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**ENVIRONMENTAL PROTECTION AGENCY****40 CFR Parts 141 and 143**

[ -FRL-3254-5]

**National Primary Drinking Water Regulations; Analytical Techniques****AGENCY:** Environmental Protection Agency (EPA).**ACTION:** Final rule.

**SUMMARY:** This action amends the National Primary Drinking Water Regulations (NPDWRs) promulgated pursuant to Sections 1401, 1412 and 1445 of the Safe Drinking Water Act (SDWA) (42 U.S.C. 300f *et seq.*, as amended). These amendments specify two alternate analytical techniques that have been added to the list of analytical methods approved by EPA to measure the concentration of six inorganic chemicals and four organochlorine pesticides in drinking water. These techniques are the: (1) Inductively coupled plasma (ICP) atomic emission spectrometric method for inorganic contaminants, and (2) solid phase extraction method for pesticides. In addition, this notice amends the National Secondary Drinking Water Regulations (NSDWRs) by adding the ICP technique to the list of analytical techniques that may be used in the determination of four inorganic chemicals.

EPA proposed the approval of the two techniques listed above on October 23, 1986 (51 FR 37608). The Agency requires that only approved analytical techniques be used for determining compliance with the maximum contaminant levels (MCLs) for NPDWR contaminants. The Agency also provides guidance on the adequacy of analytical techniques for the determination of NSDWR contaminants. The Agency has determined that the proposed techniques are substantially equivalent in both precision and accuracy to techniques already approved.

**EFFECTIVE DATE:** This rule is effective March 21, 1988. In accordance with 40 CFR 23.7, this regulation shall be considered final Agency action for the purposes of judicial review at 1:00 eastern daylight savings time on March 4, 1988.

**ADDRESSES:** The public comments and supporting documents are in the public docket. The public docket is located in the Science and Technology Branch, Criteria and Standards Division, Office of Drinking Water (WH-550D), WSM, Environmental Protection Agency, 401 M. Street, SW., Washington, DC 20460.

The public docket is available for review by contacting Mrs. Colleen Campbell-Jozefczyk (202) 382-3027.

**FOR FURTHER INFORMATION CONTACT:** Joseph A. Cotruvo, Ph. D., Director, Criteria and Standards Division, Office of Drinking Water (WH-550D), Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, telephone (202) 382-7575.

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**I. Summary of Today's Action:**

Today's action makes available two additional analytical methods for determining compliance with existing NPDWRs. They are: (1) The Inductively Coupled Plasma (ICP) Atomic Emission Spectrometric Method for the determination of arsenic, barium, cadmium, chromium, lead and silver, and (2) the Solid Phase Extraction (SPE) Method for the determination of endrin, lindane, methoxychlor and toxaphene. In addition, the ICP method is being added to the list of analytical techniques that may be used for determining compliance with existing NSDWRs for copper, iron, manganese and zinc.

**II. Statutory Authority and Regulatory Background****A. Statutory Authority**

The SDWA requires the EPA to promulgate NPDWRs which include MCLs or treatment techniques which public water systems must meet. SDWA section 1412. NPDWRs also contain "criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels; including quality control and testing procedures to ensure compliance with such levels \* \* \* SDWA sections 1401(1)(D); 42 U.S.C. 330f(1)(D). In addition, section 1445(b), 42 U.S.C. 300j-4(b), authorizes the Administrator to require monitoring to assist in determining whether persons are acting in compliance with the Act. EPA's promulgation of analytical

techniques is authorized under these sections of the Act.

The Act also requires EPA to promulgate NSDWRs for contaminants in drinking water that primarily affect the aesthetic qualities relating to the public acceptance of drinking water. SDWA section 1412. These regulations are not Federally enforceable but are guidelines for the States. The NSDWRs also include analytical techniques for determining compliance with the regulations.

EPA promulgated NPDWRs in 1975, 1976, 1980, and 1987 for a total of 32 drinking water contaminants. See 40 CFR 141.11-16. At the same time, EPA promulgated analytical techniques for these contaminants. See 40 CFR 141.21-30. Under these regulations, persons must use one of several approved analytical techniques for determining compliance with the MCLs. In addition, under 40 CFR 141.27, alternate analytical techniques may be used by public water systems upon request and after concurrence by the State and EPA.

**B. Regulatory Background**

EPA proposed the approval of two analytical techniques in the October 23, 1986 Federal Register. (1) The Inductively Coupled Plasma (ICP) Atomic Emission Spectrometric Method for the determination of arsenic, barium, cadmium, chromium, lead and silver, and (2) the Solid Phase Extraction Method for the determination of endrin, lindane, methoxychlor and toxaphene.

In addition, the ICP method was proposed for determining compliance with existing NSDWRs for copper, iron, manganese and zinc.

These techniques have been reviewed by EPA and they are deemed equivalent to the EPA's approved test procedures in terms of precision and accuracy at the established MCLs. EPA will reexamine all the approved procedures as part of its revision of the existing primary drinking water regulations being conducted pursuant to the 1986 amendments to the Safe Drinking Water Act. Below is a description of these techniques.

**1. Inductively Coupled Plasma (ICP)—Atomic Emission Spectrometric Method**

This method (also known as "EPA Method 200.7") describes a technique for the simultaneous or sequential multi-element determination of trace elements in solution. This method was developed by EPA's Environmental Monitoring and Support Laboratory (EMSL) in Cincinnati and has been validated through an interlaboratory method study. The Agency proposed the approval of this technique for the

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determination of six primary contaminants—arsenic, barium, cadmium, chromium, lead and silver—and of four secondary contaminants—copper, iron, manganese and zinc. The basis of the method is the measurement of atomic emission by an optical spectroscopic technique. Samples are nebulized and the aerosol that is produced is transported to the plasma torch where excitation occurs. Characteristic atomic line emission spectra are produced by a radio frequency ICP. The spectra are dispersed by a grating spectrometer and the intensities of the lines are monitored by photomultiplier tubes. The photocurrents from the photomultiplier tubes are processed and controlled by a computer system. A background correction technique is required to compensate for variable background contribution to the determination of trace elements. Background must be measured adjacent to analyte lines on samples during analysis.

Pursuant to 40 CFR 141.27, the Agency has granted limited approval in the past to laboratories requesting the use of Method 200.7 as an alternative analytical technique for certain inorganics in drinking water samples. The acceptability of this technique has been demonstrated through various data sources including: (1) Performance evaluation study data and (2) the interlaboratory method validation study (i.e., EPA Method Study 27, Method 200.7, Trace Metals by ICP).

The Agency developed a concentration technique that allows for the determination of trace metals at levels significantly lower than the established MCLs. This procedure has been written as an Appendix to Method 200.7 entitled, "Inductively Coupled Plasma Atomic Emission Analysis of Drinking Water." The concentration technique requires concentration of samples at least four times prior to analysis. The concentration step is necessary because Method 200.7, without concentration of the samples, is not sensitive enough for the determination of arsenic and lead at the established MCLs. This concentration technique improves the sensitivity of ICP to other elemental contaminants as well. EMSL gathered performance data (i.e., precision, accuracy, limits of detection) for the following primary elemental contaminants—arsenic, barium, silver, cadmium, chromium, and lead—and for four secondary elemental contaminants—copper, iron, manganese, and zinc. These data showed improved performance for all the analytes of interest.

## 2. Solid Phase Extraction Method

The Solid Phase Extraction (SPE) Method describes the use of an SPE procedure developed by J.T. Baker Chemical Company as an alternative to the present liquid/liquid extraction procedure. The new test procedure is described in a document entitled, "Methods for Organochlorine Pesticides and Chlorophenoxy Acid Herbicides in Drinking Water and Raw Source Water." This method was proposed for the analysis of endrin, lindane, methoxychlor, and toxaphene. The method uses a serological polypropylene column which is packed with a 40 µm average particle diameter 60A° silica gel covalently bonded and endcapped with a reversed phase organosilane. The packing is held in place by compression between two 40 µm polyethylene frits.

After conditioning the column with suitable solvents, the drinking water sample is drawn or forced through the column. The low levels of contaminants are selectively extracted and concentrated in the packing. Co-extracted interferences and impurities are selectively removed with a solvent/solution wash. The compounds of interest are then eluted with a small volume of solvent, typically 1 ml. The collected eluants are subsequently analyzed for organochlorine pesticides using the USEPA-approved test procedure. Use of the Baker Solid Phase columns eliminates the liquid/liquid extraction step in the USEPA approved test procedure, thereby saving considerable time and resources. Since the analytes are adsorbed onto the bonded surface of the column packing, the extracted compounds of interest are in an "immobilized" state and the extraction columns can be easily transported to central laboratories for immediate analyte elution.

J.T. Baker Chemical Co. completed a study which indicated comparability of the SPE technique to the approved technique for four organochlorine pesticides: endrin, lindane, methoxychlor, and toxaphene. Details regarding the proposed and approved methods used for developing the comparability data, spiking levels, and the data points from analysis of water supplies were provided in a report to the Agency. (Collaborative Study, Proposed J.T. Baker Chemical Co. Solid Phase Extraction (SPE) Alternate Test Procedure (ATP); Test Method No. SPE-500 for EPA Test—Methods for Organochlorine Pesticide and Chlorophenoxy Acid Herbicides in Drinking Water and Raw Source Water, NIPDWR Compliance Monitoring, February 5, 1985). Statistical analyses of

the data provided in this report were performed by EMSL-Cincinnati. The results show that in those cases where there were statistical differences between the two methods, the SPE procedure provided more complete recovery of the compound tested and the SPE procedure was more precise than the EPA-approved procedure. Inspection of the recoveries and precision by each method and analyte indicated that these differences were very small and were insignificant relative to the applicable maximum contaminant level for endrin, lindane, methoxychlor, and toxaphene.

## III. Comments and Responses

EPA requested comments on the suitability of the ICP for determining compliance with primary and secondary MCLs for metals. EPA also requested comments on the suitability of the Solid Phase Extraction technique for determining compliance with four primary MCLs for organochlorine pesticides.

EPA received a total of nine comments on the proposed rule. Of these comments, one was a general comment commending EPA for its efforts to approve suitable, new and improved analytical techniques. The other eight commenters provided specific comments on the ICP technique and/or the SPE technique. Seven comments addressed the ICP technique and four comments addressed the Solid Phase Extraction (SPE) technique. The commenters were generally in favor of approval of these analytical techniques, with the exception of one negative comment on the ICP technique and one negative comment on the SPE technique. For each technique, a general summary of the comments received, with EPA's responses, are presented below. A detailed comment-response document is contained in the record for this rulemaking.

### A. Approval of Inductively Coupled Plasma (ICP)—Atomic Emission Spectrometric Method

Seven comments were received concerning the approval of the ICP technique for the primary contaminants—arsenic, barium, cadmium, chromium, lead and silver—and of four secondary contaminants—copper, iron, manganese and zinc. Six commenters agreed with EPA's recommendation for approval of this technique and one disagreed with the proposed action. One of the favorable commenters stated that the ICP method is routinely used to monitor select inorganic constituents in various water matrices with success, and the

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technique is considerably more cost-effective than other EPA-approved techniques for compliance monitoring."

The commenter opposing approval of the ICP method cited three reasons why the Agency should not approve the technique for compliance monitoring purposes. First, the commenter claimed that the concentration procedure provided for in the appendix to the method could potentially cause variability in the results obtained by the method. The commenter argued that the Agency should have assessed the extent of that variability by conducting an interlaboratory validation study of the concentration component of the method. Second, the commenter asserted that the method detection limits cited in the appendix to Method 200.7 were too low; the commenter calculated alternate MDLs in order to demonstrate that the ICP technique was not sufficiently sensitive to serve as a monitoring method for lead and arsenic. Third, the commenter claimed that certain procedures followed in Method Study 27 were flawed and undermined the reliability of the study's results. The discussion below responds to each of these comments in turn.

### 1. Potential variability due to concentration procedure, and necessity of conducting interlaboratory validation study

EPA agrees with the commenter that concentration procedures can introduce additional variability in the results obtained by an analytical method. However, data gathered and summarized in the appendix to Method 200.7 demonstrate that the overall precision of the method improves significantly as a result of the four-fold concentration of the sample which is required for drinking water samples. The commenter asserts that, in the general population of laboratories, error added by the concentration step may be sufficiently large to offset any additional precision which may be obtained through concentration. To judge the variability across different laboratories, the commenter asserts that an interlaboratory study is necessary.

EPA rejects these contentions on several grounds. First, EPA believes that the concerns expressed by the commenter are addressed by the mandatory quality control requirements described in the Appendix to Method 200.7. EPA believes that the best way to assure acceptable analytical results is to require that each laboratory which proposes to use a method demonstrate its ability to meet specified quality control requirements. As long as laboratories properly follow the

procedures described in the Appendix, the ICP technique will yield satisfactory results. Second, while the precision and bias estimates in the Appendix to Method 200.7 are based on single laboratory data, the Agency has also examined multilaboratory performance evaluation (PE) data on the ICP Method collected by EPA's Environmental Monitoring and Support Laboratory. These data indicate that better precision is attained by laboratories using the ICP as opposed to the approved atomic absorption methods, and refute the commenter's argument that unacceptable variability will occur during the day-to-day operations of various laboratories.

The commenter's position also appears to be based on the erroneous assumption that interlaboratory validation studies must always be conducted prior to approval of an analytical technique. While such studies are generally beneficial, EPA has repeatedly approved the use of alternative analytical techniques without having performed any interlaboratory studies. This was the case with the gas chromatographic methods for trihalomethanes and the furnace atomic absorption methods for metals which were approved in 1979 and 1980, respectively. In 1987, the Agency approved five analytical methods for some volatile organic chemicals (VOCs) that were modifications of existing methods for VOCs without having conducted interlaboratory validation studies of those methods. The costs to the Agency of conducting interlaboratory validation studies for every analytical method or modification of existing methods would be prohibitive. Thus, emphasis is given in the drinking water program to the demonstration of the laboratory's ability to attain results within specified accuracy limits. This demonstration of capabilities is an integral part of the Drinking Water Laboratory Certification Program. This program provides a mechanism for the evaluation of laboratories to help assure the validity of data generated. Laboratories wishing to analyze compliance samples must meet the requirements of this program.

### 2. Method detection limit of the ICP technique

The commenter also objects to approval of the ICP technique on the basis of the requirement written in the appendix to Method 200.7 that the detection limits for each element must not exceed one-fifth of its corresponding MCL. Using established procedures contained in 40 CFR Part 136 Appendix B, EPA projected MDLs for each

element, and included those MDLs in the Appendix to Method 200.7. The commenter seemed to challenge the validity of these MDLs, and performed calculations using data from Method Study 27 (interlaboratory validation of Method 200.7) to project different MDLs.

EPA examined the statistical manipulations performed by the commenter and concluded that many assumptions made by the commenter are not technically justifiable. The manipulation of Method Study 27 data to estimate MDLs does not follow the procedure in 40 CFR Part 136 which EPA has determined is appropriate for determining MDLs. Therefore, EPA believes that the conclusions derived from these manipulations are inaccurate. Multilaboratory method studies are simply not designed to estimate MDLs. The lowest concentrations actually tested in Method Study 27 are higher than those which, under EPA procedures, must be used to estimate MDLs (Glaser et al., *Env. Sci. Tech.*, 15, 1426, 1981). Generally, the use of concentrations higher than required by EPA procedures results in overestimates of MDLs. As a result, the detection limits calculated by the commenter were too high. This is not to say that all laboratories will be able to achieve the method detection limit calculated under ideal research conditions by EPA laboratories. EPA recognizes that detection limits can vary depending upon the precision attainable by individual laboratories. To minimize this variability and insure satisfactory analytical results, Method 200.7 with appendix requires laboratories to demonstrate that they can reliably analyze compliance samples at the maximum containment levels.

### 3. Challenges to design of interlaboratory validation Study—Method Study 27

The commenter also questions the appropriateness of that portion of the interlaboratory study for ICP where participants collected and spiked their own tap, surface and reagent waters. The commenter expressed concern that this practice caused the study results to be non-uniform and, therefore, not of sufficient quality to ensure that the precision and bias of the ICP Method 200.7 were acceptable for compliance monitoring purposes.

The commenter asserted that this problem arose in connection with the interlaboratory validation study of the furnace atomic absorption methods (Method Study 31) because in that study as well, participants collected and spiked their own samples of reagent, tap

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and surface waters. According to the commenter, Method Study 31 concluded that the performance data were adversely affected by this practice. While noting that no such conclusions were drawn in Method Study 27, the commenter hypothesized that non-uniformity would have had a negative influence on the precision and bias of the ICP technique, if the preconcentration procedure had been studied along with Method 200.7.

EPA agrees that concentration may interfere with the recovery of an analyte in certain water matrices (i.e., cause matrix effects), but disputes the commenter's belief that the procedure described in the Appendix to Method 200.7 poses such problems. The commenter's reliance on Method Study 31 is misplaced. While the study observed some statistically significant matrix effects for a few elements in surface and effluent waters, no such effects were noted in the drinking water matrices. This observation indicates that drinking water, being relatively free of contaminants, is not likely to contain many elements which interfere with accurate recoveries of elements of concern.

In addition, the appendix to Method 200.7 addresses potential interferences caused by concentration of samples. High levels of calcium and magnesium are the primary interferents which result from concentration of samples prior to ICP analysis. The method requires that a matrix-matched calibration standard be used when the concentration of calcium or calcium and magnesium combined exceed certain levels. Laboratories following this practice will not experience matrix effects due to the concentration procedure contained in the Appendix to Method 200.7.

#### *B. Approval of Solid Phase Extraction Method*

Four comments were received concerning the approval of the SPE technique for endrin, lindane, methoxychlor and toxaphene. Three of the commenters agreed with EPA's recommendation for approval of this technique. One of these commenters provided specific research references that support the use of solid-phase extraction methods for organochlorine pesticide analysis. The fourth commenter, the Chemical Manufacturers Association (CMA), stated that the applicant, J.T. Baker Chemical Company, failed to establish equivalency for the SPE method, and argued, therefore, that this method should not be granted approval. J.T. Baker conducted a collaborative study to compare the performance of the

proposed SPE method and the USEPA-approved method. The analyses were conducted by two different laboratories, Rutgers University and Virginia Polytechnic Institute. J.T. Baker provided a report to the Agency that included the concentration levels used and the data points generated from analysis of water samples using the proposed and approved methods.

CMA stated that the Baker "Collaborative Study" submitted to EPA in support of their application does not contain an interpretative text, statistical evaluation of data, or any interlaboratory assessments of precision and accuracy. However, the purpose of the J.T. Baker study was only to provide the Agency analytical data using both the proposed and the approved procedures. The Agency does not require the report to contain statistical evaluation, data interpretation, or assessments of precision and accuracy. The subject report satisfies the comparability data requirements for nationwide approval of alternate test procedures. To satisfy these requirements, J.T. Baker was instructed to collect drinking water from six geographically dispersed water supply systems which utilized ground and surface water. From each system, six grab samples were collected, spiked with known amounts of lindane, endrin, methoxychlor, or toxaphene, split, and analyzed eight times; four each using the approved liquid/liquid extraction method as specified in 40 CFR Part 141, and four using the Baker SPE technique.

Two EPA laboratories conducted statistical analysis and technical reviews of the data provided by J.T. Baker. CMA's critique of Baker's collaborative study appears to be based on their assumption that the applicant had to provide statistical analysis of the submitted data. CMA apparently did not obtain copies of the technical reviews listed under the Public Docket/References section of the proposed rule. During the technical reviews, EPA addressed the specific issues raised by CMA: (1) That one of the universities involved in the study experienced serious problems with the recovery/analysis of methoxychlor, (2) that there are some questionable results, and (3) that there are a high number of false negatives. EPA responses to these issues are summarized below.

1. The commenter correctly points out that one university had difficulty with the recovery/analysis of methoxychlor. However, this difficulty was experienced with both the proposed and the approved analytical methods. This problem in quantitation using both

analytical methods indicates that the preparation technique which is the unique feature of the proposed method was not the cause of the recovery problem. Since both the approved and proposed methods utilize identical procedures to determine the presence and the amount of analyte in a sample, and since there were recovery problems with both methods, it is likely that those problems were due to deficiencies in the determinative procedure. Therefore, the experience of this laboratory does not refute other evidence that the solid phase extraction technique is equivalent to the approved analytical methods.

2. Approximately forty-one questionable data points were encountered, the majority of which were immediately noticeable by excessively high recoveries. All but five were documentable reporting or calculation errors and were corrected prior to statistical analysis. The remaining number of questionable data points is not significant considering the total number of results.

3. EPA's review also revealed false negative results, i.e., zero percent recoveries for an analyte extracted by the SPE procedure when the approved extraction yielded acceptable recoveries. Of the 960 individual analyses reported, six such results were observed. However, this number is slightly smaller than the incidence of zero percent recoveries for samples extracted using the approved procedure when the SPE technique yielded acceptable results. EPA does not consider the number of false negative results obtained by the SPE technique to be significant considering the total number of data points.

In fact, it appears that the SPE technique performed better than the approved liquid-liquid extraction procedure. The statistical analyses of the comparability data indicated that in those cases where there were statistically significant differences between the two methods, the mean recoveries of the SPE procedure were slightly higher or the SPE procedure was significantly more precise than the approved technique. Therefore, the Agency maintains that the Baker SPE procedure is suitable for monitoring compliance with MCLs for the four organochlorine pesticides: endrin, lindane, methoxychlor, and toxaphene.

#### **IV. Future Review of Analytical Methods**

EPA is approving the use of these new analytical methods to make them available to the regulated community as soon as possible. However, the Agency

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will also generally examine the approved drinking water methods as part of its promulgation of MCLs pursuant to the 1986 amendments to the SDWA. Before EPA promulgates MCLs for inorganic contaminants and pesticides, the Agency expects to reevaluate all methods (including those approved today) and determine whether to continue their approval.

The analytical method approved today are only applicable to the existing MCLs. Public water systems are cautioned that detection limits for certain inorganic chemicals such as lead and arsenic are higher using the ICP technique than with atomic absorption methodology. Thus, the ICP technique may not be adequate for very low concentrations.

#### V. Regulatory Assessment Requirements

##### A. Executive Order 12291

Under Executive Order 12291, EPA must judge whether a regulation is "major" and, therefore, requires a regulatory impact analysis. EPA has determined that this regulation is not major as it will not result in an effect on the economy of \$100 million or more, a significant increase in cost or prices, or any of the adverse effects described in the Executive Order. This rule simply specifies two analytical techniques which may be used by laboratories to measure concentrations of certain pesticides and inorganic chemicals and, therefore, has no adverse economic impacts. However, this action was submitted to OMB for their review under the Executive Order.

##### B. Regulatory Flexibility Act

This amendment is consistent with the objectives of the *Regulatory Flexibility Act* (5 U.S.C. 602 *et seq.*) because it will not have a significant economic impact on a substantial number of small entities. The methods which are included in this final rule give all laboratories, including small laboratories, the flexibility to use these alternate methods.

##### C. Paperwork Reduction Act

This rule contains no requests for information and is, therefore, exempt from the requirements of the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.*

#### VI. Effective Date

This rule is issued under SDWA section 1401, 1412 and 1445. Although section 1412(b) provides that the National Primary Drinking Water Regulations (as described in section 1401) take effect 18 months after their promulgation, under section 1445 there

is no such limitation for monitoring, reporting, and recordkeeping regulations which may be used to assist in determining compliance. To allow the monitoring methods to be used after 30 days of promulgation, EPA is promulgating these regulations under section 1445. Effective 18 months after promulgation, the analytical methods will also be deemed to be promulgated under section 1412.

#### VII. References and Public Docket

The following references are included in the Public Docket together with other correspondence and information. The Public Docket is available for reviewing in Washington, DC, at the address listed at the beginning of this notice. All public comments received on the proposal are included in the Docket.

- Technical reviews of the proposed analytical techniques.
- Report with recommendations from the Director, Environmental Monitoring and Support Laboratory in Cincinnati to the Director, Office of Drinking Water.
- Copies of the proposed analytical techniques and performance data.
- Method Validation Study Report for ICP technique.
- Collaborative Study Report for SPE technique.
- Public Comments and EPA Responses.

#### List of Subjects in 40 CFR Parts 141 and 143

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

Dated: February 9, 1988.

Lee M. Thomas,  
Administrator, U.S. Environmental Protection Agency.

For the reasons set out in the preamble, Parts 141 and 143 of Title 40, Code of Federal Regulations are amended as set forth below.

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

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

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

2. Section 141.23 is amended by revising paragraphs (f) introductory text, (f)(1), (f)(2), (f)(3), (f)(4), (f)(5) and (f)(9), footnotes 1-4 are republished, and footnote 8 added to read as follows:

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

(f) 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> D2972-78B or Method <sup>2</sup> 301.A VII, pp. 159-162, or Method <sup>3</sup> I-1062-78, pp. 61-63, Atomic Absorption-Gaseous Hydride; or Method <sup>1</sup> 206.4, or Method <sup>4</sup> D-2972-78A, or Method <sup>2</sup> 404-A and 404-B(4), 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> 301-A IV, pp. 152-155, 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> 301-A II or III, pp. 148-152, 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> 301-A II or III, pp. 148-152, 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) Lead-Method <sup>1</sup> 239.1, or Method <sup>4</sup> D 3559-78A 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;

<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," 14th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1976.

<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>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.

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or Method <sup>8</sup> 200.7, Inductively Coupled Plasma Technique.

(9) Silver-Method <sup>1</sup> 272.1, or Method <sup>2</sup> 301-A II, pp. 148-152, Atomic Absorption-Direct Aspiration; or Method <sup>1</sup> 272.2, Atomic Absorption Furnace Technique; or Method <sup>8</sup> 200.7, Inductively Coupled Plasma Technique.

3. Section 141.24 is amended by revising paragraph (e), and the footnotes thereto by republishing footnotes 2 and 5 unamended and by adding a new footnote 6, as follows:

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

(e) Analysis made to determine compliance with § 141.12(a) shall be made in accordance with the following methods, or their equivalent as determined by the Administrator: "Methods for Organochlorine Pesticides and Chlorophenoxy Acid Herbicides in Drinking Water and Raw Source Water," available from ORD Publications, CERL, EPA, Cincinnati, Ohio 45268; or "Organochlorine Pesticides in Water," Annual Book of ASTM Standards, part 31, Water, Method D-3086-79; or Method 509-A, pp. 555-565; <sup>2</sup> or Gas Chromatographic Methods for Analysis of Organic Substances in Water, <sup>5</sup> USGS, Book 5, Chapter A-3, pp. 24-39; or Solid Phase Extraction (SPE) <sup>6</sup> Test Method Number

<sup>2</sup> See footnote 2 to § 141.23.

<sup>5</sup> Techniques of Water-Resources Investigation of the United States Geological Survey, Chapter A-3, "Methods for Analysis of Organic Substances in Water," Book 5, 1971, Stock #2401-1227. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC.

<sup>6</sup> Solid Phase Extraction (SPE) Test Method Number SPE-550 is available from J.T. Baker

SPE-500 for EPA's "Methods for Organochlorine Pesticides and Chlorophenoxy Acid in Herbicides in Drinking Water and Raw Source Water."

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

4. The authority citation for Part 143 continues to read as follows:

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

5. Section 143.4 is amended by revising paragraphs (b)(3), (b)(5), (b)(6), and (b)(11) to read as follows:

#### § 143.4 Monitoring.

(b) \* \* \*

(3) Cooper—Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes," pp. 108-109, EPA, Office of Technology Transfer, Washington, DC 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater," 13th Edition, pp. 210-215, 14th Edition, pp. 144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma—Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes—Method 200.7," available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

(5) Iron—Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes," pp. 110-111, EPA, Office of Technology Transfer, Washington, DC 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater," 13th

Chemical Company, 22 Red School Lane, Phillipsburg, New Jersey 08865.

Edition, pp. 210-215, 14th Edition, pp. 144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma—Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes—Method 200.7," available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

(6) Manganese—Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes," pp. 116-117, EPA, Office of Technology Transfer, Washington, DC 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater," 13th Edition, pp. 210-215, 14th Edition, pp. 144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma—Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes—Method 200.7" available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

(11) Zinc—Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes," pp. 155-156, EPA, Office of Technology Transfer, Washington, DC 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater," 13th Edition, pp. 210-215, 14th Edition, pp. 144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma—Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes—Method 200.7," available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

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