ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 260, 261, 262, 264, 265, 268 and 270

[FRL-3394-4]

Hazardous Waste Management System; Testing and Monitoring Activities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is today proposing to revise certain testing methods that are approved or required under Subtitle C of the Resource Conservation and Recovery Act (RCRA). EPA is also proposing to add several new testing methods that can be used to comply with the requirements of Subtitle C of RCRA. These new and revised methods are found in the Third Edition of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846 and the first update package to this Third Edition of SW-846. The Agency is also proposing to make specified Quality Control (QC) procedures mandatory for all testing conducted under the hazardous waste regulations of RCRA. These Quality Control procedures are also found in the Third edition of SW-846. Some modifications have also been made to Chapter One of the manual to provide clarification of definitions. The modified sections of Chapter One are found in the first update package to the Third Edition of SW-846, which is also being proposed in today's rule. The revisions to Chapter One contained in this first update package are given in Appendix A of this proposed rule. The appendix has been added to this proposed rule in order to provide the public with the specific language that will be substituted for the language currently found in Chapter One of the SW-846 manual. Today's action is necessary to provide better and more complete analytical test methods for RCRA-related testing and to document the quality of the data gathered for complying with the RCRA hazardous waste regulations. This proposed rule will provide more reliable analytical data and promote consistency in the analytical test methods used for compliance with RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

DATE: Comments on this proposed rule must be submitted on or before March 9, 1989.

ADDRESS: The public should submit an original and two copies of their comments on this proposed rule to: Docket Number F-89-WTMP-FFFFF, EPA RCRA Docket, OS-305 (Room SE-205), U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. Please place Docket number on all comments. The EPA RCRA Docket is located in the sub-basement at the above address and is open from 9:00 a.m. to 4:00 p.m., Monday through Friday, except Federal holidays. The public must make an appointment to review docket materials by calling (202) 475-9327. The public may copy 100 pages of material from any one regulatory docket at no cost; additional copies cost $0.15 per page.

Copies of the Third Edition of SW-846 and of the proposed first update to the Third Edition are available from the Government Printing office, Superintendent of Documents, Washington, DC 20402, (202) 783-3238. The document number is 955-001-00000-1 and the cost is $110.00 for the four-volume set plus updates. Update packages will be automatically mailed to all subscribers. Non-subscribers may order the proposed first update package by calling the RCRA Hotline at (800) 424-9346 (toll free) or (202) 382-3000, or by writing the Communications and Training Section, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460. The requester must specify the appropriate document title, document number and "First Update Package."

Copies of the Second Edition of SW-846 are available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4600. The document number is PB87-120-291 and the cost is $48.95 for paper copies and $13.50 for microfiche.

FOR FURTHER INFORMATION CONTACT: For general information contact the RCRA Hotline at (800) 424-9346 (toll free) or (202) 382-3000. For information on the technical aspects of this proposed rule contact Charles Sellers, Office of Solid Waste, OS-331, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (202) 382-3282.

SUPPLEMENTARY INFORMATION:

Index

I. Background

On October 1, 1984 (49 FR 33786-33812), EPA proposed several changes to the RCRA hazardous waste regulations. These proposed changes included the following elements:

(1) Addition of new methods to SW-846.

(2) Mandatory adherence to the procedures and methods in SW-846 for all RCRA testing.

(3) Elimination of requirements to test for certain compounds when conducting ground water monitoring.

(4) Use of screening tests when monitoring ground water for hazardous constituents.

(5) Use of the Hierarchical Analysis Procedure for ground water screening.

Many comments were received on the proposal. The Agency evaluated these comments and, as a result, decided not to promulgate the October 1, 1984, proposal. Instead, the Agency revised SW-846 to incorporate many of the suggestions made in the comments and undertook other actions to address changes to the ground water monitoring regulations. On March 16, 1987, EPA announced the availability of the Third Edition of SW-846 in the **Federal Register** (50 FR 8072). The Third Edition contains 72 methods that are new to SW-846. Of these, 43 will be finalized in a soon to be released rulemaking and will be acceptable for use, where required in 40 CFR Parts 260 through 270, in conjunction with, or in addition to, the Second Edition of SW-846 as amended by Updates I and II. These 43 methods were first proposed in the 1984 Notice of Proposed Rulemaking (NPRM), and are not being reproposed in today's rulemaking. However, of the remaining methods, 28 methods not previously proposed for RCRA testing are being proposed, and one other method is being reproposed by the Agency in today's rulemaking.

Upon review and following comments and questions received from the public, it was determined that several errors existed in the manual. Comments also indicated the need to provide additional and improved analytical test methods for RCRA-related testing. To alleviate confusion arising from errors or confusing language in the test methods, an update package with revisions and

clarifications was deemed necessary. Thus, the Agency is also proposing the use of the first update package to the Third Edition, along with the Third Edition in today's rulemaking. The first update package contains revisions to methods in the Third Edition, as well as 14 methods that are new to SW-846. Of these, four will be finalized in a soon to be released rulemaking and will be acceptable for use, where required in 40 CFR Parts 260 through 270, in conjunction with, or in addition to, the Second Edition of SW-846 as amended by Updates I and II. These four methods were first proposed in the 1984 NPRM, and are not being reproposed in today's rulemaking. However, the remaining ten methods not previously proposed for RCRA testing, are being proposed by the Agency in today's rulemaking.

Promulgation of this proposal will allow the use of the Third Edition as revised by the first update package for all testing for which the Second Edition methods are mandated by current RCRA regulations (see PROPOSAL, Regulatory Status of the Third Edition) and will mandate certain Quality Control procedures detailed in Chapter One of the Third Edition and revised in the first update.

II. Proposal

A. Methods Substitutions

The Agency is today proposing to replace the SW-846 Second Edition methods with the versions contained in the Third Edition and the first update package. These replacements will allow the Third Edition as revised by the first update to be used for all RCRA testing. The Agency is making this substitution because it believes that the Third Edition and first update methods are improvements on those in the Second Edition. (See the Background Document included in the docket to this proposal for a specific discussion of these changes and why they are improvements.)

B. Methods Format

Comments on the October 1, 1984, **Federal Register** proposal also indicated that the Second Edition method formats were inconsistent and difficult to follow. The Agency agreed with these comments and made changes accordingly. The methods were reviewed by a work group composed of technical experts from within EPA and state hazardous waste testing programs. One of the aims of their efforts was to edit the text for technical clarity. The method formats were revised and standardized into the following format:

1.0 Scope and Application.
2.0 Summary.
3.0 Interferences.
4.0 Apparatus and Materials.
5.0 Reagents.
6.0 Sample Collection, Preservation, and Handling.
7.0 Procedure.
8.0 Quality Control.
9.0 Method Performance.
10.0 References.

Section 9.0, Method Performance, is new to the Manual. It contains available method precision and accuracy data. Such data are not available for all methods; however, the Agency is continuing its data gathering effort and will provide the data as they become available in future updates.

Comments also noted that detailed procedures and instrument calibration procedures were not consistent between the EPA solid waste management programs (i.e., RCRA and CERCLA), even when essentially identical methods were used. The Office of Solid Waste (OSW), therefore, worked with the CERCLA program to make the methods used in the two programs as consistent as possible. Particularly, OSW changed standards and surrogates, calibration procedures, and gas chromatographic (GC) analysis conditions of the gas chromatographic/mass spectrometric (GC/MS) methods.

In order to save space and eliminate duplication of information, each group of methods that applies to a specific class of analytes or concerns a general analytical technique (e.g., atomic absorption spectroscopy) is preceded by a general method that contains common information and analytical guidance. Thus, information is not repeated in the detailed directions for each analyte.

The comments also contained many requests for additional guidance on method selection. EPA responded by including a new chapter in the Third Edition. This chapter, "Choosing the Correct Procedure," aids the analyst in choosing appropriate methods for samples based on sample matrix, properties to be measured, and the regulations requiring the analysis. For example, an analysis scheme is presented for determining Appendix IX analytes in ground water. It give advice on suitable, cost-effective SW-846 methods for the volatile and semi-volatile organic analytes, taking into account the sample matrix and the regulatory requirements.

C. Regulatory Status of The Third Edition

The hazardous waste regulations under Subtitle C of RCRA require that specific testing methods described in the Second Edition of SW-846 be employed for certain applications. The following sections of 40 CFR require the use of SW-846 methods:

(1) Section 260.22(d)(1)(i)—Submission of data in support of petitions to exclude a waste produced at a particular facility.

(2) Section 261.22(a)—Evaluation of wastes against the Corrosivity Characteristic.

(3) Section 261.24(a)—Evaluation of wastes against the Extraction Procedure Toxicity Characteristic.

(4) Sections 264.314(a) and 265.314(d)—Evaluation of wastes to determine if free liquid is a component of the waste.

(5) Section 270.62(b)(2)(i)(C)—Analysis of wastes prior to conducting a trial burn in support of an application for a hazardous waste incineration permit.

The Agency is today proposing to replace the Second Edition methods with the Third Edition methods as revised by the first update package to the Third Edition for the reasons discussed previously (see PROPOSAL, Methods Substitutions).

D. Quality Control

EPA is today proposing to make selected Quality Control (QC) procedures in Chapter One of SW-846 (specifically Sections 1.2 and 1.3 and procedures referenced therein) mandatory for all RCRA testing. Chapter One has been modified in order to provide consistency and clarification of definitions within the regulatory community as well as the SW-846 manual. These modifications are contained in the first update to the Third Edition, also proposed in today's rule and are republished in Appendix A of this **Federal Register** Notice.

Appendix A has been added to this proposed rule in order to provide the public with the specific language that will be substituted for the language found in Chapter One of the Third Edition of the SW-846 manual. Additional information regarding the rationale for the first update's revisions to Chapter One proposed in today's rule and published in Appendix A of this **Federal Register** notice, is included in the docket to this proposed rule. These QC procedures are proposed to be mandatory for all chemical analyses required under RCRA regulations codified in 40 CFR Parts 260, 261, 262, 264, 265, 268, and 270 regardless of whether or not SW-846 analytical methods are used. Thus, the QC procedures are proposed to be mandatory for required RCRA analyses under these Parts when SW-846 analytical methods are used, whether or

not use of these methods are mandatory under the applicable RCRA regulations and where a method other than an SW-846 method is used. The Agency thus intends to document the quality of data generated to determine compliance with the RCRA hazardous waste regulations.

EPA is proposing to mandate the QC procedures which are contained in Section 1.2, (which discusses field and analytical laboratory QC), and Section 1.3 (which discusses method detection limits), as well as the procedures referenced in these two sections.

The other sections of Chapter One (1.1 Introduction, 1.4 Data Reporting, 1.5 Quality Control Documentation, and 1.6 References) do not contain QC procedures. They are included for completeness but are offered only as guidance. Many of the proposed mandated QC procedures listed in Section 1.2 and 1.3 are described more fully in Section 8.0 of the applicable SW-846 method located in later chapters of the manual. For example, while instrument calibration is mandated in Section 1.2.2.3.2, the diversity of calibration techniques which are peculiar to specific instruments and procedures, precludes the incorporation of all the calibration techniques described in the different methods set forth in Chapters Three through Eight and Ten of SW-846. Therefore, the reader is referred by Sections 1.2 and 1.3 to the applicable QC procedures contained in Section 8.0 of the applicable RCRA test method in these chapters of SW-846. These referenced procedures found in Section 8.0 of each test method shall also be mandatory when an SW-846 method is used. When an SW-846 method is not used, the referenced procedures located in Section 8.0 of the methods shall, of course, not be mandatory. QC sections in Chapter One, other than Sections 1.2 and 1.3 and those in other parts of the manual are offered only as guidance.

The Agency's philosophy is that a QC program must begin at the inception of a project, continue through collection and storage of samples, include all phases of chemical analyses, and extend through the interpretation and compilation of data results. Two basic concepts used in a QC program are to: (1) Control errors, and (2) verify that the entire analytical method is operating within acceptable performance limits. Use of qualified personnel, reliable and well-maintained equipment, appropriate calibrations and standards, and close supervision of all operations are important components of the QC system.

Some aspects of such a QC program are to: (1) Use matrix spikes and surrogates to provide a means for generating accurate analytical data of documented quality to determine that the required sensitivity is being achieved; (2) use duplicates to indicate the existence of gross errors; (3) use field QC to show that the sample is free from contamination errors introduced in sampling and handing; (4) use standard curves and check samples to indicate proper instrument calibration; and (5) use detection and quantification limit criteria to show that the method detection limit was adequate to detect analytes at or below a regulatory threshold and assist in the identification of possible sources of error and laboratory problems. A quality-control program can be divided into two main categories: (1) Field Quality Control and (2) Laboratory Quality Control.

1. Field Quality Control

It is the intention of the Agency to mandate the QC procedures in Section 1.2.1 of SW-846 in order to eliminate improper sampling and handling techniques and, thus, minimize potential errors that could skew data results. Areas of concern in field QC include sampling techniques; documentation of pre-field, field, and post-field activities; and generation of QC samples such as field duplicate samples (taken from the same sampling point in the field), trip blanks, field blanks and equipment blanks. Quality control in these areas is necessary to document that sampling equipment is properly calibrated, containers are appropriately prepared, representative samples are taken, and proper shipping procedures are followed.

This section of SW-846 mandates that documentation of compliance with the requirements for field activities be maintained and made available upon request.

2. Analytical Laboratory Quality Control

Section 1.2.2 discusses analytical laboratory QC procedures. The QC procedures described are intended to be applied to all chemical analytical procedures. The purpose of laboratory QC is to provide information about the quality of the data as they are being produced. Data quality is usually expressed in terms of accuracy, precision, and detection limit of the analytical method. Accuracy is a measurement of the closeness of an individual measurement, or an average of a number of measurements to the true value. Accuracy is generally represented as percent recovery.

Precision is defined as a measure of reproducibility among individual measurements of the same analyte under specified conditions. Instrument and overall method precision are often expressed as the coefficient of variation, standard deviation, percent difference, and/or relative standard deviation. The sections on precision are currently included in the interest of completeness. The Agency is not seeking to mandate the determination of precision in this rulemaking since significant precision data cannot be obtained from the analysis of one replicate or duplicate as proposed here. The Agency is soliciting comment on appropriate ways to determine method precision in the sample matrix, especially when the number of samples in the batch is limited.

More accurate results may be obtained by instituting a QC program which demands that the degree of variability of all operating parameters that are under the control of the analyst be kept within the control limits. However, the QC system does not ensure this. Results from QC procedures are used to document data quality, to verify that the analytical system is working well on a given matrix/analyte combination, to indicate whether instruments are operating properly, and to indicate when additional sample cleanup or other corrections need to be made. The QC data are indicators, but themselves do not change the quality of the analytical data.

Table 1 contains analytical QC requirements and their frequency of application. It also clarifies some of the terms used in Sections 1.2 and 1.3 of Chapter One. The QC requirements in Table 1 will produce qualitative and quantitative information about the generated data. If the QC data indicate that any aspect of the system is out of control, measures must be taken to bring it back into control. The Agency is considering including the use of control charts in the QC requirements and invites comments.

Standard curves covering the analytical range of interest for calibrating analytical instruments are required to define the linear calibration range which can be used for environmental sample analyses.

GC/MS Quality Control presents slightly expanded method-specific requirements that are necessary to guarantee proper determination and identification of the analytes. This involves special instrument tuning, verification of retention times, mass spectral correlation with an authentic standard of a particular analyte, and the use of surrogates. These QC procedures are found in the individual methods.

All QC data must be recorded and maintained by the laboratory for later

verification and must be available upon request for a period of 3 years from the date the data are reported.

TABLE 1—QC REQUIREMENTS AND FREQUENCY OF APPLICATION

QC Parameter	Frequency	Comments
Matrix spikes	One per analytical batch per matrix or every 20 samples, whichever is greater.	
Replicates (See Figure 1).	One per analytical batch per matrix or every 20 samples, whichever is greater.	Replicate samples are separate aliquots taken from the same sample container in the laboratory and analyzed independently. Evaluation of replicate data can indicate the existence of gross errors in the analysis. In cases where aliquoting is impossible (i.e., volatiles), duplicate samples must be taken for replicate analysis.
Blanks	One per analytical batch per matrix or every 20 samples, whichever is greater.	
Field duplicates (See Figure 1).	One per analytical batch per matrix or every 20 samples, whichever is greater.	Field duplicate samples are two separate samples taken from the same sampling point in the field (i.e., in separate containers and analyzed independently). Evaluation of duplicate data can indicate the existence of gross errors in the sampling technique.
Check standard	One per analytical batch or every 20 samples, whichever is greater.	
Surrogates	Add prescribed surrogates to every blank, standard, sample and QC sample.	Only for volatile and semi-volatile organics and pesticides.
Column check sample.	One per batch of adsorbent	Applies to adsorbent chromatography and back extractions of organic compounds.
Column check sample blank.	One per batch of adsorbent	Applies to adsorbent chromatography and back extractions of organic compounds.
Standard curves.	Refer to specific method for necessary periodic calibration	As prescribed by specific methods.
GC/MS instrument performance check.	Initial 5-point calibration is to be verified with a single point calibration once every 12 hrs of instrument operation and if the sensitivity and linearity criteria are not met, a new 5-point initial calibration must be generated.	Performed to meet tuning criteria of the instrument as specified in the GC/MS methods. Organic analytes shall be checked with a 4-bromofluorobenzene (BFB) for determination of volatiles and with decafluorotriphenylphosphine (DFTPP) for determination of semi-volatiles.

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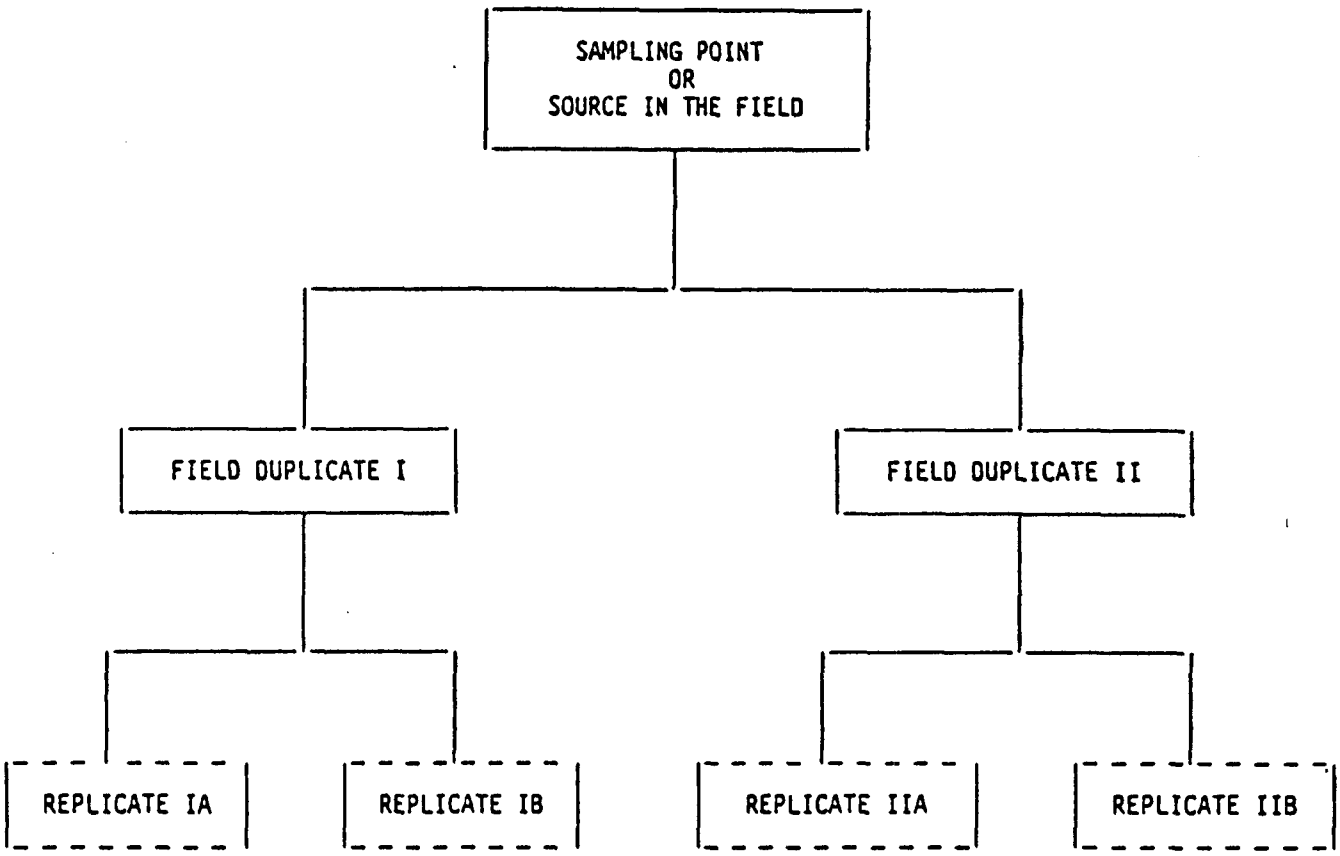

Figure 1. Sampling Chart for Field Duplicates and Replicates.

_____ Collected in the field

_ _ _ _ _ _ Analyzed in the laboratory

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When the analytical data are used to demonstrate compliance with a regulation, Data Quality Objective, or other study objective, any and all values reported as less than a specified regulatory threshold must be verified. If no regulatory threshold is mandated for the analyte of interest, any and all values reported as less than the method detection limit must be verified. The analyst must demonstrate the method's ability to detect the analyte of concern in the sample matrix. This is accomplished using a "clean" sample; for example, tint base would be a suitable "clean" representative matrix when testing paint waste; or upgradient ground water (from the same aquifer) could be a suitable "clean" representative matrix when testing monitoring well samples.

E. Methods Inclusion and Exclusion

The majority of the methods proposed for addition to SW-846 on October 1, 1984, are included in the Third Edition of SW-846. Some proposed methods and some methods in the Second Edition are not included because problems were encountered during their evaluation. Data generated by the public and by EPA demonstrated that the methods could not be used in their published form for the purpose stated in the method. These methods are listed in Table 2. More detailed information can be found in the technical support document, which is located in the EPA RCRA Docket F-89-WTMP-FFFFF.

TABLE 2.—METHODS NOT INCLUDED IN THE THIRD EDITION OF SW-846

Method	Title	Comments
1120	Electrochemical Corrosion	Method not equivalent to reference method.
3560	Reverse Phase Cartridge Extraction	Lack of sufficient data on column pre-treatment and conditioning, elution sequences, elution volumes, and the effect of the loading of organic compounds on the column to permit method to be adequately defined.
7551	Osmium (AA, Furnace Technique)	EPA study indicates accuracy problems.
8320	Miscellaneous Compounds by HPLC	No supporting data on effectiveness of cleanup procedures and HPLC to determine the analytes. Questionable precision and accuracy.
8330	Thioureas	No supporting data on effectiveness of cleanup procedures and HPLC to determine the analytes. Questionable precision and accuracy.
8410, 8411	Formaldehyde, Basic and Acidic Medium	Too susceptible to interferences for application to ground water and solid waste matrices.
8600	Heirarchical Analysis Protocol	Method not sensitive enough for its intended purpose.
8610	Total Aromatics by Ultraviolet Spectroscopy	Method not sensitive enough for its intended purpose.
8620	Total Nitrogen-Phosphorous Gas Chromatographable Compounds.	Method not sensitive enough for its intended purpose.
8630	Derivatization Procedure for Appendix VIII Compounds	Method not sensitive enough for its intended purpose.
9011	Photodegradable Cyanides	Uncertain how test and results relate to the environment and the regulations.
9037	Sulfate, Gravimetric	Precision and sensitivity not adequate. Interference-prone and therefore not appropriate for environmental assay.

The methods described in SW-846 are not mandatory for all testing under RCRA. Currently, only §§ 260.22(d)(1)(i), 261.22(a), 261.24(a), 264.314(c), 265.314(d), and 270.62(b)(2)(i)(C) of 40 CFR require use of SW-846 methods. The proposed Third Edition will not alter the current testing requirements.

The Third Edition contains 72 methods that are new to SW-846 and are listed in Table 3. Of these, 43 will be finalized in a soon to be released rulemaking, and will be acceptable for use, where required in 40 CFR Parts 260 through 270, in conjunction with, or in addition to, the Second Edition of SW-846 as amended by Updates I and II. Data generated by the public and by EPA for the 43 methods have demonstrated that the method precision and accuracy are adequate for the purpose stated. Although listed in Table 3, the Agency is not reproposing these 43 methods in today's rule. These methods are listed in Table 3 solely to notify the public that these methods are appearing for the first time in the Third Edition of SW-846. The Agency is today proposing the remaining 29 methods found in Table 3 for public comment. Of these 29 methods, some were extracted and reformatted from earlier methods. For example, some of the organic procedures in the Second Edition were made up of several methods (i.e., separation/extraction, cleanup, and determinative methods). Several of these procedures were divided and the component methods given individual numbers. Thus, these methods listed in Table 3 are not new to SW-846, but are simply appearing independently under a new number. Finally, one method, Method 9090, is being reproposed. This method was extensively revised since it was first proposed on October 1, 1984. The Agency seeks comment on this revised version and, therefore, decided to repropose this method rather than to finalize it.

TABLE 3.—NEW METHODS INCLUDED IN THE THIRD EDITION OF SW-846

Method	Title	Comments
0010 *	Modified Method 5 Sampling Train	Stack sampling method for semi-volatile compounds.
0020 *	Source Assessment Sampling System	Stack sampling method for semi-volatile compounds.
0030 *	Volatile Organic Sampling Train	Stack sampling method for organic compounds.
1320*	Multiple Extraction Procedure	Extraction procedure used for delisting wastes that are stabilized, encapsulated, or chemically fixed.
1330*	Extraction Procedure for Oily Wastes	Extraction procedures for removal of oil or grease that may interfere with the EP test.
3005	Acid Disgestion of Waters for Total Recoverable or Dissolved Metals for Analysis by Flame Atomic Absorption or ICP Spectroscopy.	Provides digestion technique for dissolved metals in a water matrix.
3500	Organic Extraction and Sample Preparation	Serves as an introduction to 35XX series methods dealing with quantitative extraction of volatile and semivolatile organic compounds from various sample matrices.

TABLE 3.—NEW METHODS INCLUDED IN THE THIRD EDITION OF SW-846—Continued

Method	Title	Comments
3580	Waste Dilution	Solvent dilution procedure for nonaqueous waste samples nonaqueous waste samples prior to cleanup and/or analysis.
3600	Cleanup	Serves as an introduction to 36XX series methods which diminish or eliminate extraneous materials from the waste sample.
3610[b]	Alumina Column Cleanup	Separation of analytes of a narrow polority range from interfering peaks of a different polarity.
3611[a]	Alumina Column Cleanup and Separation of Petroleum Wastes	Provies a cleanup technique for oily matrices. Proposed as Method 3570.
3620[b]	Florisil Column Cleanup	Separation of analytes of a narrow polarity range from interfering peaks of a different polarity.
3630[b]	Silica Gel Cleanup	Separation of analytes of a narrow polarity range from interfering peaks of a different polarity.
3640[b]	Gel-Permeation Cleanup	Separation of high molecular weight material from sample analytes.
3650[c]	Acid-Base Partition Cleanup	Separation of base/neutral organic extractable fraction from the acid organic extractable fraction.
3660	Sulfur Cleanup	Elimination of sulfur (which may cause peaks) from sample extracts.
3810	Headspace	Formerly Second Edition Method 5020. It is now approved only as a screening technique because of problems with precision and accuracy.
3820	Hexadecane Extraction and Screening of Purgeable Organics	Qualitative screening procedure for use with purge-and-trap GC or GC/MS.
5040[a]	Protocol for Analysis of Sorbent Cartridges from Volatile Organic Sampling Train.	Provides quantitative analysis method following VOST collection. Proposed as Method 3720.
6010[a]	Inductively Coupled Plasma Atomic Emission Spectroscopy	General method for multiple element determination.
7000	Atomic Absorption Methods	Serves as an introduction to 7XXX series methods dealing with quantitative analysis of metals.
7020	Aluminum (AA, Direct Aspiration)	Flame AA method.
7090[a]	Beryllium (AA, Direct Aspiration)	Flame AA method.
7091[a]	Beryllium (AA, Furnace Technique)	Graphite furnace AA method.
7140	Calcium (AA, Direct Aspiration)	Flame AA method.
7198[a]	Chromium, Hexavalent (Differential Pulse Polargraphy)	Differential pulse polarogyaphy method.
7200	Cobalt (AA, Direct Aspiration)	Flame AA method.
7201	Cobalt (AA, Furnace Technique)	Graphite furnace AA method.
7210[a]	Copper (AA, Direct Aspiration)	Flame AA method.
7380[a]	Iron (AA, Direct Aspiration)	Flame AA method.
7450	Magnesium (AA, Direct Aspiration)	Flame AA method.
7460[a]	Manganese (AA, Direct Aspiration)	Flame AA method.
7480	Molybdenum (AA, Direct Aspiration)	Flame AA method.
7481	Molybdenum (AA, Furnace Technique)	Graphite furnace AA method.
7550	Osmium (AA, Direct Aspiration)	Flame AA method.
7610	Potassium (AA, Direct Aspiration)	Flame AA method.
7770[a]	Sodium (AA, Direct Aspiration)	Flame AA method.
7840[a]	Thallium (AA, Direct Aspiration)	Flame AA method.
7841[a]	Thallium (AA, Furnace Technique)	Graphite furnace AA method.
7870	Tin (AA, Direct Aspiration)	Flame AA method.
7910[a]	Vanadium (AA, Direct Aspiration)	Flame AA method.
7911[a]	Vanadium (AA, Furnace Technique)	Graphite furnace AA method.
7950[a]	Zinc (AA, Direct Aspiration)	Flame AA method.
8000	Gas Chromatography	Serves as an introduction to 8XXX series methods dealing with quantitative analysis of organic analytes.
8280	The Analysis of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans.	Determination of tetra-penta-, hepta-, hexa-, and octachlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) in chemical wastes.
9012	Total and Amenable Cyanides	Automated quantitative analytical method.
9022[a]	Total Organic Halides (TOX) by Neutron Activation Analysis	Neutron activation adds alternate analytical technique.
9035[a]	Sulfate	Automated chloranilate colorimetric method.
9036[a]	Sulfate	Automated methylthymol blue, autoanalyzer II colorimetric method.
9038[a]	Sulfate	Turbidimetric method.
9041	pH Paper Method	Paper method adds alternate analytical technique.
9045	Soil pH	Analytical technique to determine pH in solid matrices.
9050	Specific Conductance	Analytical technique to determine conductivity.
9060[a]	Total Organic Carbon	Infrared determination of carbon dioxide.
9065[a]	Phenolics	Manual 4-AAP with distillation spectrophotometric method.
9066[a]	Phenolics	Automated 4-AAP with distillation spectrophotometic method.
9067[a]	Phenolics	MBTH with distillation spectrophotometric method.
9070[a]	Total Recoverable Oil and Grease	Total oil and grease for liquids. Gravimetric, separatory funnel extraction.
9071[a]	Oil and Grease Extraction Method for Sludge Samples	Total oil and grease for solids.
9080[a]	Cation-Exchange Capacity of Soils	Soil liner evaluation using ammonium acetate.
9081[a]	Cation-Exchange Capacity of Soils	Soil liner evaluation using sodium acetate.
9090[d]	Compatability Test for Wastes and Membrane Liners	Liner compatability test for flexible membrane liners.
9100[a]	Saturated Hydraulic Conductivity, Saturated Leachate Conductivity, and Intrinsic Permeabilty.	General methods for hydraulic conductivity and liner permeability.
9131[a]	Coliform	Multiple tube fermentation technique.
9232[a]	Coliform	Membrane filter technique.
9200[a]	Nitrate	Brucine colorimetric method.
9250[a]	Chloride	Automated ferricyanide autoanalyzer I colorimetric method.
9251[a]	Choride	Automated ferricyanide autoanalyzer II colorimetric method.
9252[a]	Choride	Mercuric nitrate titrimetric method.
9310[a]	Gross Alpha and Beta	General radioactivity method.
9315[a]	Alpha-Emitting Radium Isotopes	Total radium method.
9320[a]	Radium-228	Radium 228 method.

[a] These methods will be finalized in a soon to be released rulemaking and, thus, are not being proposed in today's rule. They are, however, new to the Third Edition of SW-846.

[b] These methods were formerly sections within the 8000 method series in the Second Edition of SW-846.

[c] This method was formerly Method 3530 in the Second Edition of SW-846.

[d] This method is being reproposed due to extensive revision since it was first proposed on October, 1, 1984

Information on method precision, accuracy and a more detailed explanation of the Agency's rationale for the deletions and inclusions listed in Tables 2 and 3 can be found in the Technical Support Document, which is located in the EPA RCRA Docket F-89-WTMP-FFFFF.

Guidance methods issued by EPA on July 12, 1985, for the determination of reactive cyanides and sulfides in wastes have been included in the Third Edition for the convenience of persons evaluating wastes. These methods may be used for assessing whether a waste is a reactive waste by reason of toxic gas generation (reactivity), pending development and proposal of more accurate tests.

Table 4 summarizes the revisions included in the first update for the Third Edition of the methods manual and proposed today for public comment. These revised methods are being issued to subscribers in the first update package. More detailed information on these changes can be found in the Technical Support Document available in the RCRA docket.

TABLE 4.—REVISIONS INCLUDED IN UPDATE I, SW-846, THIRD EDITION

Method	Indication of change	Reason for change
Chapter 1	Partial revision	Clarification of the definitions.
Chapter 2	do	Change in TOX holding time; clarification on other analytes, and additions and deletions to analyte lists.
Chapter 4	do	Change in soil/sediment and concentrated waste holding time.
Chapter 7	do	Revision and clarification of reactive cyanide procedure.
1310—EP TOX Test Method	do	Addition of reference to Chapter 7.
1330—Extraction Procedure for Oily Wastes	do	Revision to procedure and calculation formula.
3005—Acid Digestion of Waters for Total Recoverable or Dissolved Metals for Analysis by FLAA or ICP.	do	Revision to list of applicable metals; clarification of appropriate determinative procedure.
3010—Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP.	do	Revision to list of applicable metals; clarification of procedure.
3020—Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by GFAA.	do	Revision to list of applicable methods.
3050—Acid Digestion of Sediments, Sludges, and Soils	do	Do.
3510—Separatory Funnel Liquid-Liquid Extraction	do	Clarification in procedure.
3520—Continuous Liquid-Liquid Extraction	do	Clarification in procedure.
3540—Soxhlet Extraction	do	Clarification specifies cycles/hr.
3600—Cleanup	do	Clarification in procedure.
3650—Acid-Base Partition Cleanup	Total Revision	Clarification in procedure; addition of Table of Analytes.
5030—Purge-and-Trap	Partial Revision	Clarification of method; additional solvents for waste; correction of errors.
6010—Inductively Coupled Plasma Atomic Emission Spectroscopy	Total Revision	Deletion of non-applicable steps; addition of metals.
7000—Atomic Absorption Methods	Partial Revision	Revision of list of applicable metals; clarification of procedure.
7061—Arsenic (AA, Gaseous Hydride)	do	Revision of quality control procedures.
7196—Chromium, Hexavalent (Colorimetric)	do	Revision of calibration standard and spike concentration.
7760—Silver (AA, Direct Aspiration)	Total Revision	Clarification on the use of cyanogen iodide.
8000—Gas Chromatography	Partial Revision	Revision of calculation formula.
8010—Halogenated Volatile Organics	do	Deletion of analytes from Table 1; clarification in procedure.
8015—Non-halogenated Volatile Organics	do	Deletion of analytes from Table 1.
8030—Acrolein, Acrylonitrile, Acetonitrile	do	Revision to stock standard preparation.
8040—Phenols	do	PQL[1] listed for all matrices.
8120—Chlorinated Hydrocarbons	do	Deletion of analytes from Table 1.
8150—Chlorinated Herbicides	do	Addition of waste preparation step; addition of operational parameters; correction of errors.
8240—GC/MS for Volatile Organics	do	Addition of other operational parameters; additional solvents for waste; correction of errors.
8250—GC/MS for Semivolatile Organics: Packed Column Technique.	do	Text correction in matrix spikes.
8270—GC/MS for Semivolatile Organics: Capillary Column	do	Addition of other operational parameters; correction of errors.
9010—Total and Amenable Cyanide	Total Revision	Alternative determinative procedure; additional performance data.
9030—Acid-Soluble and Acid-Insoluble Sulfides	do	Addition of semi-quantitative method for acid insoluble sulfides; additional performance data.
9090—Compatibility Test for Wastes and Membrane Liners	Partial Revision	Clarification of procedure.

[1] Practical Quantitation Limit.

The first update to the Third Edition contains 14 methods that are new to SW-846 and are listed in Table 5. Of these, four will be finalized in a soon to be released rulemaking, and will be acceptable for use, where required in 40 CFR Parts 260 through 270, in conjunction with, or in addition to, the Second Edition of SW-846 as amended by Updates I and II. Although listed in Table 5, the Agency is not reproposing these four methods in today's rule. These methods are listed in Table 5 solely to notify the public that these methods are appearing for the first time in the Third Edition of SW-846. The Agency is today proposing the remaining ten methods found in Table 5 for public comment. These new methods are being issued to subscribers in the first update package. More detailed information on these new methods can be found in the Technical Support Document available in the RCRA docket.

TABLE 5.—NEW METHODS INCLUDED IN UPDATE I, SW-846, THIRD EDITION

Method	Reason for inclusion
**7081—Barium (AA, furnace technique)	Provides lower detection limit and analytical flexibility.
*7211—Copper (AA, furnace technique)	Provides lower detection limit and analytical flexibility.
*7381—Iron (AA, furnace technique)	Provides lower detection limit and analytical flexibility.
7430—Lithium (AA, direct aspiration)	No previous determinative method; needed to support incineration regulations.
*7461—Manganese (AA, furnace technique)	Provides lower detection limit and analytical flexibility.
**7761—Silver (AA, furnace technique)	Provides lower detection limit and analytical flexibility.
7780—Strontium (AA, direct aspiration)	No previous determinative method.
*7951—Zinc (AA, furnace technique)	Provides lower detection limit and analytical flexibility.
8011—1,2-Dibromoethane and 1,2-Dibromo-3-chloropropane in Water by Microextraction and Gas Chromatography.	Determines compounds not listed in any other SW-846 method.
8021—Violates in Water by Purge and Trap Capillary Column GC with PID and ELCD in Series.	Offers lower detection limit and improved resolution; allows concurrent analysis of aromatics and halocarbons.
8070—Nitrosamines	No previous determinative method.
8110—Haloethers	No previous determinative method.
8141—Organophosphorus Pesticides	Capillary column technique; additional performance data for soil samples.
8260—GC/MS for Volatile Organics: Capillary Column Technique	Determines volatile organics using GC/MS capillary (as opposed to packed) column technique.
9021—Purgeable Organic Halides	Provides quick screening procedure; eliminates need for carbon adsorption.
9031—Extractable Sulfides	Includes additional matrices.

*These methods will be finalized in a soon to be released rulemaking. They are, however, being submitted to subscribers for the first time in this update.
**These methods were finalized in the Second Edition of SW-846. They were inadvertently omitted from the Third Edition and are not being proposed as new.

III. State Authority

A. Applicability of Rules in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. (See 40 CFR Part 271 for the standards and requirements for authorization.) Following authorization, EPA retains enforcement authority under sections 3008, 7003 and 3013 of RCRA, although authorized States have primary enforcement responsibility.

Prior to the Hazardous and Solid Waste Amendments of 1984 (HSWA), a State with final authorization administered its hazardous waste program entirely in lieu of EPA administering the Federal program in that State. The Federal requirements no longer applied in the authorized State, and EPA could not issue permits for any facilities in the State which the State was authorized to permit. When new, more stringent Federal requirements were promulgated or enacted, the State was obliged to enact equivalent authority within specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under section 3006(g) of RCRA, 42 U.S.C. 6926(g), new requirements and prohibitions imposed by the HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. EPA is directed to carry out those requirements and prohibitions in authorized States, including the issuance of permits, until the State is granted authorization to do so. While States must still adopt HSWA-related provisions as State law to retain final authorization, the HSWA applies in authorized States in the interim.

B. Effect on State Authorizations

Today's rule proposes standards that would not be effective in authorized States since the requirements would not be imposed pursuant to the Hazardous and Solid Waste Amendments of 1984. Thus, the requirements will be applicable only in those States that do not have interim of final authorization. In authorized States, the requirements will not be applicable until the State revises its program to adopt equivalent requirements under State law.

40 CFR 271.21(e)(2) requires that States that have final authorization must modify their programs to reflect Federal program changes and must subsequently submit the modifications to EPA for approval. The deadline by which the State must modify its program to adopt this proposed regulation will be determined by the date of promulgation of the final rule in accordance with § 271.21(e). These deadlines can be extended in certain cases (40 CFR 271.21(e)(3)). Once EPA approves the modification, the State requirements become Subtitle C RCRA requirements.

States with authorized RCRA programs may already have requirements similar to those in today's rule. These State regulations have not been assessed against the Federal regulations being proposed today to determine whether they meet the tests for authorization. Thus, a State is not authorized to carry out these requirements in lieu of EPA until the State program modification is submitted to EPA and approved. Of course, States with existing standards may continue to administer and enforce their standards as a matter of State law.

States that submit their official application for final authorization less than 12 months after the effective date of these standards are not required to include standards equivalent to these standards in their application. However, the State must modify its program by the deadlines set forth in § 271.21(e). States that submit official applications for final authorization 12 months after the effective date of those standards must include standards equivalent to these standards in their application. 40 CFR 271.3 sets forth the requirements a State must meet when submitting its final authorization application.

IV. Economic and Regulatory Impacts

A. Regulatory Impact Analysis

Under Executive Order 12291, EPA must determine whether a regulation is "Major" and, therefore, subject to the requirement of a Regulatory Impact Analysis. The total additional annualized cost for substituting the Second Edition of SW-846 with the Third Edition of SW-846 and for mandating specified Quality Control procedures for all testing conducted under the hazardous waste identification and management regulation of RCRA has been conservatively estimated at $60 million, which is well below the $100 million that constitutes a major regulation. EPA has also determined that this proposed rule will not cause a major increase in prices, and will not have a significant adverse effect on competition or the ability of U.S. enterprises to compete with foreign enterprises. Increased costs

could result from the minimal additional quality control compliance and recordkeeping involved in implementing this proposed rule. Since the procedures mandated by these rules are those already performed by reputable laboratories, few laboratories are likely to be significantly impacted by this rule. Detailed information on the costs of the proposal and a brief regulatory impact analysis can be found in the background document located in EPA RCRA Docket F-89-WTMP-FFFFF.

B. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601-612, Pub. L. 96-354, September 19, 1980), whenever an agency is required to publish a general notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis (RFA) that describes the impact of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). No regulatory flexibility analysis is required, however, if the head of the agency certifies that the rule will have a significant impact on a substantial number of small entities.

This rule will not require the purchase of new instruments or equipment. The proposed Quality Control is basic and the Agency believes that most laboratories have already implemented the use of these QC procedures. The regulation requires no new reports beyond those now required. The analytical techniques approved here can either be handled by small facilities, or are widely available by contract at a reasonable price. EPA is certifying that this proposed rule, if promulgated, will not have a significant economic impact on a substantial number of small entities (as defined by the RFA). Thus, the proposed regulation does not require a RFA. Therefore, in accordance with 5 U.S.C. 605(b), I hereby certify that this rule will not have a significant adverse economic impact on a substantial number of small facilities.

C. Paperwork Reduction Act

The information collection requirements in this proposed 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.* An Information Collection Request document has been prepared by EPA (ICR No. 1485) and a copy may be obtained from Richard Westlund, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., SW., Washington, DC 20460, or by calling (202) 382-2745.

Public reporting burden for this collection of information is estimated to average 0.5 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., SW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Desk Officer for EPA." The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

List of Subjects in 40 CFR Parts 260, 261, 262, 264, 265, 268, and 270

Chemical, physical and biological treatment, General facility standards, Ground water monitoring, Hazardous waste, Hazardous waste incinerator permits, Incinerators, Intergovernmental regulations, Interim status standards for owners and operators of hazardous waste treatment facilities, Landfills, Land treatment, Reporting and recordkeeping requirements, Storage and disposal facilities, Surface impoundment, Thermal treatment, Waste piles, Waste treatment and disposal.

Dated: December 14, 1988.

Lee M. Thomas,

Administrator.

For the reasons set out in the preamble, it is proposed that Chapter I of Title 40 of the Code of Federal Regulations be amended as follows:

PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL

The authority citation for Part 260 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921 through 6927, 6930, 6934, 6935, 6937, 6938, 6939, and 6974.

Subpart A—General

2. Section 260.1 is amended by adding (c) to read as follows

§ 260.1 Purpose, scope and applicability.

* * * * *

(c) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 260 must comply with the quality control procedures specified in Sections 1.2 and 1.3, and, where an SW-846 method is used, the additional procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in § 260.11. These quality control procedures must be followed when using any SW-846 method, whether mandatory or not mandatory, and when using any other analytical method.

Subpart B—Definitions

3. Section 260.11 is amended by revising the fourth reference in paragraph (a) to read as follows:

§ 260.11 References

(a) * * * "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, Third Edition, 1987, as amended by Update I. This document is available as document number 955-001-00000-1 from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, (202) 783-3238, on a subscription basis. Future updates will automatically be mailed to the subscriber.

* * * * *

Subpart C—Rulemaking Petitions

4. Section 260.22 is amended by adding paragraph (a)(3) to read as follows:

§ 260.22 Petitions to amend Part 261 to exclude a waste produced at a particular facility.

(a) * * *

(3) Information submitted under paragraphs (a) (1) and (2) of this section must be based on appropriate test methods prescribed in Appendix III of Part 261. The test methods must follow the quality control procedures specified in Sections 1.2 and 1.3, and procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in § 260.11. The testing and quality control requirements of this section also apply to § 260.22 (b), (c), (d), and (e) below.

* * * * *

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

5. The authority citation for Part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, and 6922.

Subpart A—General

6. Section 261.1 is amended by adding paragraph (d) to read as follows:

§ 262.1 Purpose and scope.

* * * * *

(d) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 261 must comply with the quality control procedures specified in Section 1.2 and 1.3 and, when an SW–846 method is used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical methods.

Appendices

7. Appendix III of Part 261 is revised to read as follows:

Appendix III—Chemical Analysis Test Methods

Tables 1, 2, and 3 specify the appropriate analytical procedures described in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", incorporated by reference in § 260.11 that shall be used to determine whether a sample contains a given Appendix VII or VIII toxic constituent.

Table 1 identifies each Appendix VII or VIII organic constituent along with the approved measurement method. Table 2 identifies the corresponding methods for inorganic species. Table 3 summarizes the contents of SW–846 and supplies the specific section and method number for sampling and analysis methods.

Prior to final sampling and analysis method selection, the analyst should consult the specific section or method described in SW–846 for additional guidance on which of the approved methods should be employed for a specific sample analysis situation. In all cases, the sampling and analytical determinations must comply with quality control procedures specified in Sections 1.2 and 1.3, and those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, incorporated by reference in § 260.11.

These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

TABLE 1.—ANALYSIS METHODS FOR ORGANIC CHEMICALS CONTAINED IN SW–846

Compound	Method(s)
Acetonitrile	8030, 8240
Acetophenone	8250, 8270
Acrolein	8030, 8240
Acrylamide	8015
Acrylonitrile	8030, 8240
Aldrin	8080, 8250, 8270
4-Aminobiphenyl	8250, 8270
Aniline	8250, 8270
Benzal chloride	8120
Benzene	8020, 8021, 8240, 8260
Benzidine	8250, 8270
Benzo(b)fluoranthene	8100, 8250, 8270, 8310
Benz(a)anthracene	8100, 8250, 8270, 8310
Benzo(j)fluoranthene	8100
Benzo(a)pyrene	8100, 8250, 8270, 8310
Benzotrichloride	8120
Benzyl chloride	8010, 8120, 8240
Bis(2-chloroethoxy)methane	8010, 8110, 8250, 8270
Bis(2-chloroethyl)ether	8110, 8250, 8270
Bis(2-chloroisopropyl)ether	8010, 8110, 8250, 8270
Bis(2-ethylhexyl)phthalate	8060, 8250, 8270
Bromoform	8010, 8021, 8240, 8260
4-Bromophenyl phenyl ether	8110, 8250, 8270
Butyl benzyl phthalate	8250, 8270
Carbon disulfide	8240
Carbon tetrachloride	8010, 8021, 8240, 8260
Chlordane	8080, 8250, 8270
Chlorinated biphenyls	8080
Chlorinated dibenzo-p-dioxins	8280
Chlorinated dibenzofurans	8280
4-Chloroaniline	8250, 8270
Chlorobenzene	8010, 8020, 8021, 8240, 8260
2-Chloroethyl vinyl ether	8010, 8240
Chloroform	8010, 8021, 8240, 8260
Chloromethane	8010, 8021, 8240, 8260
Chloromethylmethyl ether	8010
2-Chloronaphthalene	8120, 8250, 8270
2-Chlorophenol	8040, 8250, 8270
Chrysene	8100, 8250, 8270, 8310
Creosote [1]	8100, 8250, 8270
Cresol(s)	8040
Creyslic acid(s)	8040, 8250, 8270
2,4-D	8150
4,4'-DDD	8080, 8250, 8270
4,4'-DDE	8080, 8250, 8270
4,4'-DDT	8080, 8250, 8270
Dibenz(a,h)acridine	8100
Dibenz(a,j)acridine	8100, 8250, 8270
Dibenz(a,h)anthracene	8100, 8250, 8270, 8310
7H-Dibenzo(c,g)carbazole	8100
Dibenzo(a,e)pyrene	8100, 8270
Dibenzo(a,h) pyrene	8100
Dibenzo(a,i)pyrene	8100
Di-n-butylphthalate	8060, 8250, 8270
Dichlorobenzene(s)	8010, 8020, 8021, 8120, 8220, 8250, 8260
3,3'-Dichlorobenzidine	8250, 8270

TABLE 1.—ANALYSIS METHODS FOR ORGANIC CHEMICALS CONTAINED IN SW–846—Continued

Compound	Method(s)
Dichlorodifluoromethane	8010, 8021, 8240, 8260
Dichloroethane(s)	8010, 8021, 8240, 8260
1,1-Dichloroethylene	8010
1,2-Dichloroethylene	8010, 8240
Dichloromethane	8010
2,4-Dichlorophenol	8040, 8250, 8270
2,6-Dichlorophenol	8040, 8250, 8270
1,2-Dichloropropane	8010, 8021, 8240, 8260
trans-1,3-Dichlorophropylene	8010
Dichloropropene(s)	8240
Dieldrin	8080, 8250, 8270
Diethyl phthalate	8060, 8250, 8270
4-Dimethylaminoazobenzene	8250, 8270
7,12-Dimethylbenz(a)anthracene.	8250, 8270
alpha-,alpha-Dimethylphenethylamine.	8250, 8270
2,4-Dimethylphenol	8040, 8250, 8270
Dimethyl phthalate	8060, 8250, 8270
Dinitrobenzene(s)	8090, 8270
2,4-Dinitrophenol	8040, 8250, 8270
2,4-Dinitrotoluene	8090, 8250, 8270
2,6-Dinitrotoluene	8090, 8250, 8270
Dinoseb	8150, 8260
Di-n-octylphthalate	8060
Diphenylamine	8250, 8270
1,2-Diphenylhydrazine	8250, 8270
Disulfoton	8140, 8270
Endosulfan(I & II)	8080, 8250, 8270
Endrin	8080, 8250, 8270
Ethyl ether	8015
Endrin metabolites	8080, 8250, 8270
Ethyl methanesulfonate	8250, 8270
Fluoranthene	8100, 8250, 8270, 8310
Heptachlor	8080, 8250, 8270
Heptachlor epoxide	8080, 8250, 8270
Hexachlorobenzene	8120, 8250, 8270
Hexachlorobutadiene	8021, 8120, 8250, 8260, 8270
Hexachlorocyclopentadiene	8210, 8250, 8270
Hexachloroethane	8120, 8250, 8270
Indeno(1,2,3-cd)pyrene	8100, 8250, 8270, 8310
Lindane	8080
Maleic anhydride	8250, 8270
Methoxychlor	8080, 8250, 8270
3-Methylcholanthrene	8100, 8250, 8270
Methyl ethyl ketone	8015
Methyl isobutyl ketone	8015, 8240
Methylmethanesulfonate	8250, 8270
Naphthalene	8021, 8100, 8250, 8270, 8310
Naphthoquinone	8090, 8270
1-Naphthylamine	8250, 8270
2-Naphthylamine	8250, 8270
4-Nitroaniline	8250, 8270
Nitrobenzene	8090, 8250, 8270
4-Nitrophenol	8040, 8250, 8270
N-Nitrosodibutylamine	8250, 8270
N-Nitrosodimethylamine	8250, 8270
N-Nitrosopiperidine	8250, 8270
Paraldehyde (trimer of acetaldehyde).	8015
Parathion	8140, 8141, 8270
Pentachlorobenzene	8250, 8270
Pentachloronitrobenzene	8250, 8270
Pentachlorophenol	8040, 8250, 8270
Phenacetin	8250, 8270
Phenol	8040, 8250, 8270
Phorate	8140, 8141
Phthalic anhydride	8270
2-Picoline	8240, 8250, 8270
Pronamide	8250, 8270

TABLE 1.—ANALYSIS METHODS FOR ORGANIC CHEMICALS CONTAINED IN SW-846—Continued

Compound	Method(s)
Tetrachlorobenzene(s)	8120, 8250, 8270
Tetrachloroethane(s)	8010, 8021, 8240, 8260
Tetrachloroethane	8010, 8021, 8240, 8260
Tetrachlorophenol	8040, 8250, 8270
Toluene	8020, 8021, 8240, 8260
Toxaphene	8080, 8250, 8270
1,2,4-Trichlorobenzene	8021, 8120, 8250, 8260, 8270
Trichloroethane(s)	8010, 8021, 8240
Trichloroethene	8010, 8021, 8240
Trichlorofluoromethane	8010, 8021, 8240
Trichlorophenol(s)	8040, 8250, 8270
Trichloropropane	8010, 8021, 8240
Vinyl chloride	8010, 8021, 8240, 8260
Xylene(s)	8020, 8021, 8240, 8260

[1] Analyze for phenanthrene and carbazole; if these are present in a ratio between 1.4:1 and 5:1 creosote should be considered present.

TABLE 2—ANALYSIS METHODS FOR INORGANIC CHEMICALS AND MISCELLANEOUS GROUPS OF ANALYTES CONTAINED IN SW-846

Compound	Method(s)
Aluminum	6010, 7020
Antimony	6010, 7040, 7041
Arsenic	6010, 7060, 7061
Barium	6010, 7080, 7081
Beryllium	6010, 7090, 7091
Cadmium	6010, 7130, 7131
Calcium	6010, 7140
Chromium	6010, 7190, 7191
Chromium, Hexavalent	7195, 7196, 7197, 7198
Cobalt	6010, 7200, 7201
Copper	6010, 7210, 7211
Iron	6010, 7380, 7381
Lead	6010, 7420, 7421
Lithium	6010, 7430
Magnesium	6010, 7450
Manganese	6010, 7460, 7461
Mercury	7470, 7471
Molybdenum	6010, 7480, 7481
Nickel	6010, 7520
Osmium	7550
Phosphorus	6010
Potassium	6010, 7610
Selenium	6010, 7740, 7741
Silver	6010, 7760, 7761
Sodium	6010, 7770
Strontium	6010, 7780
Thallium	6010, 7840, 7841
Tin	7870
Vanadium	6010, 7910, 7911
Zinc	6010, 7950, 7951
Cyanide	9010, 9012
Total Organic Halogen	9020, 9022
Purgeable Organic Halides	9021
Sulfide	9030, 9031
Sulfate	9035, 9036, 9038
Total Organic Carbon	9060
Phenolics	9065, 9066, 9067
Oil and Grease	9070, 9071
Total Coliform	9131, 9132
Nitrate	9200
Chloride	9250, 9251, 9252

TABLE 2—ANALYSIS METHODS FOR INORGANIC CHEMICALS AND MISCELLANEOUS GROUPS OF ANALYTES CONTAINED IN SW-846—Continued

Compound	Method(s)
Gross Alpha and Gross Beta	9310
Alpha-Emitting Radium Isotopes	9315
Radium-228	9320

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846

Title	Chapter No.	Method No.
Quality control	1.0	
Introduction	1.1	
Quality control	1.2	
Method detection limit	1.3	
Data reporting	1.4	
Quality control documentation	1.5	
References	1.6	
Choosing the correct procedure	2.0	
Purpose	2.1	
Required information	2.2	
Implementing the guidance	2.3	
Characteristics	2.4	
Ground water	2.5	
References	2.6	
Metallic analytes	3.0	
Sampling considerations	3.1	
Sample preparation methods	3.2	
Acid digestion of waters for total recoverable or dissolved metals for analysis by flame AAS or ICP	3.2	3005
Acid digestion of aqueous samples and extracts for total metals for analysis by flame AAS or ICP	3.2	3010
Acid digestion of aqueous samples and extracts for total metals for analysis by furnace AAS	3.2	3020
Dissolution procedure for oils, greases, or waxes	3.2	3040
Acid digestion of sediments, sludges and soils	3.2	3050
Methods for the determination of metals	3.3	
Inductively coupled plasma atomic emission spectroscopy	3.3	6010
Atomic absorption methods	3.3	7000

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846—Continued

Title	Chapter No.	Method No.
Aluminum, flame AAS	3.3	7020
Antimony, flame AAS	3.3	7040
Antimony, furnace AAS	3.3	7041
Arsenic, furnace AAS	3.3	7060
Arsenic, gaseous hydride AAS	3.3	7061
Barium, flame AAS	3.3	7080
Barium, furnace AAS	3.3	7081
Beryllium, flame AAS	3.3	7090
Beryllium, furnace AAS	3.3	7091
Cadmium, flame AAS	3.3	7130
Cadmium, furnace AAS	3.3	7131
Calcium, flame AAS	3.3	7140
Chromium, flame AAS	3.3	7190
Chromium, furnace AAS	3.3	7191
Chromium, hexavalent, coprecipitation	3.3	7195
Chromium, hexavalent, colorimetric	3.3	7196
Chromium, hexavalent, chelation/ extraction	3.3	7197
Chromium, hexavalent, differential pulse polarography	3.3	7198
Cobalt, flame AAS	3.3	7200
Cobalt, furnace AAS	3.3	7201
Copper, flame AAS	3.3	7210
Copper, furnace AAS	3.3	7211
Iron, flame AAS	3.3	7380
Iron, furnace AAS	3.3	7381
Lead, flame AAS	3.3	7420
Lead, furnace AAS	3.3	7421
Magnesium, flame AAS	3.3	7450
Manganese, flame AAS	3.3	7460
Manganese, furnace AAS	3.3	7461
Mercury in liquid waste, manual cold vapor technique	3.3	7470
Mercury in solid or semisolid waste, manual cold-vapor technique	3.3	7471
Molybdenum, flame AAS	3.3	7480
Molybdenum, furnace AAS	3.3	7481
Nickel, flame AAS	3.3	7520
Osmium, flame AAS	3.3	7550
Potassium, flame AAS	3.3	7610
Selenium, furnace AAS	3.3	7740

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846—Continued

Title	Chapter No.	Method No.
Selenium, gaseous hydride AAS	3.3	7741
Silver, flame AAS	3.3	7760
Silver, furnace AAS	3.3	7761
Sodium, flame AAS	3.3	7770
Thallium, flame AAS	3.3	7840
Thallium, furnace AAS	3.3	7841
Tin, flame AAS	3.3	7870
Vanadium, flame AAS	3.3	7910
Vanadium, furnace AAS	3.3	7911
Zinc, flame AAS	3.3	7950
Zinc, furnace AAS	3.3	7951
Organic analytes	4.0	
Sampling considerations	4.1	
Sample preparation methods	4.2	
Extraction and preparations	4.2.1	
Organic extraction and sample preparation	4.2.1	3500
Separatory funnel liquid-liquid extraction	4.2.1	3510
Continuous liquid-liquid extraction	4.2.1	3520
Soxhlet extraction	4.2.1	3540
Ultrasonic extraction	4.2.1	3550
Waste dilution	4.2.1	3580
Purge-and-trap	4.2.1	5030
Protocol for analysis of sorbent cartridges from VOST	4.2.1	5040
Cleanup	4.2.2	
Cleanup	4.2.2	3600
Alumina column cleanup	4.2.2	3610
Alumina column cleanup and separation of petroleum wastes	4.2.2	3611
Florisil column cleanup	4.2.2	3620
Silica gel cleanup	4.2.2	3630
Gel-permeation cleanup	4.2.2	3640
Acid-base partition cleanup	4.2.2	3650
Sulfur cleanup	4.2.2	3660
Determination of organic analytes	4.3	
Gas chromatographic methods	4.3.1	
Gas chromatography	4.3.1	8000
Halogenated volatile organics	4.3.1	8010
EDB and DBCP	4.3.1	8011
Nonhalogenated volatile organics	4.3.1	8015
Aromatic volatile organics	4.3.1	8020

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846—Continued

Title	Chapter No.	Method No.
Volatile organic compounds in water by purge-and-trap capillary column GC with PID and electrolytic conductivity detector in series	4.3.1	8021
Acrolein, acrylonitrile, acetonitrile	4.3.1	8030
Phenols	4.3.1	8040
Phthalate esters	4.3.1	8060
Nitrosamines	4.3.1	8070
Organochlorine pesticides and PCBs as aroclors	4.3.1	8080
Nitroaromatics and cyclic ketones	4.3.1	8090
Polynuclear aromatic hydrocarbons	4.3.1	8100
Haloethers	4.3.1	8110
Chlorinated hydrocarbons	4.3.1	8120
Organophosphorous pesticides	4.3.1	8140
Organophosphorus pesticides: capillary column	4.3.1	8141
Chlorinated herbicides	4.3.1	8150
Gas chromatographic/mass spectroscopic methods	4.3.2	
GC/MS volatiles	4.3.2	8240
GC/MS semivolatiles, packed column	4.3.2	8250
GC/MS for volatiles capillary column	4.3.2	8260
GC/MS semivolatiles, capillary column	4.3.2	8270
Analysis of chlorinated dioxins and dibenzofurans	4.3.2	8280
High performance liquid chromatographic methods (HPLC)	4.3.3	
Polynuclear aromatic hydrocarbons	4.3.3	8310
Miscellaneous screening methods	4.4	
Headspace	4.4	3810

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846—Continued

Title	Chapter No.	Method No.
Hexadecane extraction and screening of purgeable organics	4.4	3820
Miscellaneous test methods	5.0	
Total and amenable cyanide (colorimetric, manual)	5.0	9010
Total and amenable cyanide (colorimetric, automated)	5.0	9012
Total organic halides (TOX)	5.0	9020
Purgeable organic halides (POX)	5.0	9021
Total organic halides (TOX) by neutron activation analysis	5.0	9022
Acid-soluble and acid-insoluble sulfides	5.0	9030
Extractable sulfides	5.0	9031
Sulfate (colorimetric automated, chloranilate)	5.0	9035
Sulfate, (colorimetric automated, methylthymol blue, AA II)	5.0	9036
Sulfate, (turbidimetric)	5.0	9038
Total organic carbon	5.0	9060
Phenolics (spectrophotometric, manual 4-AAP)	5.0	9065
Phenolics (colorimetric automated, 4-AAP)	5.0	9066
Phenolics (spectrophotometric, MBTH)	5.0	9067
Total recoverable oil and grease (gravimetric, separatory funnel extraction)	5.0	9070
Oil and grease extraction method for sludge samples	5.0	9071
Total coliform: multiple tube fermentation	5.0	9131
Total coliform: membrane filter	5.0	9132
Nitrate	5.0	9200
Chloride (colorimetric automated, ferricyanide AAI)	5.0	9250
Chloride (colorimetric automated, ferricyanide AAII)	5.0	9251
Chloride (titrimetric, mercuric nitrate)	5.0	9252
Properties	6.0	
Multiple extraction procedure	6.0	1320
Extraction procedure for oily wastes	6.0	1330
pH electrometric measurement	6.0	9040
pH paper method	6.0	9041

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846—Continued

Title	Chapter No.	Method No.
Soil pH	6.0	9045
Specific conductance	6.0	9050
Cation-exchange capacity of soils (ammonium acetate)	6.0	9080
Cation-exchange capacity of soils (sodium acetate)	6.0	9081
Compatibility test for wastes and membrane liners	6.0	9090
Paint filter liquids test	6.0	9095
Saturated hydraulic conductivity, saturated leachate conductivity, and intrinsic permeability	6.0	9100
Gross alpha and gross beta	6.0	9310
Alpha-emitting radium isotopes	6.0	9315
Radium-228	6.0	9320
Introduction and regulatory definitions	7.0	
Ignitability	7.1	
Corrosivity	7.3	
Reactivity	7.3	
Test method to determine hydrogen cyanide released from wastes	7.3	
Test method to determine hydrogen sulfide released from wastes	7.3	
Extraction procedure toxicity	7.4	
Methods for determining characteristics	8.0	
Ignitability	8.1	
Pensky-Martens closed-cup method	8.1	1010
Setaflash closed-cup method	8.1	1020
Corrosivity	8.2	
Corrosivity toward steel	8.2	1110
Reactivity	8.3	
Toxicity	8.4	
Extraction procedure (EP) toxicity test method and structural integrity test	8.4	1310
Sampling plan	9.0	
Design and development	9.1	
Implementation	9.2	
Sampling methods	10.0	
Modified method 5 sampling train, appendix A and B	10.0	0010
Source assessment sampling system (SASS)	10.0	0020
Volatile organic sampling train	10.0	0030

TABLE 3.—SAMPLING AND ANALYSIS METHODS CONTAINED IN SW-846—Continued

Title	Chapter No.	Method No.
Ground water monitoring	11.0	
Background and objectives	11.1	
Relationship to the regulations and to other documents	11.2	
Revisions and additions	11.3	
Acceptable designs and practices	11.4	
Unacceptable designs and practices	11.5	
Land treatment monitoring	12.0	
Background	12.1	
Treatment zone	12.2	
Regulatory definition	12.3	
Monitoring and sampling strategy	12.4	
Analysis	12.5	
References and bibliography	12.6	
Incineration	13.0	
Introduction	13.1	
Regulatory definition	13.2	
Waste characterization strategy	13.3	
Stack-gas effluent characterization strategy	13.4	
Additional effluent characterization strategy	13.5	
Selection of specific sampling and analysis methods	13.6	
References	13.7	

Subpart C—Characteristics of Hazardous Waste

8. Section 261.22 is amended by revising paragraphs (a)(1) and (2) to read as follows:

§ 261.22 Characteristic of corrosivity.

(a) * * *

(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using either an EPA test method or an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21. The EPA test method for pH is specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in § 260.11. In all cases, the sampling and analytical determinations must comply with the quality control procedures specified in Sections 1.2 and 1.3, and where an SW-846 method is used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of SW-846.

(2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55° C (130° F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-69 as standardized in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846, as incorporated by reference in § 260.11, or an equivalent test method approved by the Administrator under the procredures set forth in §§ 260.20 and 260.21. In all cases, the sampling and analytical determinations must comply with the quality control procedures specified in Sections 1.2 and 1.3, and, where an SW-846 method is used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of SW-846.

* * * * *

9. Section 261.24 is amended by revising paragraph (a) to read as follows:

§ 261.24 Characteristic of EP toxicity.

(a) A solid waste exhibits the characteristic of EP toxicity if, using the test methods and procedures described in Appendix II or equivalent methods approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21, the extract from a representative sample of the waste contains any of the contaminants listed in Table 1 at a concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering, is considered to be the extract for the purposes of this section. In all cases, the determinations must comply with the quality control procedures specified in Sections 1.2 and 1.3, and, where an SW-846 method is used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW-846 as incorporated by reference in § 260.11.

* * * * *

PART 262—STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE

10. The authority citation for Part 262 continues to read as follows:

Authority: 42 U.S.C. 6906, 6912, 6922, 6923, 6924, 6925, and 6937.

Subpart A—General

11. Section 262.11 is amended by adding, paragraph (e) to read as follows:

§ 262.11 Hazardous waste determination.

* * * * *

(e) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 262 must comply with the quality control procedures specified in Sections 1.2 and 1.3, and, where the SW–846 methods are used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. These quality control requirements must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

12. The authority citation for Part 264 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, and 6925.

Subpart A—General

13. Section 264.1 is amended by adding (i) to read as follows:

§ 264.1 Purpose, scope, and applicability.

* * * * *

(i) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 264 must comply with the quality control procedures specified in Section 1.2 and 1.3, and, where SW–846 methods are used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

Subpart N—Landfills

14. Section 264.314 is amended by revising paragraph (c) to read as follows:

§ 264.314 Special requirements for bulk and containerized liquids.

* * * * *

(c) To demonstrate the absence or presence of free liquids in either a containerized or a bulk waste, the following test must be used: Method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. The sampling and analytical determinations performed to demonstrate the absence or presence of free liquids in a containerized or bulk waste must comply with the appropriate quality control procedures specified in Section 1.2, and those procedures set forth in Section 8.0 of Method 9095 referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11

* * * * *

PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

15. The authority citation for Part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, 6925, and 6935.

Subpart A—General

16. Section 265.1 is amended by adding paragraph (f) to read as follows:

§ 265.1 Purpose, scope, and applicability.

* * * * *

(f) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 265 must comply with the quality control procedures specified in Sections 1.2 and 1.3, and, where SW–846 methods are used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

Subpart N—Landfills

17. Section 265.314 is amended by revising paragraph (d) to read as follows:

§ 265.314 Special requirements for bulk and containerized liquids.

* * * * *

(d) To demonstrate the absence or presence of free liquids in either a containerized or a bulk waste, the following text must be used: Method 9095 (Paint Filter Liquids Test) as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. The sampling and analytical determinations performed to demonstrate the absence or presence of free liquids in a containerized or bulk waste must comply with the appropriate quality control procedures specified in Section 1.2, and those procedures set forth in Section 8.0 of Method 9095 referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11.

* * * * *

PART 268—LAND DISPOSAL RESTRICTIONS

18. The authority citation for Part 268 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921 and 6924.

Subpart A—General

19. Section 268.1 is amended by adding paragraph (e) to read as follows:

§ 268.1 Purpose, scope and applicability.

* * * * *

(e) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 268 must comply with the quality control procedures specfied in Sections 1.2 and 1.3, and those additional procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 260.11. These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

* * * * *

PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM

20. The authority citation for Part 270 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912, 6925, 6927, 6939, and 6974.

Subpart A—General Information

21. Section 270.1 is amended by adding paragraph (d) to read as follows:

§ 270.1 Purpose and scope of these regulations.

* * * * *

(d) In all cases, the sampling and analytical determinations performed to meet the requirements of Part 270 must comply with the quality control procedures specified in Sections 1.2 and 1.3, and those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 270.6. These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

22. Section 270.6 is amended by revising the first reference in paragraph (a) to read as follows:

§ 270.6 References.

(a) * * * "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, Third Edition, 1987, as amended by Update I. This document is available as document number 955–001–00000–1 from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, (202) 783–3238, on a subscription basis. Future updates will automatically be mailed to the subscriber.

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Subpart F—Special Forms of Permits

23. Section 270.62 is amended by revising paragraph (b)(2)(i)(C) to read as follows:

§ 270.62 Hazardous waste incinerator permits.

* * * * *

(b) * * *

(2) * * *

(i) * * *

(C) An identification of any hazardous organic constituents listed in Part 261, Appendix VIII of this chapter, which are present in the waste to be burned, except that the applicant need not analyze for constituents listed in Part 261, Appendix VIII, of this chapter which would reasonably not be expected to be found in the waste. The constituents excluded from analysis must be identified, and the basis for the exclusion stated. The waste analysis must rely on analytical techniques specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 270.6, or their equivalent. In all cases, the sampling and analytical determinations performed to meet the requirements of this Part must comply with the quality control procedures specified in Sections 1.2 and 1.3, and, where an SW–846 method is used, those procedures set forth in Section 8.0 of the methods contained in Chapters Three through Eight and Ten which are referenced therein, of Chapter One of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA Publication SW–846, as incorporated by reference in § 270.6. These quality control procedures must be followed when using any SW–846 method, whether mandatory or not mandatory, and when using any other analytical method.

* * * * *

Editorial Note: This appendix will not appear in the Code of Federal Regulations.

Appendix A—Chapter One Changes in SW–846, Third Edition

Page No. in Chapter One

1. ONE–7—In section 1.1.8, revise the definition of ACCURACY to read as follows:

Accuracy is the nearness of a measurement or the mean (x) of a set of measurements to the true value. Accuracy is assessed by means of reference samples and percent recoveries.

2. ONE–7—Add this sentence after the last sentence in the present definition of ANALYTICAL BATCH:

Analytical batch: "* * * Samples in each batch should be of similar composition (e.g. ground water, sludge, ash, etc.)

3. ONE–7—Replace present definition for BLANK with the following: Blanks:

ONE–7—*Calibration blank:* Usually an organic or aqueous solution that is as free of analyte as possible and prepared with the same volume of chemical reagents used in the preparation of the calibration standards and diluted to the appropriate volume with the same solvent (water or organic) used in the preparation of the calibration standard. The calibration blank is used to give the null reading for the instrument response versus concentration calibration curve. One calibration blank should be analyzed with each analytical batch or every 20 samples, whichever is greater.

ONE–8—*Equipment blank:* Usually an organic or aqueous solution that is as free of analyte as possible and is tranported to the site, opened in the field, and poured over or through the sample collection device, collected in a sample container, and returned to the laboratory. This serves as a check on sampling device cleanliness. One equipment blank should be analyzed with each analytical batch or every 20 samples, whichever is greater.

ONE–8—*Field blank:* Usually an organic or aqueous solution that is as free of analyte as possible and is transferred from one vessel to another at the sampling site and preserved with the appropriate reagents. This serves as a check on reagent and environmental contamination. One field blank should be analyzed with each analytical batch or every 20 samples, whichever is greater.

ONE–8—*Reagent blank:* Usually an organic or aqueous solution that is as free of analyte as possible and contains all the reagents in the same volume as used in the processing of the samples. The reagent blank must be carried through the complete sample preparation procedure and contains the same reagent concentrations in the final solution as in the sample solution used for analysis. The reagent blank is used to correct for possible contamination resulting from the preparation or processing of the sample. One reagent blank should be prepared for every analytical batch or for every 20 samples, whichever is greater.

ONE–8—*Trip blank:* Usually an organic or aqueous solution that is as free of analyte as possible and is transported to the sampling site and returned to the laboratory without being opened. This serves as a check on sample contamination originating from sample transport, shipping, and from the site conditions. One trip blank should be analyzed with each analytical batch or every 20 samples, whichever is greater.

4. ONE–8—Delete CALIBRATION CHECK and insert the following:

Check standard: A material of known composition that is analyzed concurrently with test samples to evaluate a measurement process. An analytical standard that is analyzed to verify the calibration of the analytical system. One check standard should be analyzed with each analytical batch or every 20 samples, whichever is greater.

5. ONE–8—Add the definition of MATRIX SPIKE as follows:

Matrix spike: A *matrix spike* is employed to provide a measure of accuracy for the method used in a given matrix. A matrix spike analysis is performed by adding a predetermined quantity of stock solutions of certain analytes to a sample matrix prior to sample extraction/digestion and analysis. The concentration of the spike should be at the regulatory standard level or the PQL for the method. When the concentration of the analyte in the sample is greater than 0.1%, no spike of the analyte is necessary.

6. ONE–9—Delete MQL and insert the following:

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is

determined from analysis of a sample in a given matrix containing the analyte.

7. ONE-9—Revise the definition of PRECISION to read as follows:

Precision is the agreement between a set of replicate measurements without assumption or knowledge of the true value. Precision is assessed by means of duplicate/replicate sample analysis.

8. ONE-9—Add the heading SAMPLES, with the following definitions:

ONE-9—Delete MATRIX SPIKE/ DUPLICATE ANALYSIS and insert the following:

Duplicate samples: Duplicate samples are two separate samples taken from the same source (i.e. in separate containers and analyzed independently).

ONE-10—Delete CHECK SAMPLE and insert the following:

Quality control reference sample: A sample prepared from an independent standard at a concentration other than that used for calibration, but within the calibration range. An independent standard is defined as a standard composed of the analyte(s) of interest from a different source than that used in the preparation of standards for use in the standard curve. A quality control reference sample is intended as an independent check of technique, methodology, and standards and should be run with every analytical batch or every 20 samples, whichever is greater. This is applicable to all organic and inorganic analyses.

ONE-10—Replace the definition of REPLICATE SAMPLE with the following:

Replicate Samples: Replicate samples are two aliquots taken from the same sample container and analyzed independently. In cases where aliquoting is impossible, as in the case of volatiles, duplicate samples must be taken for replicate analysis.

9. ONE-10—Replace the definition of STANDARD CURVE with the following:

Standard curve: A *standard curve* is a curve which plots concentrations of known analyte standards versus the instrument response to the analyte. Calibration standards are prepared by diluting the stock analyte solution in graduated amounts which cover the expected range of the samples being analyzed. Standards should be prepared at the frequency specified in the appropriate section. The calibration standards must be prepared using the same type of acid or solvent and at the same concentration as will result in the samples following sample preparation. This is applicable to organic and inorganic chemical analyses.

10. ONE-10—Replace the definition of SURROGATE with the following:

Surrogate: Surrogates are organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromatography, but which are not normally found in environmental samples. These compounds are spiked into all blanks, calibration and check standards, samples (including duplicates and QC reference samples) and spiked samples prior to analysis. Percent recoveries are calculated for each surrogate.

11. ONE-11—Replace the definition of WATER with the following:

Water: Any reference to water in a Chapter or Method refers to ASTM Type II reagent water (unless otherwise specified) which is free of contaminants that may interfere with the analytical test in question.

12. ONE-11—In section 1.2.1, revise FIELD QUALITY CONTROL to read as follows:

1.2.1 *Field Quality Control* "* * * Quality Assurance Project Plan (QAPP) shall include as appropriate:"

13. ONE-11—In section 1.2.2 revise *Analytical Quality Control* by deleting the last sentence in the second paragraph:

"The frequencies of these procedures shall be as stated below or at least one with each analytical batch."

14. ONE-12—Replace section 1.2.2.1.1 with the following:

1.2.2.1.1 *Matrix Spiked Sample:* A matrix spiked sample shall be analyzed with every analytical batch or every 20 samples, whichever is greater. The sample shall be spiked with the analyte(s) of interest (see the appropriate method). The sample to be spiked should be typical or representative of the batch. Ideally, it should be an intermediate between the cleanest and the most contaminated samples based on the best information available. It is recommended that the spike be made in a replicate of the field duplicate samples. This is applicable to all organic or inorganic chemical analyses.

15. ONE-12—Add section 1.2.2.1.2 to read as follows:

Field Duplicate Samples shall be analyzed with every analytical batch or every 20 samples, whichever is greater. This procedure is applicable to all organic and inorganic chemical analyses.

16. ONE-12—Add the following sentence to the discussion under section 1.2.2.1.4, FIELD SAMPLES/SURROGATE COMPOUNDS, delete the term "Field Samples" from the heading, and replace check sample with the following:

1.2.2.1.4 *Surrogate Compounds:* "* * * evaluation of analytical quality then will rely on the quality control embodied in the quality control reference sample and spiked and duplicate samples. This is applicable to organic analyses only."

17. ONE-12—In section 1.2 2.1.5, the term CHECK SAMPLE has been changed to QUALITY CONTROL REFERENCE SAMPLE and the definition rewritten as follows:

1.2.2.1.5 *Quality Control Reference Sample:* A *quality control reference sample* is a sample prepared from an independent standard at a concentration other than that used for calibration, but within the calibration range. An independent standard is defined as a standard composed of the analytes of interest from a different source than that used in the preparation of standards for use in the standard curve. A quality control reference sample is intended as an independent check of technique, methodology, and standards and should be run with every analytical batch or every 20 samples, whichever is greater. This is applicable to all organic and inorganic analyses.

18. ONE-13—Insert section 1.2.2.1.6, CHECK STANDARD, to read as follows:

1.2.2.1.6 *Check Standard*: A standard of known concentration prepared by the analyst to monitor and verify instrument performance on a daily basis.

19. ONE-13—In section 1.2.2.2, add the following sentence at the end of the discussion on CLEAN-UPS:

"This is applicable to organic analyses only."

20. ONE-13—In section 1.2.2.2.1, add the following sentence at the end of the discussion on *Column check Sample*:

"This is applicable to organic analyses only."

21. ONE-13—In section 1.2.2.2.2, remove "sample" from the heading for COLUMN CHECK SAMPLE BLANK, delete the present discussion, and insert the following:

1.2.2.2.2 *Column Check Blank*: "* * * The *column check blank* shall be run after activating or deactivating a batch of adsorbent. This is applicable to organic analyses only."

22. ONE-13—In section 1.2.2.3.1, add the following sentence to INSTRUMENT ADJUSTMENT: TUNING, ALIGNMENT, ETC. and alter the heading as follows:

1.2.2.3.1 *Instrument Adjustment, Tuning, and Alignment: "* * * appropriate procedures. This is applicable to all organic and inorganic analyses."*

23. ONE-14—In section 1.2.2.3.2, revise CALIBRATION to read as follows:

"* * * procedures employed. Methods 6010, 7000, and 8000 as well as the appropriate analytical procedure * * *"

24. ONE-14—In section 1.2.2.3.3, revise ADDITIONAL QC REQUIREMENTS FOR INORGANIC ANALYSIS to read as follows:

"Standard curves derived from data consisting of one calibration blank and three concentrations * * *"

25. ONE-16—In section 1.3, rvise METHOD DETECTION LIMIT to read as follows:

For operational purposes, when it is necessary to determine the method detection limit in the sample matrix, the MDL defined in One-9 shall be determined by multiplying by 7 the standard deviation obtained from the triplicate analyses of a matrix spike containing the analyte of interest at a concentration three to five times the estimated MDL.

- Determine the estimated MDL as follows:
- Obtain the concentration value that corresponds to:
- a) an instrument signal/noise ratio within the range of 2.5 to 5.0, or
- b) the region of the standard curve where there is a significant change in sensitivity, i.e., a break in the slope of the standard curve.
- Determine the variance (S^2) for each analyte as follows:

$$S^2 = 1/(n-1)\left[\sum_{i=1}^{n} X_i^2 - 1/n\left(\sum_{i=1}^{n} X_i^2\right)\right]$$

• Determine the standard deviation (S) for each analyte as follows: $S = (S^2)^{1/2}$

• Determine the MDL for each analyte as follows: $MDL = t_{(n-1,\ 1-\alpha=0.99)}$ (S) where $t_{(n-1,\ 1-\alpha=0.99)} = 6.965$ for three replicates as determined from the table of student's t values at the 99 percent level.

26. ONE-16—Revise section 1.5 QUALITY CONTROL DOCUMENTATION to read as follows:

"* * * This package can be obtained from * * *"

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