-dichloroethane, benzene, 1,1-dichloroethylene, and p-dichlorobenzene).

For vinyl chloride, the final acceptance limits are based initially on +/-40 percent of the true value at all levels. This is because the available data support acceptance limits of +/-40 percent and do not support acceptance limits of +/-20 percent for this compound, EPA may modify the laboratory performance requirements for all VOCs as new information becomes available.

Even the best laboratories may not be able to analyze all the VOCs within the acceptance limits 100 percent of the time. Random errors are likely to occur in any large data generation activity. EPA has evaluated data from recent performance evaluation studies to determine how many analytes EPA and State laboratories were able to analyze within the acceptance limits. The number of analytes within the acceptance limits varies from laboratory to laboratory. EPA evaluated data from Water Supply Study #17 for EPA and State laboratories

that analyzed for all eight VOCs. The data indicate that 15 out of 18 laboratories (or 83 percent of the laboratories) were able to analyze at least 6 out of 7 VOCs (excluding vinyl chloride) at concentrations of 0.004 mg/l or above within the acceptance limits, while only 7 of these laboratories (or 39 percent of the laboratories) were able to analyze all 7 VOCs. For very low levels (<0.004 mg/l) greater failure rates would result. When the highest concentration of p-dichlorobenzene (0.776 mg/l) was not considered, 15 laboratories were still able to analyze at least 6 out of 7 VOCs within the acceptance limits, while the number of laboratories that were able to analyze all 7 VOCs increased to 12 (or 67 percent of the laboratories). For vinyl chloride only 8 out of 18 laboratories (or 44 percent of the laboratories) were able to analyze all three levels within the +/-40 percent acceptance limits. When the lowest concentration (0.0015 mg/l) was not considered, the number of laboratories within the acceptance limits increased to 13 out of 18 (or 72 percent of the laboratories).

EPA also evaluated preliminary data from Water Supply Study #20 to determine whether this study supports the results from the Water Supply Study #17. Two samples were offered in this study to those laboratories wishing to obtain conditional approval for VOCs. One sample contained the eight VOCs for which MCLs are being set in this notice. The second sample contained 4 of the 8 VOCs plus other Section 1445 unregulated VOCs. Excluding vinyl chloride, there were a total of 11 responses for the 7 VOCs (7 from the first sample and 4 from the second sample). The results are summarized in Table 4 for a total of 44 EPA and State laboratories.

TABLE 4. -- ANALYSES WITHIN THE ACCEPTANCE LIMITS OF ELEVEN VOC SAMPLES

Acceptable data	Num-ber of labora-tories	Per-cent of labora-tories
11 out of 11	8	18
10 out of 11	22	50
9 out of 11	31	70
8 out of 11	36	82
<8 out of 11	8	18

Taking the data from the first sample for the seven VOCs, 36 out of 44 laboratories (or 82 percent of the laboratories) were able to analyze at least 6 out of 7 VOCs within the acceptance limits, while only 22 out of 44 (or 50 percent of the laboratories) were able to analyze all seven VOCs. These results are similar to the results obtained in Water Supply Study #17 for the 7 VOCs.

Twenty-nine out of the 44 laboratories (or 66 percent of the laboratories) were able to analyze vinyl chloride within the +/-40 percent limits. These results are similar to the results obtained in Water Supply Study #17 when the lowest concentration (0.0015 mg/l) was not considered.

Based on the results obtained in Water Supply Study #17 (which are supported by preliminary results from Water Supply Study #20), EPA concluded that it is reasonable to expect that laboratories meet the acceptance limits in § 141.24(g)(11) for at least 6 out of 7 of the VOCs to receive conditional approval. Therefore, the Agency will provide conditional approval of VOC analysis to laboratories that meet the following requirements:

- (1) Use approved analytical methods as specified in §§ 141.24(g)(10) and 141.24(g)(11);

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- (2) Are approved for THMs analysis; and
- (3) Perform within the acceptance limits for at least 6 of the 7 VOCs (excluding vinyl chloride).

In addition, special conditional approval will be granted separately to laboratories wishing to analyze for vinyl chloride if they meet (1) and (2) above, and are able to perform within the acceptance limits for vinyl chloride at all levels.

The above performance criteria apply specifically to laboratories that participated in Water Supply Study #20. These requirements will apply to conditional approval until such a time when EPA evaluates additional Water Supply Study data and develops final certification criteria. States that provide their own performance evaluation samples instead of EPA samples must use testing procedures equivalent to Water Supply Study #20 and must apply the same requirements, as described above, to grant conditional approval to laboratories.

G. Variances and Exemptions

1. Variances

The conditions for granting a variance from an NPDWR are specified in Section 1415(a)(1)(A) of the Safe Drinking Water Act. According to this provision of the ACT, EPA or a state which has primary enforcement responsibility (i.e., the primacy agent) may grant variances from MCLs to those public water systems that cannot comply with the MCLs because of characteristics of the water sources that are reasonably available. A variance may only be granted to those systems which have installed best available technology, treatment techniques, or other means which EPA finds are available (taking cost into consideration); in this notice these treatment techniques will be referred to collectively as BAT. Furthermore, before a State may grant a variance, it must find that the variance will not result in an unreasonable risk to health. The level representing unreasonable risk to health for each of the VOCs will be addressed in the proposal addressing the next 40 contaminants required to be regulated under the SDWA by June 1988. The proposal is scheduled for the Fall of 1987. In general, the unreasonable risk to health level would reflect acute and subchronic toxicity for shorter-term exposures and high carcinogenic risks (as calculated using the linearized multi-stage model in accordance with the Agency's risk assessment guidelines) for long-term exposures.

Under Section 1413(a)(4), States that choose to issue variances must do so under conditions, and in a manner, which are no less stringent than EPA allows in Section 1415. Of course, a State may adopt standards which are more stringent than the EPA standards.

Best Available Technologies for Variances. In the November 1985 notice, EPA proposed two technologies as the best technologies generally available (BTGA) for the treatment of VOCs: packed tower aeration (PTA) and granular activated carbon (GAC). The public comments that EPA received supported this finding. The 1986 amendments to the SDWA changed the technology standard for drinking water treatment from BTGA to best available technology (BAT). After carefully reexamining the proposed rule in light of the 1986 amendments, the Agency has decided that packed tower aeration or granular activated carbon are also BAT for variance purposes (except for vinyl chloride, for which BAT is only packed tower aeration); this decision is based upon the factors discussed in Section II of today's preamble.

Under Section 1415(a)(1)(A), EPA's determination of BAT for variances may vary from BAT for setting MCLs under Section 1412 based on the number of persons served by a particular water system, the physical conditions related to engineering feasibility, and the costs of compliance. With respect to small systems, there are no engineering aspects of these two technologies which would indicate that EPA should specify different BATs for variances, since VOC removal rates, operational feasibility, and equipment availability do not

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application to even the smallest systems. In fact, both technologies are currently commercially available in sizes that can treat a single home, a few (e.g., 15) homes, or larger size systems. Therefore, EPA has determined that its selection of packed tower aeration and granular activated carbon as BAT need not be varied due to system size, or physical characteristics, and that these technologies are BAT for all public water systems.

Costs Considerations in Applying BAT to Small Systems. The Agency based its decision to designate packed tower aeration and granular activated carbon as BAT under Section 1415 for all size systems in part on the following analysis of small system costs. Table 3 displays the costs of 99 percent removals of the eight VOCs for the smallest system size (25-100 persons or 13,000 gallons per day) using PTA or GAC. (See Ref. 2 for a more detailed discussion.) The costs of treatment for the very small size category (25-100 persons or 13,000 gallons per day) range from 70 cents per thousand gallons for removal of trichloroethylene by GAC to 204 cents per thousand gallons for removal of para-dichlorobenzene by PTA. On an annual basis, this might increase the average small system residential water bill by about \$70 per year to remove trichloroethylene and \$200 per year to remove 1,2-dichloroethane.

TABLE 5. -- ESTIMATED COSTS OF REMOVING VOCs FROM DRINKING WATER USING PACKED TOWER AERATION OR GRANULAR ACTIVATED CARBON FOR THE SMALLEST SYSTEM SIZE *

[Assuming 99 percent removal from 0.5 mg/l to 0.005 mg/l]

Chemical	PTA			GAC			
	c/ Annual 1,000	Capital	O & M	Annual gallons	Capital	O & M	c/ Annual 1,000
TCE		\$58,000	\$800	169	\$13,000	\$1,600	70
C. Tet		52,000	700	162	13,000	2,000	79
1,2-DCA		62,000	1,300	202	13,000	330	106
V.C.		48,000	600	148	NA	NA	NA
1,1-DCE		50,000	600	154	13,000	1,600	70
Benzene		56,000	1,000	180	13,000	5,500	153
1,1,1-TCA		50,000	700	156	13,000	3,500	110
p-DCB		63,000	1,300	204	13,000	1,700	72

* Cost are in 1983 dollars. Smallest system = 13,000 gallons/day average flow or 25-100 persons served.

Although current total water costs for typical small system households range from about \$100 to \$150 per year, these costs are quite low in comparison to the costs of other utilities. In addition, as system size increases, the costs of water treatment per unit volume of water rapidly decline. For example, using all the same assumptions, the packed tower aeration costs decrease from 202 cents per thousand gallons for the 25 to 100 person (0.013 mgd) system size category to 101 cents per thousand gallons for the 101 to 500 person (0.037 mgd) system size category, and decrease further to 21 cents per thousand gallons for the 50,001 to 75,000 person (12 mgd) category. Thus, aeration treatment offers significant economies of scale, e.g., with respect to 1,2-dichloroethane removal, as plant size increases by a factor of three (0.013 mgd to 0.037 mgd), the cost decreases by a factor of two (202 to 101¢/1,000 gallons). In addition, costs will be less when lower removal efficiencies are sufficient to achieve the standard in those cases where the raw water concentrations are less than 0.5 mg/l, which is usually the case.

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It should be noted that the costs in Table 3 are based on a variety of data (see Ref. 2). For all the VOCs, except vinyl chloride, benzene, and p-dichlorobenzene, carbon usage rates are based on projection of pilot column data. Neither adequate adsorption isotherms nor column data were available to project carbon usage rates or empty bed contact times for vinyl chloride. As indicated earlier, GAC adsorption is not considered BAT for the removal of vinyl chloride because of this and other feasibility considerations. For the two aromatic compounds, benzene and p-dichlorobenzene, only carbon adsorption isotherms were available. That is, no pilot column data were available for these two compounds. To compensate for this lack of pilot column data, the cost estimates in Table 3 for these two compounds were adjusted to be higher than if column data had been available (see Ref. 2). These costs are believed to be adequate for purposes of determining MCLs and estimating national economic impacts.

Both pilot- and full-scale data demonstrate that packed tower aeration and granular activated carbon are capable of 90-99 percent or greater removals of the VOCs (except that GAC is not as effective as PTA for vinyl chloride). In light of this removal efficiency and the potential cost impacts, the Agency considers the treatment costs to be justified and reasonable; under a worst case scenario, the water rate might double for the smallest system consumers. Consequently, the Agency has concluded that there is no reason to vary the BAT standard for small systems.

Required Examination and Installation of Alternate Treatment Technologies. Under section 1415 of the Act, a State may grant variances from a NPDWR if certain conditions are met. These conditions, described more fully below, include: (1) An inability to meet the MCLs despite the installation of the best available technology; (2) a finding that the variance will not result in an unreasonable risk; (3) imposition of a compliance schedule; (4) implementation of such additional control measures as the State may require; and, (5) public notice of the proposed variance and opportunity for a hearing.

To receive a variance, a PWS would be required to install BAT first even if the BAT was not anticipated to achieve the MCL; the objective would be to reduce the level of contaminants as much as could be achieved by those technologies. The only exception to this requirement is that if a system were to demonstrate that the best available technology only achieved *de minimis* reduction of the contaminant(s) of concern, the system would not have to install that technology. However, as a condition of receiving a variance without installing BAT, the State could require comprehensive engineering studies of other technologies and if any were technically feasible, it could require one of those technologies to be installed.

EPA has identified three additional treatment methods that the State may require the PWS to investigate and, if feasible, to install as a condition of obtaining a variance. These are: (1) Removal using other aeration techniques, such as multiple tray aeration, spray aeration, cascade aeration, diffused aeration, or mechanical aeration; (2) removal using powdered activated carbon adsorption; and (3) use of an alternative source of water.

EPA discourages systems from using an alternative source of water which has no VOC contamination but may be contaminated with other substances. Specifically, EPA discourages systems which find low levels of VOCs in their ground water source, which is otherwise of good quality, from switching to a surface water source where the risk from disinfection by-products (e.g., trihalomethanes) might be greater than from the VOCs. In such a case, where alternative sources pose a greater risk than the VOC-contaminated supply, the water supplier should treat the original water.

Subsections 1415(a)(1)(A) (i) and (ii) of the SDWA require the State to prescribe a schedule for compliance at the same time that it issues a variance. The schedule must include: (1) Increments of progress toward compliance; and (2) an implementation plan of such control measures and application of other treatment techniques or technologies that the State considers necessary. These provisions are aimed at bringing the system into compliance with

the MCL as soon as practicable. The following points need to be taken into consideration:

- (1) The schedule of compliance which accompanies a variance may require that the system examine other treatment methods (e.g., various aeration technologies, powdered activated carbon, or alternate sources of water) to determine their availability, feasibility, costs, and effectiveness.
- (2) Such an examination may include engineering studies and pilot projects, for potentially applicable technologies, to determine what reduction in VOC levels could be achieved by the treatment method. EPA will provide guidance on examining technologies for compliance schedules.
- (3) Systems or the State always have the option of proposing studies of other methods.
- (4) The State can decide whether any of the possible treatment methods would achieve reductions in VOC levels justifying use of that particular method. In such cases, the State may require, as part of the compliance schedule, installation and use of such methods by the system.

Use of POU Devices and Bottled Water. As described above, under section 1415(a)(1)(A)(ii), the State is to prescribe a schedule for implementation of any additional control measures it may require. The State may require the use of POU devices, bottled water, or other mitigating measures as an "additional control measure" during the period of a variance, as a condition of receiving the variance, if an unreasonable risk to health exists.

In prescribing the use of POU devices, the State would be required to impose the same conditions as outlined in section III.A.1 for approval of POE devices. If a PWS distributes bottled water as a control measure, the PWS must ensure that the following conditions are satisfied:

- (1)(a) The bottled water is subject to a monitoring program that provides adequate assurances that the water meets all MCLs. The public water system must monitor the bottled water for VOCs the first quarter that it supplies water to the public, and annually thereafter. Results of the monitoring program shall be provided to the State annually, or
 - (b) The public water system must receive a certification from the bottled water company that
 - (i) the bottled water supplied has been taken from an "approved source" as defined in 21 CFR 129.3(a);
 - (ii) the bottled water company has conducted monitoring in accordance with 21 CFR 129.80(g) (1)-(3); and
 - (iii) the bottled water does not exceed the MCLs or quality limits set out in 21 CFR 103.35. The public water system shall provide the certification to the State the first quarter after it supplies bottled water and annually thereafter; and
- (2) The public water system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system including delivery via a door-to-door bottled water delivery system.

These conditions constitute the minimum standards for protection of public health.

2. Exemptions

Under section 1416(a), a State may exempt public water systems from any requirements respecting an MCL or treatment technique requirements of an NPDWR, if it finds that (1) due to compelling factors (which may include economic factors), the PWS is unable to comply with the requirement; (2) the exemption will not result in an unreasonable risk to human health; and (3) the PWS was in operation on the effective date of the NPDWR, or for a system which was not in operation by that date, only if no reasonable alternative source of drinking water is available to the new system. If a State grants an exemption to a public water

system, it must at the same time prescribe a schedule for compliance (including increments of progress) and implementation of appropriate control measures that the State requires the system to meet while the exemption is in effect. Under section 1416(2)(A), the schedule must require compliance within one year after the date of issuance of the exemption. However, section 1416(b)(2)(B) states that the State may extend the final date for compliance provided in any schedule for a period not to exceed three years, if the public water system is taking all practicable steps to meet the standard and one of the following conditions applies: (1) The system cannot meet the standard without capital improvements which cannot be completed within the period of the exemption; (2) in the case of a system which needs financial assistance for the necessary implementation, the system has entered into an agreement to obtain financial assistance; or (3) the system has entered into an enforceable agreement to become part of a regional public water system. For public water systems which do not serve more than 500 service connections and which need financial assistance for the necessary improvements, the State may renew an exemption for one or more additional two-year periods if the system establishes that it is taking all practicable steps to meet the requirements noted above. Section 1416(b)(2)(C).

Under section 1416(d), EPA is required to review State-issued exemptions at least every three years and, if the Administrator finds that a State has, in a substantial number of instances, abused its discretion in granting exemptions or failed to prescribe schedules in accordance with the statute after following various procedures, the Administrator may revoke or modify those exemptions and schedules. EPA will use these procedures to strictly scrutinize exemptions from the MCLs for VOCs granted by states and, if appropriate, will revoke or modify exemptions granted.

Under this rule, as a condition of receiving an exemption, the State may require the use of POU devices or bottled water for the duration of the exemption. The conditions for the use of POU devices or bottled water are the same as those described for variances in section III.G.1.

3. Central Treatment vs. POU/Bottled Water

EPA believes that, when treatment is appropriate, central treatment should be the primary means of attaining MCLs. However, although the long-term goal for these systems is to meet MCLs with centrally treated and distributed water, EPA is allowing the State to require the use of POU devices or bottled water, for instance, if there is an unreasonable risk to health, as a condition of receiving a variance or an exemption to ensure that the PWS provides an interim source of drinking water that meets the MCLs while the system brings its water supply into compliance. This is especially valuable in the case of exemptions for small systems, i.e., systems with less than 500 connections, because their exemptions may be extended for one or more two-year periods. The goal is application of non-central treatment or bottled water is to provide water of equivalent quality to that which would be provided by a traditional well operated central treatment facility. Equivalent means water that meets all Primary and Secondary Drinking Water Standards and is not an acceptable quality.

H. Public Notification

Under section 1414(c)(1) of the Act, each owner or operator of a public water system must give notice to persons served by it of (1) any violation of any MCL, treatment technique requirement, or testing provision prescribed by an NPDWR; (2) failure to comply with any monitoring requirement under section 1445(a) of the Act; (3) existence of a variance or exemption; and (4) failure to comply with the requirements of a schedule prescribed pursuant to a variance or exemption. The 1986 amendments require that, within 15 months of enactment, EPA amend its current public notification regulations to provide for different types and frequencies of notice based on the differences between violations which are intermittent or infrequent and violations which are continuous or frequent. **CLW** into account the seriousness of any potential adverse health effects which may be involved.

EPA proposed regulations to revise the public notification requirements on April 6, 1987 (52 FR 10972). The regulations proposed that public notices for MCL and treatment technique violations ("Tier 1 violations") contain mandatory health effects language specifying concisely and in non-technical terms what adverse health effects may occur as a result of the violation. States and water utilities would remain free to add additional information to each notice, as deemed appropriate for specific situations. The April 1987 notice proposed specific health effects language for the eight VOCs which are subject to today's rulemaking. The April 1987 notice also proposed that a CWS with Tier 1 violations must notify the public by newspaper, mail delivery of notice and press release (for acute violations) is required. The proposal states that public water systems which fail to comply with any monitoring or testing requirements, which are granted variances or exemptions, or which fail to comply with the requirements of a variance or exemption schedule, would be required to give newspaper notice, with additional notice at State discretion. The PWS is allowed to post notice under certain conditions for Tier 1 and Tier 2 violations. The Agency expects to promulgate final public notification regulations in September 1987.

I. Reporting Requirements

The current regulations, 40 CFR 141.31, require public water systems to report monitoring data to States within specified time periods. EPA did not propose any changes in these requirements for the VOCs. No comments were received on this issue. Thus, EPA will require the same reporting requirements for the VOCs as required under the current regulations for other contaminants.

The reporting requirements for results of the monitoring for unregulated contaminants (described below) apply to both the community water systems (CWS) and the NTNCWS. Each CWS or NTNCWS must submit the results of the monitoring within thirty days of receipt from the certified laboratory. These results are to be submitted to the State. In addition, the State or public water system must submit the following information to EPA for every sample: (1) Results of all the analytical methods, including negatives; (2) name and address of the system that supplied the sample; (3) contaminants for which the analyses were performed; (4) analytical method(s) used; (5) date of sample; and (6) date of analysis.

J. Total Volatile Synthetic Organic Chemicals (TVOC)

In the June 12, 1984, proposal for MCLGs for the VOCs, EPA requested public comments on setting an MCLG and MCL for total volatile organic chemicals to provide additional protection from simultaneous exposure to multiple VOCs. Following analysis of public comments and available scientific information, EPA determined that an MCLG and MCL would not be appropriate at this time. This conclusion was discussed in the November 1985 notice.

K. Monitoring for Unregulated Contaminants

Section 1445(a)(1) of the Act requires EPA to promulgate regulations by December 19, 1987, which require public water systems to conduct a monitoring program for unregulated contaminants. Each system must monitor at least once every five years for unregulated contaminants unless EPA requires more frequent monitoring. This data will assist EPA in determining whether regulations for these contaminants are necessary, and if so, what levels might be appropriate.

EPA proposed monitoring requirements for 51 unregulated contaminants in the November 1985 notice. The Agency also requested comment on a method developed for the analysis of 1,2-dibromoethane (EDB) and 1,2-dibromo-3-chloropropane (DBCP) at low levels. These two compounds are included among the substances that PWSs must monitor under Section 144.5, as discussed below. This method is entitled "Method 504 -- 1,2-Dibromoethane (EDB) and 1,2-Dibromo-3-chloropropane in Water by Microextraction and Gas Chromatography." EPA

received no comments on Method 504. The Agency believes that this method is adequate to determine concentrations of EDB and DBCP. Therefore, this method is included in this rule as the monitoring method for these two contaminants. Several commenters pointed out that analysis of 10 to 15 other compounds on the list of 51 was more difficult than analysis of the other compounds, resulting in higher costs. In addition, they observed that the likelihood of these substances being present is much less than for other VOCs. EPA agrees with these comments and thus is promulgating monitoring regulations which separate the unregulated contaminants into three lists as follows:

List 1: Monitoring required for all CWS and NTNCWSs. Compounds can be readily analyzed.

List 2: Monitoring required only for systems vulnerable to contamination by these compounds. Compounds have limited localized occurrence potential and require some specialized handling.

List 3: The State decides which systems would have to analyze for these contaminants, which includes compounds that do not elute within reasonable retention time using packed column methods or are difficult to analyze because of high volatility or instability, and are much less likely to be present in drinking water.

EPA is deleting the monitoring requirements for pentachloroethane and bis(2-chloroisopropyl) ether from the list of unregulated contaminants in the final rule. Pentachloroethane has been deleted because it is unstable in water. Bis(2-chloroisopropyl) ether has been deleted because it does not purge well, and there are very few occurrences in drinking water. Therefore, both of these are low priority compounds for regulation. EPA is adding tetrachloroethylene to List 1 because the rulemaking for this contaminant is now included with the contaminants scheduled for regulation in June 1988 and the resulting monitoring data will be useful (see the November 13, 1985, notice for discussion of the tetrachloroethylene regulation). In addition, 1,3-dichloropropene has been added to List 1 because it has been detected in ground waters and is measured by these analytical methods. Data gathered under this Section 1445 regulation can be used for compliance purposes when EPA promulgates regulations for tetrachloroethylene and any other of these VOCs for which EPA is developing MCLs.

Table 6 presents the three lists of compounds.

Table 6 -- Unregulated Contaminants

List 1: Monitoring Required for All Systems

Bromobenzene

Bromodichloromethane

Bromoform

Bromomethane

Chlorobenzene

Chlorodibromomethane

Chloroethane

Chloroform

Chloromethane

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- o-Chlorotoluene
- p-Chlorotoluene
- Dibromomethane
- m-Dichlorobenzene
- o-Dichlorobenzene
- trans-1,2-Dichloroethylene
- cis-1,2-Dichloroethylene
- Dichloromethane
- 1,1-Dichloroethane
- 1,1-Dichloropropene
- 1,2-Dichloropropane
- 1,3-Dichloropropane
- 1,3-Dichloropropene
- 2,2-Dichloropropane
- Ethylbenzene
- Styrene
- 1,1,2-Trichloroethane
- 1,1,1,2-Tetrachloroethane
- 1,1,2,2-Tetrachloroethane
- Tetrachloroethylene
- 1,2,3-Trichloropropane
- Toluene
- p-Xylene
- o-Xylene
- m-Xylene

List 2: Required for Vulnerable Systems

- Ethylene dibromide (EDB)
- 1,2-Dibromo-3-Chloropropane (DBCP)

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List 3: Monitoring Required as the State's Discretion

Bromochloromethane

n-Butylbenzene

Dichlorodifluoromethane

Fluorotrichloromethane

Hexachlorobutadiene

Isopropylbenzene

p-Isopropyltoluene

Naphthalene

n-Propylbenzene

sec-Butylbenzene

tert-Butylbenzene

1,2,3-Trichlorobenzene

1,2,4-Trichlorobenzene

1,2,4-Trimethylbenzene

1,3,5-Trimethylbenzene

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The compounds in List 1 can be analyzed easily with the analytical methods in this final rule (Methods 502.1, 503.1, and 524.1). As previously discussed, the Agency has also developed capillary column methods (Methods 502.2 and 524.2) that are also available for the monitoring of these compounds. Monitoring for the compounds in List 2 (EDB and DBCP) requires much lower limits of detection and quantitation because of health concerns at low levels; as stated above, EPA Method 504 is available for the analysis of these two compounds at lower levels. Analysis of compounds in Lists 2 and 3 is best accomplished using the capillary column methods.

Analysis for unregulated contaminants must be conducted in laboratories approved for VOC analysis by the State. Because the monitoring requirements for unregulated contaminants will go into effect before full certification programs can be implemented, EPA will accept monitoring data analysis from those laboratories that analyze performance evaluation samples for VOCs within acceptable limits of the true value for the VOCs and that have been approved for THM analysis. The acceptance limits are +/-20 percent for concentrations ≥ 0.010 mg/l and +/-40 percent for concentrations < 0.010 mg/l. Laboratories conducting EDB and DBCP analysis should be approved separately by the State.

The monitoring requirements for the unregulated VOCs are similar to those required for the regulated VOCs so that public water systems are encouraged to use the same samples for all the analyses and to have the analysis of the unregulated VOCs performed with the analysis for the regulated VOCs, thereby reducing the costs of both sampling and analysis. This approach was generally supported by commenters.

The State would determine whether to require consecutive systems to monitor for VOCs and

trihalomethanes under Section 1445 for systems with a population of less than 10,000. If the consecutive system disinfects, then the samples for trihalomethanes should be taken after disinfection. This is because these systems currently do not monitor for trihalomethanes and trihalomethane concentrations usually increase after disinfection by the consecutive systems.

The November 1985 proposal did not include repeat monitoring for unregulated VOCs (unless imposed by the State). In this final rule, however, EPA is requiring repeat monitoring for unregulated contaminants every five years, as specified in the SDWA Amendments of 1986. However, EPA expects to specify a new list for unregulated contaminant monitoring within five years. This means that PWSs will not actually have to conduct repeat monitoring for the list of 50 specified in this notice, but instead will monitor for a new list in five years. However, States are encouraged to require follow-up monitoring for these 50 contaminants and mitigation procedures as needed if contamination is indicated.

States may delete contaminants from the list if EPA approves, and can add contaminants to the list for individual public water systems without EPA approval. The State may apply to EPA for approval in order to delete a substance for an individual water system by certifying to EPA that it has used the vulnerability criteria in reaching that decision. EPA will retain oversight authority of this process.

Section 1445(a)(6) states that EPA may waive the monitoring requirements for unregulated VOCs for systems that have conducted monitoring programs since January 1, 1983. EPA will waive this requirement only if the monitoring program was consistent with the requirements promulgated today. "Consistent" means the sampling locations, sampling techniques, and analytical methods are the same, and the analyses were performed by qualified laboratories (i.e., laboratories that are THM-certified) with adequate quality control. While EPA would prefer that all of the 33 VOCs on List 1 would have been included in the previous monitoring program, the Agency intends the requirements to be flexible so that systems that have monitored for most of the 33 VOCs could qualify for a waiver. For example, if 30 of 33 VOCs were included in a previous monitoring program by a particular system, that system might qualify for a waiver depending upon which three VOCs were not included. If these were relatively high occurrence VOCs, then a waiver would be inappropriate. Other factors that EPA will consider are the results of the monitoring program for the contaminants that were analyzed and the system's vulnerability status.

Under section 1445(a)(7), systems serving fewer than 150 connections are treated as complying with the unregulated contaminant monitoring requirements if the systems provide water samples or the opportunity for sampling. While EPA encourages these systems to request the additional analytical results for the unregulated contaminants from laboratories conducting their analysis for VOC compliance monitoring since the additional cost is relatively small (probably \$50 or less), this is not a requirement of this rule. Under the final rule, these systems are required to send a letter to the State specifying that their system is available for sampling; no samples are to be sent unless requested by the State.

States or the water systems may composite up to 5 samples when monitoring for unregulated contaminants. The compositing procedure is described in the section on Compliance Monitoring.

IV. Effective Dates

These regulations have an effective date of January 1, 1988: the laboratory performance requirements and monitoring for compliance requirements (§ 141.24(g)) and the unregulated monitoring and reporting requirements (§ 141.35 and 141.40) [Prior to the adoption of the compliance monitoring requirements by the State, the authority for compliance monitoring is section 1445 of the Act]. All other provisions promulgated in this final rulemaking (concerning MCLs, variance, and exemptions, provisions of reporting and recordkeeping) are effective January 9, 1989, as provided in section 1412(b)(10).

V. Impact Analyses

The economic impact analysis supporting this final rule is contained in "Economic Impact Analysis of Proposed Regulations to Control Volatile Synthetic Organic Chemicals in Drinking Water," October 1985, as amended (Ref. 3). The report presents estimates of the benefits and costs of regulatory alternatives. Also included are analyses required by the Regulatory Flexibility Act and the Paperwork Reduction Act. The purpose of the assessment was to determine overall economic impacts of the regulations. The addendum to the assessment responds to comments made during the public comment period. There has been no significant change in the initial assessment, which showed that approximately 1300 community water supplies would be expected to exceed the final standards without additional controls. If nearly all these systems took actions to comply with the regulations, the total present value cost of compliance to the nation would be about \$280 million. On an annualized basis, the cost of compliance would be \$21 million per year. Extending the VOC regulations to non-community non-transient water systems will require approximately 400 additional systems to treat their water, at a capital cost of \$20 million and approximately \$1.5 million per year.

The cost impacts on community water systems and consumers affected by volatile organic contamination vary depending upon the size of the PWS. Very small systems which serve from 25 to 500 people could be expected to increase their water rates by approximately 54 cents per 1000 gallons of water. As a result of economies of scale, large community systems serving more than 50,000 people could be expected to increase their rates only about 5 cents per 1000 gallons. These increases would only affect systems with contaminant levels above the standards.

Under Executive Order 12291, EPA must judge whether a regulation is "major" and, therefore, subject to the requirements of a Regulatory Impact Analysis. This action does not constitute a "major" regulatory action because it will not have a major financial or adverse impact on the country. This regulation has been reviewed by the Office of Management and Budget as required by Executive Order 12291 and their comments are available in the public docket.

The costs of compliance monitoring and monitoring for the unregulated contaminants are presented in Table 7 (see Ref. 3). As noted above, composites of up to five sources are allowed and the costs shown in Table 7 assume that systems composite a number of their sources. In addition, certain States conduct monitoring for small systems. Compositing of different system sources by States is allowed in the regulations; savings are estimated to be \$500,000 per year for the initial compliance monitoring, \$200,000 per year for the initial unregulated monitoring, and \$400,000 per year for the repeat compliance monitoring.

TABLE 7. -- COSTS (\$ MILLION/YEAR)

FOR MONITORING FOR COMPLIANCE
WITH MCLS FOR VOCS AND FOR
UNREGULATED VOCS

Initial Round:

VOCs subject to MCLs	\$7.5
Unregulated contaminants	\$1.7

Repeat Monitoring:

VOCs subject to MCLs	\$19.2
Unregulated contaminants	n1

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n1 The cost for repeat monitoring of unregulated contaminants will vary because the Agency will specify a new list of contaminants to be monitored in five years. Consequently,

contaminants other than those specified in this notice may be listed at that time.

The Regulatory Flexibility Act requires EPA to explicitly consider the effect of regulations on small entities. If there is a significant effect on a substantial number of small systems, the Agency must seek means to minimize the effects. With respect to the requirements of the Regulatory Flexibility Act, 5 U.S.C. 602 *et seq.*, today's action will not have a significant effect on a substantial number of small entities. Using the Small Business Administration's definitions, a "small" water utility is one that serves fewer than 50,000 people. There are about 78,500 such systems. Of these, fewer than 1700 are likely to have contamination levels greater than the MCLs. Therefore, this rule will affect about that 2 percent of the "small" systems, which does not constitute a substantial number of small systems. However, it is possible that today's action will have a substantial impact on a few small systems if regulated VOCs are found at levels higher than the MCL. Therefore, the Agency has attempted to provide alternatives to the requirements whenever possible. Specifically, EPA allows compositing of samples. Small systems may choose to composite their samples and to share the analytical costs. Also, the Agency has allowed bottled water and point-of-use devices as conditions of receiving a variance or exemption, even though decentralized treatment is less than the Agency's longrange goal of centralized treatment (due to untreated taps and possible inhalation effects), to accommodate the needs of the smaller systems with limited resources. The Agency also has given states the discretion to reduce monitoring frequency in accordance with a system's findings of no VOCs and its vulnerability status. Consequently, small systems which do not have VOC contamination in their water supply and are not located in a vulnerable area may have to monitor only infrequently. In addition, very small systems are not required to sample for unregulated contaminants; they are only required to provide a sample or make the opportunity for sampling available to the State.

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.* The information collection requirements are not effective until OMB approves them and a technical amendment to that effect is published in the Federal Register.

VI. References and Public Docket

The following references are referred to in this notice and are included in the Public Docket together with other correspondence and information. The Public Docket is available for viewing by appointment in Washington, D.C. by calling the telephone number at the beginning of this notice. All public comments received on the proposal are included in the Docket.

- (1) * U.S. Environmental Protection Agency, Criteria and Standards Division, Analytical Methods/Monitoring the VOCs in Drinking Water. June, 1987.
- (2) * U.S. Environmental Protection Agency, Criteria and Standards Division, Technologies and Costs for the Removal of Volatile Organic Chemicals from Potable Water Supplies. May, 1985.
- (3) * U.S. Environmental Protection Agency, Office of Program Development and Evaluation, Economic Impact Analysis of Proposed Regulations to Control Volatile Synthetic Organic Chemicals in Drinking Water. October, 1985, as amended 1987.
- (4) U.S. Environmental Protection Agency, Criteria and Standards Division, Summary of Comments and EPA Responses on the Proposed MCLs for the VOCs, Reproposed MCLG for para-Dichlorobenzene, and "Requirements for Unregulated Contaminants." (June 1987)
- (5) Peters, W., and Clark, S. Memo: Risks Associated With Air Emissions from Aeration of Drinking Water. To Robert G. Kellam, Program Analysis and Technology Section and Arthur H. Perler, Science and Technology Branch, Criteria and Standards Division, Office of Drinking

Water. Nov. 13, 1985.

(6) * National Toxicology Program, Toxicology and Carcinogenesis Studies of 1,4-Dichlorobenzene in F344 Rats and B6C3F[1] Mice (Gavage Studies), final report, 1987 (Technical Report Series No. 319).

(7) U.S. Environmental Protection Agency Ground Water Supply Survey January 1983.

(8) U.S. Environmental Protection Agency, Criteria and Standards Division. Criteria Document for ortho-Dichlorobenzene, meta-Dichlorobenzene, and para-Dichlorobenzene. (June 1987)

The starred (*) documents are available for a fee from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The toll-free number is 703/487-4650. These documents are also available for review at the Drinking Water Supply Branch Office in EPA's Regional Offices.

List of Subjects in 40 CFR Parts 141 and 142

Chemicals, Reporting and record-keeping requirements, Water supply, Administrative practice and procedure.

Dated: June 19, 1987.

Lee M. Thomas,

Administrator, Environmental Protection Agency.

Therefore, 40 CFR Parts 141 and 142 are amended as follows:

PART 141 -- [AMENDED]

1. In Part 141:

a. The authority citation for Part 141 continues to read as follows:

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

b. In § 141.2, the existing paragraph designations are removed, the existing paragraphs are arranged in alphabetical order, and the following new definitions are added:

§ 141.2. Definitions.

* * *

"Best available technology" or "BAT" means the best technology, treatment techniques, or other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration). For the purposes of setting MCLs for synthetic organic chemicals, any BAT must be at least as effective as granular activated carbon.

* * *

"Non-transient non-community water system or "NTNCWS" means a public water system that is not a community water system and that regularly serves at least 25 of the same persons over 6 months per year.

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"Point-of-entry treatment device" is a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

"Point-of-use treatment device" is a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.

* * *

c. A new paragraph (g) is added to § 141.24 to read as follows:

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

* * *

(g) Analysis of the contaminants listed in § 141.61(a) for purposes of determining compliance with the maximum contaminant levels shall be conducted as follows:

(1) Ground-water systems shall sample at points of entry to the distribution system representative of each well. Sampling must be conducted at the same location or a more representative location each quarter. Ground-water systems must sample every three months for each entry point to the distribution system except as provided in paragraph (g)(8)(i) of this section.

(2) Surface water systems shall sample at points in the distribution system representative of each source or at entry points to the distribution system after any application of treatment. Surface water systems must sample each source every three months except as provided in paragraph (g)(8)(ii) of this section. Sampling must be conducted at the same location or a more representative location each quarter.

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

(4) All community water systems and non-transient, non-community water systems serving more than 10,000 people shall analyze all distribution or entry-point samples, as appropriate, representing all source waters beginning no later than January 1, 1988. All community water systems and non-transient non-community water systems serving from 3,300 to 10,000 people shall analyze all distribution or entry-point samples, as required in this paragraph (g), representing source waters no later than January 1, 1989. All other community and non-transient, non-community water systems shall analyze distribution or entry-point samples, as required in this paragraph (g), representing all source waters beginning no later than January 1, 1991.

(5) The State or EPA may require confirmation samples for positive or negative results. If a confirmation sample(s) is required by EPA or the State, then the sample result(s) should be averaged with the first sampling result and used for compliance determination in accordance with (g)(9) of this section. States have discretion to delete results of obvious sampling errors from this calculation.

(6) Analysis for vinyl chloride is required only for ground water systems that 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. The analysis for vinyl chloride is required at each distribution or entry point at which one or more of the two-carbon organic

compounds were found. If the first analysis does not detect vinyl chloride, the State may reduce the frequency of vinyl chloride monitoring to once every three years for that sample location or other sample locations which are more representative of the same source. Surface water systems may be required to analyze for vinyl chloride at the discretion of the State.

(7) A State or individual public water systems may choose to composite up to five samples from one or more public water systems. Compositing of samples is to be done in the laboratory by the procedures listed below. Samples should be analyzed within fourteen days of collection. If any organic contaminant listed in § 141.61(a) VOC is detected in the original composite sample, a sample from each source that made up the composite sample must be reanalyzed individually within fourteen days from sampling. The sample for reanalysis cannot be the original sample but can be a duplicate sample. If duplicates of the original samples are not available, new samples must be taken from each source used in the original composite and analyzed for VOCs. Reanalysis must be accomplished within fourteen days of the second sample. To composite samples, the following procedure must be followed:

(i) 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 deg. 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 smaller syringe may be used.

(ii) 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.

(8) The State may reduce the monitoring frequency specified in paragraphs (g) (1) and (2) of this section, as explained in this paragraph as follows:

(i) The monitoring frequency for ground-water systems is as follows:

(A) When VOCs are not detected in the first sample (or any subsequent samples that may be taken) and the system is not vulnerable as defined in paragraph (g)(8)(iv) of this section, monitoring must be repeated every 5 years.

(B) When VOCs are not detected in the first sample (or any subsequent sample that may be taken) and the system is vulnerable as defined in paragraph (g)(8)(iv) of this section,

(1) Monitoring must be repeated every 3 years for systems >500 connections.

(2) Monitoring must be repeated every 5 years for system \leq 500 connections.

(C) If VOCs are detected in the first sample (or any subsequent sample that may be taken), regardless of vulnerability, monitoring must be repeated every 3 months, as required under paragraph (g)(1) of this section.

(ii) The repeat monitoring frequency for surface water systems is as follows:

(A) When VOCs are not detected in the first year of quarterly sampling (or any other subsequent sample that may be taken) and the system is not vulnerable as defined in paragraph g(8)(iv), monitoring is only required at state discretion.

(B) When VOCs are not detected in the first year of quarterly sampling (or any other subsequent sample that may be taken) and the system is vulnerable as defined in paragraph (g)(8)(iv) of this section,

(1) Monitoring must be repeated in three years (for systems >500 connections.)

(2) Monitoring must be repeated every five years (for systems \leq 500 connections.)

(C) When VOCs are detected in the first year of quarterly sampling (or any other subsequent sample that may be taken), regardless of vulnerability, monitoring must be repeated every 3 months, as required under paragraph (g)(2) of this section.

(iii) States may reduce the frequency of monitoring to once per year for a ground-water system or surface water system detecting VOCs at levels consistently less than the MCL for three consecutive years.

(iv) Vulnerability of each public water system shall be determined by the State based upon an assessment of the following factors:

(A) Previous monitoring results.

(B) Number of persons served by public water system.

(C) Proximity of a smaller system to a larger system.

(D) Proximity to commercial or industrial use, disposal, or storage of Volatile Synthetic Organic Chemicals.

(E) Protection of the water source.

(v) A system is deemed to be vulnerable for a period of three years after any positive measurement of one or more contaminants listed in either § 141.61(a) or § 141.40(e) except for trihalomethanes or other demonstrated disinfection by-products.

(9) Compliance with § 141.61(a) shall be determined based on the results of running annual average of quarterly sampling for each sampling location. If one location's average is greater than the MCL, then the system shall be deemed to be out of compliance. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, only that part of the system that exceeds any MCL as specified in Section 141.61(a) will be deemed out of compliance. States may reduce the public notice requirement to that portion of the system which is out of compliance. If any one sample result would cause the annual average to be exceeded, then the system shall be deemed to be out of compliance immediately. For systems that only take one sample per location because no VOCs were detected, compliance shall be based on that one sample.

(10) Analysis under this paragraph shall be conducted using the following **CLW** EPA methods or

their equivalent as approved by EPA. These methods are contained in "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water," September 1986, available from Environmental and Support Laboratory (EMSL), EPA, Cincinnati, OH 45268 or the State.

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

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

(iii) Method 524.1, "Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry."

(iv) Method 524.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography/Mass Spectrometry."

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

(11) Analysis under this section shall only be conducted by laboratories that have received conditional approval by EPA or the State according to the following conditions:

(i) To receive conditional approval to conduct analyses for benzene, vinyl chloride, carbon tetrachloride, 1,2-dichloroethane, trichloroethylene, 1,1-dichloroethylene, 1,1,1-trichloroethane, and paradichlorobenzene 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 (g)(11)(i)(C) and (g)(11)(i)(D) of this section for at least six of the seven subject organic chemicals. States may allow fewer than six of the seven.

(C) achieve quantitative results on the analyses performed under (g)(11)(i)(A) 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 (g)(11)(i)(A) of this section that are within +/-40 percent of the actual amount of the substances in the Performance Evaluation sample when the active 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.

(F) be currently approved by EPA or the State for the analyses of trihalomethanes under § 141.30.

(ii) To receive conditional approval 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 (g)(11)(i)(A) of this section that are within +/-40 percent of the actual amount of vinyl chloride in the Performance Evaluation sample.

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

(D) Receive approval or be currently approved by EPA or the State under (g)(11)(i) of this section.

(12) States have the authority to allow the use of monitoring data collected after January 1, 1983, for purposes of monitoring compliance. If the data is consistent with the other requirements in this paragraph, States may use that data to represent the initial monitoring if the system is determined by the State not to be vulnerable under the requirements of this section. In addition, the results of EPA's Ground Water Supply Survey can be used in a similar manner for systems supplied by a single well.

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

(14) 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.

(15) A public water system supplying fewer than 150 service connections shall be treated as complying with the monitoring requirements if the owner or operator sends a letter to the State specifying that their system is available for sampling. No samples may be sent to the State unless so requested. This letter must be sent to the State no later than January 1, 1991.

(16) States may exempt a public water system that obtains treated water from another public water system serving more than 10,000 persons from conducting compliance monitoring for the organic chemicals under § 141.61(a), provided that the system from which the water is obtained has conducted the analyses required under § 141.61(a).

(17) Public water systems exempted by the State under (g)(16) and which disinfect are required to monitor under § 141.40.

(18) 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 level for purposes of paragraphs (g) (5), (6), (7), and (8) of this section.

d. Section 141.32 is amended by revising the first phrase of paragraph (a) to read as follows:

§ 141.32 Public notification.

(a) If a community water system or non-transient non-community water systems fails to comply with an applicable maximum contaminant level established in Subpart B or G, * * *

* * *

e. A new § 141.35 is added to Subpart D to read as follows:

§ 141.35 Reporting and public notification for certain unregulated contaminants.

(a) The requirements of this section only apply to the contaminants listed in § 141.40.

(b) The owner or operator of a community water system or non-transient, non-community

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water system who is required to monitor under § 141.40 shall send a copy of the results of such monitoring within 30 days of receipt and any public notice under paragraph (d) of this section to the State.

(c) The State, or the community water system or non-transient, non-community water system if the State has not adopted regulations equivalent to § 141.40, shall furnish the following information to the Administrator for each sample analyzed under § 141.40:

- (1) Results of all analytical methods, including negatives;
- (2) Name and address of the system that supplied the sample;
- (3) Contaminant(s);
- (4) Analytical method(s) used;
- (5) Date of sample;
- (6) Date of analysis.

(d) The owner or operator shall notify persons served by the system of the availability of the results of sampling conducted under § 141.40 by including a notice in the first set of water bills issued by the system after the receipt of the results or written notice within three months. The notice shall identify a person and supply the telephone number to contact for information on the monitoring results.

f. Section 141.40 is revised to read as follows:

§ 141.40 Special monitoring for organic chemicals.

(a) All community and non-transient, non-community water systems shall monitor for the contaminants listed in paragraph (e) in this section by date specified in Table 1:

TABLE 1. -- MONITORING COMPLETION DATE BY SYSTEM SIZE

Number of persons served	Monitoring to begin no later than --
Over 10,000	Jan. 1, 1988
3,300 to 10,000	Jan. 1, 1989.
Less than 3,300	Jan. 1, 1991.

(b) Surface water systems shall sample in the distribution system representative of each water source or at entry points to the distribution system. The minimum number of samples is one year of quarterly samples per water source.

(c) Ground water systems shall sample at points of entry to the distribution system representative of each well. The minimum number of samples is one sample per entry point to the distribution system.

(d) The State may require confirmation samples for positive or negative results.

(e) Community water systems and non-transient, non-community water systems shall monitor for the following contaminants except as provided in paragraph (f) of this section:

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- (1) Chloroform
- (2) Bromodichloromethane
- (3) Chlorodibromomethane
- (4) Bromoform
- (5) trans-1,2-Dichloroethylene
- (6) Chlorobenzene
- (7) m-Dichlorobenzene
- (8) Dichloromethane
- (9) cis-1,2-Dichloroethylene
- (10) o-Dichlorobenzene
- (11) Dibromomethane
- (12) 1,1-Dichloropropene
- (13) Tetrachloroethylene
- (14) Toluene
- (15) p-Xylene
- (16) o-Xylene
- (17) m-Xylene
- (18) 1,1-Dichloroethane
- (19) 1,2-Dichloropropane
- (20) 1,1,2,2-Tetrachloroethane
- (21) Ethylbenzene
- (22) 1,3-Dichloropropane
- (23) Styrene
- (24) Chloromethane
- (25) Bromomethane
- (26) 1,2,3-Trichloropropane
- (27) 1,1,1,2-Tetrachloroethane
- (28) Chloroethane
- (29) 1,1,2-Trichloroethane

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- (30) 2,2-Dichloropropane
- (31) o-Chlorotoluene
- (32) p-Chlorotoluene
- (33) Bromobenzene
- (34) 1,3-Dichloropropene
- (35) Ethylene dibromide (EDB)
- (36) 1,2-Dibromo-3-chloropropane (DBCP)

(f) Community water systems and non-transient non-community water systems must monitor for EDB and DBCP only if the State determines they are vulnerable to contamination by either or both of these substances. For the purpose of this paragraph, a vulnerable system is defined as a system which is potentially contaminated by EDB and DBCP, including surface water systems where these two compounds are applied, manufactured, stored, disposed of, or shipped upstream, and for ground-water systems in areas where the compounds are applied, manufactured, stored, disposed of, or shipped in the ground-water recharge basin, or for ground-water systems that are in proximity to underground storage tanks that contain leaded gasoline.

(g) Analysis under this section shall be conducted using the recommended EPA methods as follows, or their equivalent as determined by EPA: 502.1, "Volatile Halogenated Organic Compounds in Water by Purge and Trap Gas Chromatography," 503.1, "Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography," 524.1, "Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry," 524.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography/Mass Spectrometry, or 502.2, "Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series." These methods are contained in "Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water," September 1986, available from Environmental Monitoring and Support Laboratory (EMSL), EPA, Cincinnati, Ohio 45268. Analysis of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) shall be conducted by Method 504, "Measurement of 1,2-Dibromoethane (EDB) and 1,2-Dibromo-3-chloropropane (DBCP) in Drinking Water by Microextraction and Gas Chromatography," September 1986, available from EMSL, Cincinnati, Ohio 45268 or the State.

(h) Analysis under this section shall only be conducted by laboratories approved under § 141.24(g)(11). In addition to the requirements of § 141.24(g)(11), each laboratory analyzing for EDB and DBCP must achieve a method detection limit for EDB and DBCP of 0.00002 mg/l, according to the procedures in Appendix B of Part 136.

(i) Public water systems may use monitoring data collected any time after January 1, 1983 to meet the requirements for unregulated monitoring, provided that the monitoring program was consistent with the requirements of this section.

(j) Monitoring for the following compounds is required at the discretion of the State:

- (1) 1,2,4-Trimethylbenzene
- (2) 1,2,4-Trichlorobenzene

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(3) 1,2,3-Trichlorobenzene

(4) n-Propylbenzene

(5) n-Butylbenzene

(6) Naphthalene

(7) Hexachlorobutadiene

(8) 1,3,5-Trimethylbenzene

(9) p-Isopropyltoluene

(10) Isopropylbenzene

(11) Tert-butylbenzene

(12) Sec-butylbenzene

(13) Fluorotrichloromethane

(14) Dichlorodifluoromethane

(15) Bromochloromethane

(k) Instead of performing the monitoring required by this section, a community water system or non-transient, non-community water system serving fewer than 150 service connections may send a letter stating that its system is available for sampling.

(l) All community and non-transient, non-community water systems shall repeat the monitoring required in § 141.40 no less frequently than every five years from the dates specified in § 141.40(a).

g. Section 141.50 is amended by revising paragraph (b) to read as follows:

§ 141.50 Maximum contaminant level goals for organic contaminants.

* * *

(b) MCLGs for the following contaminants are as indicated:

Contaminant	MCLG in mg/l
(1) 1,1-Dichloroethylene	0.007
(2) 1,1,1-Trichloroethane	0.20
(3) para-Dichlorobenzene	0.075

h. Section 141.60 is revised to read as follows:

§ 141.60 Effective dates.

(a) The effective date for § 141.61 is January 9, 1989.

(b) The effective date for § 141.62(b)(2) is October 2, 1987.

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i. Section 141.61 is added as follows:

§ 141.61 Maximum contaminant levels for organic contaminants.

(a) The following maximum contaminant levels for organic contaminants apply to community water systems and non-transient non-community water systems.

CAS No.	Contaminant	Maximum contaminant level in mg/l
71-43-2	Benzene	0.005
75-01-4	Vinyl chloride	0.002
56-23-5	Carbon tetrachloride	0.005
107-06-2	1,2-Dichloroethane	0.005
79-01-6	Trichloroethylene	0.005
75-35-4	1,1-Dichloroethylene	0.007
71-55-6	1,1,1-Trichloroethane	0.20
106-46-7	para-Dichlorobenzene	0.075

(b) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means generally available for achieving compliance with the maximum contaminant level for synthetic organic chemicals (§ 141.61 (a)): Central treatment using packed tower aeration; central treatment using granular activated carbon for all these chemicals except vinyl chloride.

j. Part 141 is amended by adding a new Subpart J, consisting of § 141.100 and § 141.101, to read as follows. Subparts H and I are reserved.

Subpart J -- Use of Non-Centralized Treatment Devices

Sec.

141.100 Criteria and procedures for public water systems using point-of-entry devices.

141.101 Use of other non-centralized treatment devices.

Subpart J -- Use of Non-Centralized Treatment Devices

§ 141.100 Criteria and procedures for public water systems using point-of-entry devices.

(a) Public water systems may use point-of-entry devices to comply with maximum contaminant levels only if they meet the requirements of this section.

(b) It is the responsibility of the public water system to operate and maintain the point-of-entry treatment system.

(c) The public water system must develop and obtain State approval for a monitoring plan before point-of-entry devices are installed for compliance. Under the plan approved by the State, point-of-entry devices must provide health protection equivalent to central water treatment. "Equivalent" means that the water would meet all Primary and Secondary Drinking Water Standards and would be of acceptable quality similar to water distributed by a well-operated central treatment plant. In addition to the VOCs, monitoring must include physical measurements and observations such as total flow treated and mechanical condition

of the treatment equipment.

(d) Effective technology must be properly applied under a plan approved by the State and the microbiological safety of the water must be maintained.

(1) The State must require adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-entry devices.

(2) The design and application of the point-of-entry devices must consider the tendency for increase in heterotrophic bacteria concentrations in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contractor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.

(e) All consumers shall be protected. Every building connected to the system must have a point-of-entry device installed, maintained, and adequately monitored. The State must be assured that every building is subject to treatment and monitoring, and that the rights and responsibilities of the public water system customer convey with title upon sale of property.

§ 141.101 Use of other non-centralized treatment devices.

Public water systems shall not use bottled water or point-of-use devices to achieve compliance with an MCL. Bottled water or point-of-use devices may be used on a temporary basis to avoid an unreasonable risk to health.

PART 142 -- [AMENDED]

2. In Part 142:

a. The authority citation for 40 CFR Part 142 continues to read as follows:

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

b. A new § 142.56 is added to Subpart F, to read as follows:

§ 142.56 Bottled water and point-of-use devices.

(a) A State may require a public water system to use bottled water or point-of-use devices as a condition for granting an exemption from the requirements of § 141.61(a) of this part.

(b) Public water systems that use bottled water as a condition of obtaining an exemption from the requirements of § 141.61(a) must meet the requirements set out in § 142.62(f) of this part.

(c) Public water systems that use point-of-use devices as a condition for receiving an exemption must meet the requirements set out in § 142.62(g) of this part.

c. A new § 142.62 is added to Subpart G to read as follows:

§ 142.62 Variances from the maximum contaminant levels for synthetic organic chemicals.

(a) The Administrator, pursuant to section 1415(a)(1)(A) of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for synthetic organic chemicals: Removal using packed tower aeration; removal using granular activated carbon (except for vinyl chloride).

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(b) A State shall require community water systems and non-transient, non-community water systems to install and/or use any treatment method identified in § 141.62(a) as a condition for granting a variance except as provided in paragraph (c). If, after the system's installation of the treatment method, the system cannot meet the MCL, that system shall be eligible for a variance under the provisions of section 1415(a)(1)(A) of the Act.

(c) If a system can demonstrate through comprehensive engineering assessments, which may include pilot plant studies, that the treatment methods identified in § 141.62(a) would only achieve a *de minimis* reduction in contaminants, the State may issue a schedule of compliance that requires the system being granted the variance to examine other treatment methods as a condition of obtaining the variance.

(d) If the State determines that a treatment method identified in paragraph (c) of this section is technically feasible, the Administrator or primacy State may require the system to install and/or use that treatment method in connection with a compliance schedule issued under the provisions of section 1415(a)(1)(A) of the Act. The State's determination shall be based upon studies by the system and other relevant information.

(e) The State may require a public water system to use bottled water or point-of-use devices or other means as a condition of granting a variance from the requirements of § 141.61(a), to avoid an unreasonable risk to health.

(f) Public water systems that use bottled water as a condition for receiving a variance from the requirements of § 141.61(a) must meet the following requirements in either paragraph (f)(1) of (f)(2) of this section in addition to requirements in paragraph (f)(3) of this section:

(1) The Administrator or primacy State must require and approve a monitoring program for bottled water. The public water system must develop and put in place a monitoring program that provides reasonable assurances that the bottled water meets all MCLs. The public water system must monitor a representative sample of the bottled water for all contaminants regulated under § 141.61(a) the first quarter that it supplies the bottled water to the public, and annually thereafter. Results of the monitoring program shall be provided to the State annually.

(2) The public water system must receive a certification from the bottled water company that the bottled water supplied has been taken from an "approved source" as defined in 21 CFR 129.3(a); the bottled water company has conducted monitoring in accordance with 21 CFR 129.80(g) (1) through (3); and the bottled water does not exceed any MCLs or quality limits as set out in 21 CFR 103.35, 110, and 129. The public water system shall provide the certification to the State the first quarter after it supplies bottled water and annually thereafter.

(3) The public water system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system, via door-to-door bottled water delivery.

(g) Public water systems that use point-of-use devices as a condition for obtaining a variance from NPDWRs for volatile organic compounds must meet the following requirements;

(1) It is the responsibility of the public water system to operate and maintain the point-of-use treatment system.

(2) The public water system must develop a monitoring plan and obtain State approval for the plan before point-of-use devices are installed for compliance. This monitoring plan must provide health protection equivalent to a monitoring plan for central water treatment.

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(3) Effective technology must be properly applied under a plan approved by the State and the microbiological safety of the water must be maintained.

(4) The State must require adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-use devices.

(5) The design and application of the point-of-use devices must consider the tendency for increase in heterotrophic bacteria concentrations in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contractor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.

(6) All consumers shall be protected. Every building connected to the system must have a point-of-use device installed, maintained, and adequately monitored. The State must be assured that every building is subject to treatment and monitoring, and that the rights and responsibilities of the public water system customer convey with title upon sale of property.

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