ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 261

[FRL 1471-3]

Hazardous Waste Management System: Identification and Listing of Hazardous Waste

AGENCY: Enviromental Protection Agency.

ACTION: Final rule, interim final rule, and request for comments.

SUMMARY: Subtitle C of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended ("RCRA"), requires the Environmental Protection Agency ("EPA") to promulgate regulations establishing a Federal hazardous waste management system. The keystone of Subtitle C is Section 3001, which requires EPA to identify the characteristics of and to list those solid wastes which must be managed as hazardous wastes under that system.

This regulation is the first phase of EPA's implementation of Section 3001. It identifies four characteristics of hazardous waste to be used by persons handling solid waste to determine if that waste is a hazardous waste. In addition, it lists 85 process wastes as hazardous wastes and approximately 400 chemicals as hazardous wastes if they are discarded. Persons who generate, transport, treat, store or dispose of hazardous wastes identified or listed in this regulation must comply with all applicable requirements of Parts 122, 124, and 262 through 265 of this Chapter and the notification requirements of Section 3010 of RCRA.

In addition to identifying and listing hazardous wastes, this regulation also sets forth the criteria used by EPA to identify characteristics of hazardous wastes and to list hazardous wastes.

DATES:

Effective Date: These regulations, in the form published today, complete EPA's initial rulemaking on the subjects covered and are final agency action. They become effective on November 19, 1980, which is six months from the date of promulgation as Section 3010 requires. Today's promulgation begins the various schedules provided by RCRA for filing notifications and permit applications, and for States to apply for interim authorization.

Comment Dates: EPA will accept public comments on these regulations as follows:

Regulation and Deadline for Submission of Comments

Final regulations—technical errors only (*e.g.*, typographical errors, inaccurate cross references); July 18, 1980.

Use, re-use, recycling and reclamation of wastes (see section IV.B. of the preamble and § 261.4(c) of the regulations); August 18, 1980.

Interim final regulations (§§ 261.2, 261.4(a)(1) and 261.11, Subpart D and Appendix VIII); July 18, 1980.

Public Meetings: EPA will hold three all-day public meetings each beginning at 9 a.m. on the following dates:

May 30, 1980—San Francisco, California.

June 2, 1980—Washington, D.C.

June 6, 1980—Chicago, Illinois.

ADDRESSES: Comments on interim final portions should be sent to Docket Clerk [Docket No. 3001], Office of Solid Waste (WH-562), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Public Docket: The public docket for this regulation is located in Room 2711, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C., and is available for viewing from 9 a.m. to 4 p.m., Monday through Friday, excluding holidays. Among other things, the docket contains background documents which explain, in more detail than the preamble to this regulation, the basis for many of the provisions in this regulation.

Copies of Regulations: Single copies of this regulation will be available approximately 30 days after date of publication from Ed Cox, Solid Waste Information, U.S. Environmental Protection Agency, 26 W. Saint Clair Street, Cincinnati, Ohio 45268, (513) 684-5362. Multiple copies will be available from the Superintendent of Documents, Washington, D.C. 20402.

Public Meetings: EPA will hold three all-day public meetings, each beginning at 9 a.m., to answer questions about all of its final and interim final Subtitle C regulations. The dates and locations of these meetings are:

May 30, 1980—Sheraton Palace Hotel, 639 Market Place, San Francisco, California.

June 2, 1980—HEW Auditorium, HEW North Building, 330 Independence Avenue, S.W., Washington, D.C.

June 6, 1980—Palmer House Hotel, 17 East Monroe Street, Chicago, Illinois.

FOR FURTHER INFORMATION CONTACT: For general information, contact Alan S. Corson, Office of Solid Waste, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, (202) 755-9187. For information on implementation, contact:

Region I, Dennis Huebner, Chief, Radiation, Waste Management Branch, John F. Kennedy Building, Boston, Massachusetts 02203 (617) 223-5777.

Region II, Dr. Ernest Regna, Chief, Solid Waste Branch, 26 Federal Plaza, New York, New York 10007, (212) 264-0504/5.

Region III, Robert L. Allen, Chief, Hazardous Materials Branch, 6th & Walnut Streets, Philadelphia, Pennsylvania 19106, (215) 597-0980.

Region IV, James Scarbrough, Chief, Residuals Management Branch, 345 Courtland Street, N.E., Atlanta, Georgia 30365, (404) 881-3016.

Region V, Karl J. Klepitsch, Jr., Chief, Waste Management Branch, 230 South Dearborn Street, Chicago, Illinois 60604, (312) 886-6148.

Region VI, R. Stan Jorgensen, Acting Chief, Solid Waste Branch, 1201 Elm Street, First International Building, Dallas, Texas 75270, (214) 767-2645.

Region VII, Robert L. Morby, Chief, Hazardous Materials Branch, 324 E. 11th Street, Kansas City, Missouri 64106, (816) 374-3307.

Region VIII, Lawrence P. Gazda, Chief, Waste Management Branch, 1860 Lincoln Street, Denver, Colorado 80203, (303) 837-2221.

Region IX, Arnold R. Den, Chief, Hazardous Materials Branch, 215 Fremont Street, San Francisco, California 94105, (415) 556-4606.

Region X, Kenneth D. Feigner, Chief, Waste Management Branch, 1200 6th Avenue, Seattle, Washington 98101, (206) 442-1260.

For further information about these meetings, contact Geraldine Wyer, Public Participation Officer, Office of Solid Waste (WH-562), U.S. Environmental Protection Agency, Washington, D.C. 20460, (202) 755-9157.

SUPPLEMENTARY INFORMATION:

I. Introduction

The improper management of hazardous waste is probably the most serious environmental problem in the United States today. EPA estimates that in 1979 the United States generated almost 60 million metric tons of hazardous waste, but that only 10 percent of this waste was managed in an environmentally sound manner. The remainder—over 50 million tons—was transported, treated, stored or disposed of in a manner which potentially threatens human health and the environment.

This mismanagement has tragic consequences. EPA has on file hundreds of cases of damage to human health or the environment resulting from the

indiscriminate dumping or other improper management of hazardous waste. The vast majority of these cases involve the pollution of groundwater—the source of drinking water for about half the nations's population—from the open dumping of wastes or from improperly operated landfills and surface impoundments. In many of these cases, groundwater supplies were so badly contaminated with toxic or cancer-causing chemicals and heavy metals that residents in the area had to obtain drinking water from other sources. In other more tragic cases, residents were not aware of the contamination, continued to drink the water, and suffered serious health effects.

Groundwater pollution is not the only problem posed by improper hazardous waste management. EPA's damage case file also includes incidents where the improper disposal of hazardous waste has polluted streams, rivers, lakes and other surface waters, killing aquatic life, destroying wildlife, and denuding areas of vegetation. In other cases, the vaporization of volatile organic materials from wastes which were improperly disposed of has been linked to respiratory illnesses, skin diseases (including skin cancer) and elevated levels of toxic materials in the blood and tissues of humans and domestic livestock. In still other cases, the mismanagement of hazardous waste has resulted in fires, explosions or the generation of toxic gases which have killed or seriously injured workers and firemen.

It is against the backdrop of such incidents that Congress enacted the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. 6901 *et seq.* ("RCRA" or "Act"). Although the Act has several objectives (including the promotion of resource recovery and the proper management of non-hazardous solid waste), Congress' "overriding concern" (H.R. Rep. No. 96–1461, 96th Cong., 1st Sess. 3 (1976) ("H.R. Rep.")) in enacting RCRA was to establish the statutory framework for a national system which would insure the proper management of hazardous waste.

That framework is contained in Subtitle C of the statute. It requires EPA to establish a Federal "cradle to grave" management system for hazardous waste, including standards for generators of hazardous waste (Section 3002), standards for transporters of hazardous waste (Section 3003), standards and permit requirements for owners and operators of facilities that treat, store or dispose of hazardous waste (Sections 3004 and 3005) and a manifest system which will track the movement of the waste from the point of generation to the point of disposal (Sections 3002, 3003 and 3004). Under Section 3006 of Subtitle C, EPA may authorize States to operate a State hazardous waste program in lieu of the Federal program if they meet certain requirements.

The centerpiece of this system is Section 3001 of Subtitle C, which requires EPA to identify and list those solid wastes which must be managed as hazardous wastes according to the standards established by EPA under Sections 3002 through 3005. This identification is a two-part process. First, EPA is required to develop criteria for identifying the characteristics of hazardous waste and for listing hazardous wastes (Section 3001(a)). Then, based on these criteria, EPA must actually identify specific characteristics of hazardous waste and list particular hazardous wastes (Section 3001(b)).

EPA began developing regulations to implement these requirements shortly after RCRA was enacted. During 1977 and 1978, the Agency met extensively with experts in hazardous waste management, States, Federal agencies, industry, environmental groups and other individuals and organizations to discuss possible criteria, and to obtain suggestions for characteristics and listed wastes. Drafts of proposed regulations were developed and widely disseminated to the public for comment. Based on these meetings, several public hearings, written comments on its draft regulations and information collected by EPA, a final proposed regulation was developed and published in the Federal Register on December 18, 1978 (43 FR 58949–58968).

EPA held five public hearings on its December 18, 1978, proposal (43 FR 58946). Several hundred persons testified at these hearings. In addition, EPA received an estimated 1,000 sets of written comments on its proposed Section 3001 regulations.

Based in part on these comments, EPA proposed a supplemental list of hazardous wastes on August 22, 1979 (44 FR 49402–49404). The Agency also held a hearing on this proposal and received a number of written comments.

The Agency has carefully considered the comments received on its December 18, 1978, and August 22, 1979, proposals, as well as comments received on a number of reports, studies and other documents associated with its Section 3001 rulemaking which were noticed for public comment after the close of the comment period on the proposed regulations,[1] in developing the final and interim final regulations published today.

II. Organization of Regulations and Preamble

In response to comment that its proposed Subtitle C regulations were difficult to read, EPA has totally reorganized them. Regulations implementing Section 3001, which were originally proposed as Subpart A of Part 250 of Title 40 of the Code of Federal Regulations have been recodified as Part 261 of Title 40. Similar changes have been made in the remainder of the Subtitle C regulations. The following table shows the correlation between the statutory provisions of Subtitle C and the sections of EPA's proposed and final regulations which implement those provisions:

Statutory section	Proposed rule	Final rule
General provisions and definitions.	§§ 250.12(c), 250.11, 250.21, 250.31, 250.41	Part 260.
3001	§§ 250.10 (a) and (b), 250.12 through 250.15, 250.29(a)	Part 261.
3002	§§ 250.22 through 250.26, 250.29(b)	Part 262.
3003	§§ 250.32 through 250.38	Part 263.
3004 (permiting standards).	§§ 250.4 (a), (b), (d), and (e), 250.42 through 250.45–6	Part 264.
3004 (interim status standards).	§§ 250.40(c), 250.46	Part 265.
3005	Parts 122 and 124	Parts 122 and 124.
3006	Part 123, §§ 250.10(c), 250.20(b), 250.30(d)	Part 123.
3010	Part 250, Subpart E	45 FR 12746 (Feb. 26, 1980).

The recodification of EPA's Section 3001 regulations from a Subpart of Part 250 to Part 261 has necessitated some major reorganization of those regulations. Proposed § 250.10 is now largely incorporated in Subpart A. The purpose of this subpart is to tell the reader what materials are subject to the Federal hazardous waste management system established by Parts 262 through 265, 122 and 124. It contains a definition of solid waste, a definition of hazardous waste, and a list of materials which are excluded from all or a portion of the requirements in those parts. It also designates the points in the waste generation and handling process when a hazardous waste must begin to be managed in accordance with EPA's Parts 262 through 265 standards and explains when a hazardous waste ceases to be a hazardous waste. Finally, it establishes special requirements for small quantity generators of hazardous waste (originally contained in § 250.29(a) of EPA's proposed generator standards).

[1] See 44 FR 49277, 49278 (August 22, 1979); 44 FR 56724 (October 2, 1979); 44 FR 76827 (December 28, 1979); 45 FR 2059 (January 10, 1980); 45 FR 14232 (March 5, 1980).

Subpart B (§§ 250.12 and 250.14 of the proposed rule) establishes the criteria used by EPA in identifying the characteristics of hazardous waste and listing particular hazardous wastes. Subpart C (proposed § 250.13) contains the hazardous waste characteristics which EPA has identified and Subpart D (proposed § 250.14) the particular hazardous wastes which EPA has listed to date based on those criteria. As noted in the definition of hazardous waste in Subpart A, these two subparts are the cornerstone for the Federal hazardous waste management system because they identify which solid wastes will be regulated as hazardous wastes under that system.

The following table provides a rough correlation between the various provisions of EPA's proposed and final Section 3001 regulations:

Subject	Proposed rule	Final rule
Purpose of regulations	§ 250.10(a)	§ 261.1.
General definitions	§ 250.11	§§ 260.10, 261.2, 261.3.
Definition of solid waste	§ 250.10(b)	§ 261.2.
Definition of hazardous waste	§ 250.10(d)(1)	§ 261.3.
Exclusions	§§ 250.10(d)(2), 250.11(a)(7), 250.20(c)(4)	§ 261.4.
Small quantity generators	§ 250.29(a)	§ 261.5.
Criteria	§§ 250.12 (a) and (b), 250.14	Subpart B.
For identifying characteristics	§ 250.12(a)	§ 261.10.
For listing	§§ 250.12(b), 250.14	§ 261.11.
Characteristics	§ 250.13	Subpart C.
Ignitability	§ 250.13(a)	§ 261.21.
Corrosivity	§ 250.13(b)	§ 261.22.
Reactivity	§ 250.13(c)	§ 261.23.
Toxicity	§ 250.13(d)	§ 261.24.
Lists	§ 250.14	Subpart D.
Nonspecific sources	§ 250.14(a)	§ 261.31.
Specific sources	§ 250.14(b)(2)	§ 261.32.
Discarded chemicals	§ 250.14(a)	§ 261.33.
Procedures for exempting listed wastes from particular generating facilities.	§ 250.15	§§ 260.20, 260.22.
Petitions:		
Revision of list and characteristics.	§ 250.12(c)	§ 260.20.
Equivalent methods	§§ 250.13(a)(1)(i), (a)(2), (b)(1)(i), (b)(1)(ii), (d)(2)(ii)	§§ 260.20, 260.21.

Except for some broad issues which cut across all the Section 3001 regulations (and in some cases EPA's Section 3002 through 3004 standards), the preamble to this regulation will generally follow the structure of the final regulations. It will discuss some of the more significant issues raised during the public comment period on EPA's proposed regulations and the revisions made in response to those comments. Background documents which address these comments and revisions and explain the basis for these regulations in more detail are available as noted above.

III. General Issues

A. Phasing of Regulations

Several months prior to the proposal of EPA's Section 3001 regulations, the State of Illinois, several environmental groups, and a solid waste trade association sued the Agency under Section 7004 of RCRA to obtain a court order requiring EPA to promulgate final regulations under Section 3001 (and other sections of the Act) by a date certain. On January 3, 1979, the court issued an order directing EPA to issue final regulations under Section 3001 by December 31, 1979. *State of Illinois* v. *Costle*, 12 ERC 1597 (D.D.C. 1979). This order was subsequently modified to require EPA to use its best efforts to meet an April 1980, promulgation date (Order of December 18, 1979).

Given our limited resources, it has not been possible both to meet this deadline and to make final decisions on every segment of the very ambitious regulatory program which the Agency proposed on December 18, 1978, and August 22, 1979. We have tried to prioritize our efforts, insofar as possible, to deal with the most serious environmental problems first (*e.g.*, ones that are national in scope, are not dealt with by other State or Federal regulations) and to finalize those portions of the proposed regulations which must be issued if a core hazardous waste management program is to go into effect.

For these reasons, the final regulation published today defers final action on a number of aspects of the proposed regulation, including integrating the regulation of polychlorinated biphenyls ("PCBs") under RCRA and the Toxic Substances Control Act ("TSCA"); fully regulating wastes that are used, re-used, reclaimed or recovered; and a number of proposed listed wastes. To assist States in developing hazardous waste programs under Section 3006 of RCRA and the regulated community in preparing to comply with future regulatory requirements, EPA is providing the following information on its current schedule for acting on these deferred portions:

1. *PCB Integration.* On February 17, 1978 (43 FR 7150) EPA issued final regulations under Section 6(e) of TSCA establishing storage, landfilling, incineration, packaging, marking, placarding and recordkeeping requirements for waste PCBs. Revisions to these regulations were published on May 31, 1979 (44 FR 31514).

Because of the potential overlap between the RCRA hazardous waste management standards and the TSCA PCB marking and disposal regulations, in its proposed Section 3004 regulations, EPA requested comment on five alternative ways of integrating the two sets of regulations (43 FR 58993–58994). *See also* 43 FR 31539 (May 31, 1979). Based on the comments received, and EPA's own review of the two sets of regulations, the Agency has made a tentative decision that the best way to regulate PCBs is to merge the TSCA PCB rules into the final RCRA regulations.

Unfortunately, it has not been possible to complete this task to date. Both rules are lengthy and complicated, and must be carefully coordinated to avoid regulatory loopholes and disruption of the ongoing TSCA PCB program. Completing this coordination by April of this year would have required diverting personnel from the task of finalizing the RCRA hazardous waste program. EPA decided that it made little sense to focus its limited resources on revising an existing regulatory program when so much work needed to be done to develop a new one.

EPA expects to complete the task of integrating the RCRA regulations and TSCA PCB rules by the fall of 1980, and to amend Parts 261 through 265 to bring waste PCBs into the Subtitle C system at the same time that it promulgates its final Phase II Section 3004 standards. In the interim, the handling and disposal of waste PCBs will continue to be regulated under TSCA and other EPA statutes.

2. *Regulation of Wastes Which Are Used, Re-Used, Recovered or Reclaimed.* As discussed in some detail in section IV.B. of this preamble, EPA will be deferring the promulgation of standards to regulate hazardous waste recycling and reclamation operations and the actual use and re-use of hazardous waste until beginning in the fall of 1980.

3. *Radioactive Wastes.* In its December 18, 1978, regulation, EPA proposed to list the following radioactive materials as hazardous wastes: waste rock and overburden from uranium mining; overburden and slimes from phosphate surface mining; waste gypsum from phosphoric acid production; and slag and fluid bed prills from elemental phosphorous production (§ 250.14(b)(2)). At the same time, it proposed to establish special management standards for these wastes

which would regulate their disposal (§§ 250.46–2 and 250.46–4) and prevent their being used as fill in land used for residential development or in building products unless radon emissions and gamma radiation could be reduced to specified levels (§§ 250.46–3(c) and 250.46–4(b)). The purpose of these latter use restrictions was to reduce the amount of radiation to which persons living or working in buildings constructed either on land where these wastes were deposited or with materials containing these wastes would be exposed.

In February, 1980, the House of Representatives passed a bill which would amend RCRA to temporarily suspend EPA's authority to regulate these wastes under Subtitle C except as necessary:

> to prevent radiation exposure which presents an unreasonable risk to human health from the use in construction or land reclamation (with or without revegetation) of solid waste from the extraction, beneficiation or processing of phosphate rock or the extraction of uranium ore (Section 3(d) of H.R. 3994).

Because Congressional action on this provision is imminent (see section III.E. of this preamble), we are deferring the development of final or interim final regulations establishing a criterion for listing radioactive wastes, listing radioactive phosphate and uranium wastes, and establishing management standards for those wastes until Congress has spoken. Assuming Congress acts by the end of the summer, we would hope to promulgate regulations for radioactive wastes by the fall of 1980. This would give EPA some time to better refine its final standards and conform them to any legislative amendments, to fully respond to comments on its proposal and to coordinate its final standards with its other regulations on used, re-used, recovered and reclaimed wastes (see section IV.B.4. of this preamble).

Although the use of radioactive mining wastes in residential landfill and construction materials may pose a serious health hazard, this hazard is limited to approximately half a dozen states where these wastes are generated. Thus, in contrast with many of the wastes covered by today's regulation, which are more ubiquitous and are frequently transported across state lines, these wastes can probably be regulated effectively at the state level pending EPA action.

4. *Infectious Wastes.* In its proposed regulation, EPA listed as hazardous wastes infectious wastes generated by certain departments in health care facilities and veterinary hospitals, by laboratories handling etiologic agents, and by sewage treatment facilities, unless the wastes were sterilized or incinerated in accordance with the methods prescribed in Appendix VI or § 250.14(b)(1)(iii).

EPA received a number of comments on this proposal, particularly the absence of an infectious waste listing criterion, the breadth of sources covered and the Agency's proposed treatment methods. Although EPA has completed its evaluation of these comments and has developed a criterion for listing infectious wastes and refined its proposed list, it has not been able to complete the work necessary to identify the treatment methods it would allow to be used to exempt these wastes from regulation. Because logic dictates that these three parts of the regulation should be promulgated simultaneously, EPA is deferring action on infectious wastes until it can finish this last segment. It expects to complete this task by the fall of 1980.

In the meantime, none of these wastes will go entirely unregulated. Many will be subject to State disposal regulations or State laws governing hospitals and other health care facilities. Because of public health considerations, the operations of these facilities are generally closely scrutinized by State and local officials. In addition, during this interim period, these wastes will be subject to the "open dumping" prohibition under Section 4005(c) of RCRA. EPA's regulations defining those practices which constitute "open dumping" expressly prohibit the land disposal of infectious wastes unless measures have been taken to minimize disease vectors (40 CFR 257.3–6).

5. *Other Listed Wastes.* The other waste streams on which EPA has deferred final action fall into four basic categories: Wastes which EPA intends to list as hazardous but for which revised background documents could not be completed in time for promulgation as part of this regulation; wastes for which EPA currently has insufficient data to make a final determination that the wastes are hazardous; wastes which available data suggests are not hazardous; and wastes which are no longer produced.

It is EPA's intent to amend this regulation to add most of the wastes included in the first category of deferred wastes by June 15, 1980 (see Appendix A) and the remainder by fall, 1980 (see Appendix B). Persons handling wastes identified or listed in both this regulation and Appendix A may, if they desire, save themselves the expense and inconvenience of a second notification under Section 3010 of RCRA by including Appendix A wastes in the notification required to be filed on August 18, 1980. Owners and operators of facilities which treat, store or dispose of the wastes in both categories may similarly avoid having to amend their Part A permit application (*see* 40 CFR 122.22) by including Appendix A wastes in their initial application.

EPA will take action on the second category of deferred wastes—wastes for which EPA currently has insufficient data to make a final listing determination—as soon as it is able to obtain the information necessary to make those decisions. To enable the Agency to gather such information without the *ex parte* contact restraints normally imposed on post-proposal rulemaking activities, EPA will in the future be reopening the comment period on its December 18, 1978, proposal to list these wastes. EPA does not plan on taking any further action on the final two categories of wastes.

EPA does not believe that phasing the promulgation of Section 3001 in this fashion will frustrate the objectives of the statute or unduly complicate implementation of the hazardous waste program. Sections 2002(b), 3001(c) and 7002 of the Act clearly contemplate that regulations under Section 3001 will be periodically expanded or otherwise revised. *See also* H.R. Rep. at 25. The preview of the content and timing of future regulations provided above should help to minimize the disruption that phased promulgation of major portions of the Section 3001 regulations might cause for the regulated community and for States which are attempting to formulate their hazardous waste programs. In light of these considerations and the pressing need to begin implementation of a national hazardous waste program as soon as possible, EPA sees no reason to postpone publication of those portions of its Section 3001 regulations which it is ready to finalize today pending a final decision on the remaining portions. Such an approach would cause an unwarranted delay in the commencement of the program.

B. Interim Final Provisions

The following portions of this regulation are being published as "interim final" regulations: the lists of hazardous wastes (Subpart D), the criteria for listing hazardous wastes (§ 261.11), and the definitions of "solid waste" (§ 261.2) and "domestic sewage" (§ 261.4(a)). This means that, although these regulations are promulgated for purposes of the 90-day notification requirement under Section 3010(a), the six-month effective date under Section 3010(b) and the 90-day petition deadline under Section 7006, the public will have an additional opportunity to comment on them before they are published as "final final" regulations.

The lists of hazardous wastes under Subpart D are being published in interim final form to allow the public an opportunity to comment on the

additional data EPA has collected since the close of the public comment period to support the listing of these wastes. Because EPA received comments on only approximately twenty-five percent of the wastes listed in its December 18, 1978, and August 22, 1979, proposals; the Agency does not anticipate receiving very many comments on its revised support documents or having to make major changes in the list of wastes published today before issuing a "final final" regulation.

The criteria for listing (§ 261.11) have been substantially revised in response to public comment. While EPA believes that these changes are a logical outgrowth of the public comment period, it also recognizes that they would probably benefit from the fine tuning that an additional round of public comment would provide. For this reason, the Agency is also publishing § 261.11 in interim final form.

EPA's proposed definition of "solid waste" has been clarified and a new definition of "domestic sewage" has been added in response to public comment. Because of the difficulties inherent in devising workable, broadly applicable definitions of these terms, and their potential regulatory impact, we would like to obtain some additional comment on them before publishing them in final form.

It is EPA's intent to act on all interim final portions of these regulations prior to the compliance date of Parts 262 and 263 and the effective date of Parts 264 and 265.

C. Data Base for Regulations

EPA received a number of comments on its December 18, 1978, and August 22, 1979, proposals urging it to postpone the promulgation of final regulations under Section 3001 (and the rest of Subtitle C) until it could develop an extensive data base on hazardous waste characteristics and individual hazardous wastes, including extensive industry-specific waste studies, risk assessments, and in-depth waste analyses.

In the final regulation published today, the Agency has made every attempt to base its rules on the data available on waste generation, composition and management, on the potential health and environmental hazards posed by waste constituents, and on exposure pathways. It has also exercised its best efforts to use good scientific analysis and judgment to supplement available data and to respond to comments received on its proposed regulation. In some instances, within time and budget constraints, EPA has undertaken additional waste analyses and testing.

While the acquisition of more information is often a scientific objective, Section 3001 requires the Agency to establish regulations where it has limited, but meaningful data. The broad discretion provided to EPA under the statute, the tight statutory promulgation deadlines coupled with Congress' acknowledged recognition of the lack of available data on hazardous waste management (*see* H.R. Rep. at 26), and the critical nature of the hazardous waste problem (*see* H.R. Rep. at 3, 4, 11, 17–23; S. Rep. No. 94–988; 94th Cong. 2d Sess. at 3, 4 ("S. Rep.")) all support EPA's going forward with a regulatory program even though its data base and regulations are less than perfect. The courts have repeatedly sanctioned this approach under other EPA statutes where, as here, the Agency is implementing a complex program in an area "fraught with scientific uncertainty" where Congress has directed EPA "to act quickly and decisively despite the lack of exact data". *Weyerhaeuser Company v. Costle,* 590 F.2d 1011, 1025–1026 (D.C. Cir. 1978). *See also Ethyl Corp. v. EPA,* 541 F.2d 1, 24 (D.C. Cir. 1976); *Society of Plastics Industries, Inc. v. OSHA,* 509 F.2d 1301, 1308 (2d Cir.), *cert. denied,* 421 U.S. 992 (1975).

We are committed to improving our data base for these regulations and refining them in the future. The Agency has recently instituted a multi-year, multi-million dollar program to survey specific industries, and collect waste samples and other information which will expand its data base on the hazardous waste generated by these industries. EPA also anticipates that implementation of the Subtitle C regulations—particularly the waste testing requirements—will, over the next several years, substantially increase the national pool of information on hazardous wastes. The petitioning procedures set forth in §§ 260.20 through 260.22 should provide yet another revenue of information which can be used to improve this regulation in the future.

D. Developing a National Hazardous Waste Management System

EPA received a number of comments on its proposed regulations identifying particular wastes or management situations where a strict application of EPA's proposed regulations would result in overregulation of the wastes at issue. For exampe. commenters identified several wastes which exhibited EPA's proposed characteristics but which would not normally be thought of as hazardous, and described situations where the application of EPA's proposed Section 3004 standards was arguably unnecessary.

In the regulations promulgated today, particularly the Part 264 and 265 regulations, we have tried to address some of these criticisms, to the extent feasible, and to achieve a better balance between the often competing goals of regulatory specificity and broad applicability. Where we think specific standards are appropriate, we have promulgated specific standards; where more flexibility is required, we have either used broader standards or used specific standards and articulated exceptions or provided for individual variances. We have done our best to lay the groundwork for a hazardous waste management system which is workable and understandable, and which provides appropriate regulation of most hazardous wastes identified or listed in this Part.

This system may not work perfectly for every waste, however. It may overregulate in some instances and underregulate in others. This is an unavoidable consequence of attempting to develop a national hazardous waste managment program which has to regulate thousands of wastes in literally hundreds of thousands of individual transportation, treatment, storage and disposal situtations. To develop a program which would provide precisely the right degree of environmental and health protection in each management situation would require regulations that would be either so vague that they would offer little guidance to the regulated community and would be largely unenforceable or so extensive and so encumbered with provisions for case-by-case variances that they would be an administrative nightmare for both EPA and the hundreds of thousands of persons and facilities which are potentially subject to them.

We think that the system we have promulgated today, although not perfect in all aspects, is within the scope of what Congress intended when, in 1976, it directed EPA to establish hazardous waste management standards which were "necessary to protect health and the environment" in eighteen months. We do not think that Congress expected EPA to develop a program which it could not implement or enforce or to indefinitely postpone the issuance of regulations until it could develop standards which would provide the degree of precision desired by some commenters. Neither of these approaches would provide any health or environmental protection at all.

In these regulations we have tried to strike a balance between these two extremes. Where we have failed to achieve the right balance, we suspect that this will become apparent in the early stages of implementing the

program. If there are situations where a strict application of the standards contained in these rules would bring about a result which was obviously not intended, we would appreciate being advised of it so that we can take appropriate action. We are prepared to react to these problems with regulatory amendments, interpretive guidance and reasonable implementation and enforcment, as appropriate.

E. Pending Legislative Amendments

The United States Senate and House of Representatives have each recently passed a bill to reauthorize and amend RCRA (S. 1156 and H.R. 3994). Both bills contain amendments to Section 3001 which, if enacted, would repeal or temporarily suspend EPA's authority to regulate certain utility and energy development wastes as hazardous wastes under Subtitle C. These bills are now awaiting action by a conference committee. Because it appears likely that Congress will act before November 19, 1980 to exempt these wastes, EPA has temporarily excluded them from this regulation (*see* § 261.4(b)). This exclusion will be revised, if necessary, to conform to the legislation which is ultimately enacted.

F. Consideration of Economic Impact of the Development of the Regulations

In its proposed regulations, EPA expressed uncertainty on the appropriate role that cost considerations and economic impact should play in the development of the hazardous waste regulations:

> It is also not clear to what extent RCRA allows economic impact to be taken into account, since the Act is silent on this point. Thus, the Agency is faced with the problem of how to deal with these potential impacts with little economic data and without clear Congressional guidance. (43 FR 58971)

A variety of comments were received on this issue, expressing three predominant themes: (a) The Act and its legislative history require the Agency to analyze its regulations in terms of costs and benefits; (b) the legislative materials preclude any consideration of costs in the development of regulations; and, (c) EPA must prepare an economic impact analysis.

EPA has re-examined the legislative history of RCRA. Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most effective regulation among various alternatives that meet the statutory requirement of being "necessary to protect human health and the environment." In addition, the Agency may prepare economic analyses to supplement its regulations as an aid to congressional, intergovernmental, or public understanding of the regulatory program.

EPA disagrees with the position of several commenters that cost, or economic considerations more generally, must be a factor in EPA's decisions under Subtitle C. There is no explicit requirement in the Act directing EPA to consider costs in the development of its intitial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from the other major pollution control statutes. For example, in developing effluent guideline limitations under the Clean Water Act, the Administrator is to consider, among other things, "the total cost of the application of technology in relation to the the effluent reductions to be achieved . . ." Section 304(b)(1)(B), 33 U.S.C. 1314(b)(1)(B). *See also* Section 304(b)(2)(B). The Clean Air Act also directs that in establishing new source performance standards for stationary sources of air pollution the Administrator should "consider the cost of achieving such emission reduction and any nonair quality health and environmental impact and energy requirements." Section 111(a)(1)(C), 42 U.S.C. 7211(a)(1)(C).

The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration. A draft bill for use by the relevant House Subcommittee would have required that hazardous waste regulations "shall be such as will minimize the risk of adverse effects on human health while taking to the greatest extent possible, into account the economic cost and benefits of achieving such standards." Section 351(e), Subcommittee on Transportation and Commerce, Draft of the Solid Waste Utilization Act (December 8, 1975). When this bill was redrafted for introduction to the House of Representatives as H.R. 14496, this provision calling for consideration of costs and benefits had been deleted. The House bill, however, required that hazardous waste regulations "reasonably protect" human health and the environment. H.R. 14496, 94th Cong., 2d Sess., § 306 (1976). The legislative materials accompanying H.R. 14496 provided no guidance on what effect, if any, the draftsmen intended the potentially moderating phrase "reasonably protect" should have on the development of regulations. In the compromise bill reconciling the differences between the Senate and House bills, the adverb "reasonably" was deleted. In the debate in the House prior to the Act's passage there was no discussion of the effect of this deletion on the intended operation of the Act.

Congress was aware that the hazardous waste regulation would impose substantial costs on the regulated community. *See, e.g.,* H.R. Rep. at 4, S. Rep. at 4. Despite this recognition, Congress deliberately rejected provisions that would require consideration of cost burden on industry or to moderate the Act's environmental objectives. For these reasons, the Agency concludes that the Act prohibits it from considering such costs in the development of Subtitle C regulations as a basis for lessening the standards it considers necessary to ensure protection of human health or the environment.

The Agency has, however, considered cost-effectiveness in choosing among alternatives that meet the requirements of the statute. In addition, the Administrator may refer to other considerations such as energy or environmental impacts, and implementation and enforcement burdens. For instance, the information received or developed in the course of rulemaking on the cost implications of its proposed regulations may be used by EPA to determine the relative cost-effectiveness of various methods to implement a particular requirement. Information on economic impacts may also be useful in informing Congress about the implementation of the hazardous waste program, developing new legislative or Agency intitatives which might affect the regulatory program, and advising the public about the projected impacts of the program. *See Hercules, Inc. v. Environmental Protection Agency,* 598 F. 2d 91, 113 (D.C.Cir. 1978). EPA has prepared an economic impact analysis on the entire Subtitle C regulatory program. This analysis provides detailed information on the projected economic impacts of these regulations. The report should facilitate public understanding of the task that the Agency is undertaking.

G. Rulemaking Petitions

EPA's December 18, 1978, proposed Section 3001 regulations contained no special procedures for petitioning the Agency to identify a new characteristic or list a new hazardous waste, or to modify or revoke an existing

characteristic or listing. They simply provided that a petition to identify a characteristic or list a solid waste as a hazardous waste would be granted if EPA found that the proposed characteristic or waste met EPA's criteria for characteristics or listing (proposed § 250.12(c)).

EPA received a number of comments urging it to establish standardized procedures for the submission and processing of petitions to modify its characteristics or list of wastes. Some of these commenters simply wanted to know how to file a petition and how EPA would act on it. Others insisted that EPA establish rulemaking procedures which complied with the Administrative Procedures Act, mistakenly thinking that because proposed § 250.12(c) did not articulate the procedures EPA would follow in acting on petitions, the Agency would grant petitions, thereby modifying its regulations, without going through normal rulemaking procedures.

To provide the guidance desired by the first set of commenters and to assuage the concerns of the second, we have included in Subpart C of Part 260 procedures for the submission and processing of petitions to add to, revoke or otherwise modify any of the Subtitle C hazardous waste regulations, including the hazardous waste characteristics and lists. This provision expressly requires that a tentative decision to grant a petition be made in the form of an advance notice of proposed rulemaking or a proposed regulation, thus starting the rulemaking process.

EPA received a number of comments suggesting that unless EPA specified the information to be contained in petitions to amend its characteristics or lists of hazardous wastes, petitioners would not know what type of data to submit to the Agency and that the Agency would have to expend a substantial amount of time reviewing incomplete petitions.

EPA agrees that this may have been a problem with its proposed regulation. The Agency's proposed criteria for listing were not particularly well-articulated. In addition, the background documents for characteristics and for individual wastes also failed, in some cases, to provide meaningful guidance as to the kinds of information which should be submitted in a rulemaking petition.

We think we have remedied most of these deficiencies in this regulation. In response to comment, we have substantially expanded the criteria for listing, so that the factors which EPA will be using in making a listing decision are much better stated. The background documents for both the characteristics and lists have been materially upgraded, so that they now provide a good model for rulemaking petitions. In short, we think the regulations published today, with their supporting materials, will enable petitioners to intelligently frame rulemaking petitions.

For this reason, EPA thinks it is probably unnecessary to establish detailed informational requirements for petitions. Moreover, developing a list of such requirements would be very difficult, because the types of data and degree of detail required will vary substantially from waste to waste and from characteristic to characteristic. If, in the future, EPA finds that most petitioners are submitting insufficient information, we will reconsider establishing more specific data requirements for these petitions.

EPA recognizes that some organizations—primarily environmental groups—may not have the skills, resources, or data collection authority to fashion rulemaking petitions which contain all of the information which EPA will need to make a decision to establish a new characteristic or list a new waste. If such petitions, although incomplete, appear to have merit, EPA will attempt to obtain the supplemental data necessary to make a tentative rulemaking determination. These organizations should recognize, however, that this will necessarily delay any final action on their petitions.

IV. Subpart A.

A. Section 261.1 (Purpose, Scope and Applicability)

Although this section is largely self-explanatory, two points regarding the function of EPA's Section 3001 regulation, which were apparently a source of misunderstanding during the comment period, are deserving of special attention.

First, the purpose of this regulation is to identify those wastes which, because of the hazards they may pose in transportation, treatment, storage or disposal, should be subject to appropriate management requirements under Subtitle C. It does not dictate how wastes should be managed (although it may identify properties of the waste which will affect management practices). Management standards and permitting requirements are imposed under Sections 3002 through 3005 and Section 3010.

Second, although this regulation limits what may be regulated as a "hazardous waste" under Sections 3002 through 3005 and 3010 of RCRA, it does not limit those materials which may be considered "hazardous wastes" under other sections of the statute, particularly Section 3007 (which authorizes EPA to obtain information on "hazardous waste" in order to develop regulations or enforce RCRA) and Section 7003 (which authorizes the Agency to institute civil actions to abate imminent and substantial hazards caused by "hazardous wastes"). Unlike Sections 3002 through 3004 and Section 3010, Congress did not confine the operations of Sections 3007 and 7003 to "hazardous wastes *identified or listed under this subtitle*" (emphasis added). To avoid future confusion on this point, EPA has stated it explicitly in § 261.1(b).

B. Section 261.2 (Definition of Solid Waste)

Because no material can be a "hazardous waste" without first being a "solid waste" (Section 1004(5)), what constitutes a "solid waste" is really the definitional starting point for the hazardous waste management system. Section 1004(27) of RCRA defines a solid waste as:

> any garbage, refuse, sludge from a wastewater treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial or mining and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation return flows, or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act . . . or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 . . . (Section 1004(27)).

In its proposed regulations, EPA adopted this definition, with its exclusions, in its entirety (§ 250.11(a)(7)). In addition, it proposed to construe the term "other discarded material" in Section 1004(27) to include:

(1) Any material which is not re-used—i.e., is abandoned or committed to final disposal;
(2) Any material which is re-used by being placed in or on the land or water so that the material or any constituent thereof is released into the environment; and
(3) Waste oil burned as fuel.

EPA noted that it would add other uses to the third category of discarded materials if it found that it was necessary to control such uses (43 FR 58954).

This definition of "other discarded material" was based on four major considerations. First, after reviewing both the language and framework of

RCRA and its legislative history, EPA concluded that Subtitle C was intended to regulate hazardous wastes irrespective of their end use—*i.e.*, regardless of whether they are committed to final disposal or intended to be used, re-used, recycled or reclaimed.

Second, the Agency concluded that all hazardous wastes, regardless of their end use, may pose significant health and environmental hazards. Wastes that present a hazard in storage or transport arguably pose the same danger in storage or transport irrespective of whether they are destined for disposal or for use, re-use, recycle or reclamation. Wastes which are used or re-used by being placed on the land—*e.g.*, chemical-bearing sludges used as fertilizers, contaminated waste oil used as a dust suppressant on roads and radioactive mining wastes used as residential land fill—may pose almost the same hazards as if they were simply dumped there. Wastes which are used, re-used, recycled or reclaimed in some other fashion, and the facilities which recycle or reclaim them, may also create serious health or environmental problems. For example, waste drums containing hazardous residues which were used as municipal trash cans have injured children; waste solvent reclamation facilities have caused serious air pollution problems.

Third, EPA decided that excluding wastes that are used, re-used, recycled or reclaimed from the Subtitle C system would make the regulatory program largely unworkable and create a major regulatory loophole not intended by the Act. Without a manifest system (or its functional equivalent) there would be no way of assuring that wastes which were intended to be used, re-used, recycled or reclaimed were in fact delivered to their intended destination. Whether a waste was subject to Subtitle C requirements would be based primarily on the intent of the person handling it. This would make the requirements difficult to enforce and theoretically allow wastes to move in and out of the hazardous waste management system depending on what the person then handling the waste planned to do with it.

Finally, the Agency decided that, insofar as feasible, its regulations should try to achieve a workable balance between the requirement in Subtitle C that hazardous waste be properly managed and RCRA's overall objective of promoting the use, re-use, recycling and reclamation of wastes. The use, re-use, recycling and reclamation of wastes not only helps preserve valuable natural resources and reduces the environmental problems which stem from the exploitation of those resources, but, if properly conducted, may eliminate or reduce some of the hazards associated with other types of waste management and alleviate the strain on national disposal capacity. For this reason, EPA proposed to regulate only those uses and re-uses which could readily be expected to pose significant health and environmental hazards.

EPA received a substantial number of comments on its proposed construction of the statutory definition of "solid waste" and "other discarded materials." Virtually all commenters agreed that the terms encompassed materials which were destined for disposal. There was substantially less consensus on EPA's proposed regulation of used, re-used, recycled or reclaimed wastes. Some commenters argued that EPA had no authority under RCRA to regulate wastes which were used, re-used, recycled or reclaimed. Others contended that the Agency did have such authority and that comprehensive regulation of the use and recycling of hazardous waste was essential to protect public health and the environment and to make the hazardous waste management system workable. Still other commenters claimed that imposing stringent Subtitle C requirements on waste use, re-use, recycling and recovery would discourage such activities, thwarting one of the primary objectives of RCRA and further aggravating hazardous waste management problems.

1. *Legal Authority to Regulate Wastes That Are Used, Re-used, Recycled or Recovered.* Most commenters who challenged EPA's authority to regulate the use, re-use, recycling or reclamation of wastes based their contention on the term "other discarded material" in the statutory definition of "solid waste". The common meaning of this term, they argued, would preclude regulating as "solid waste" wastes which were not intended to be "thrown away" or "abandoned" or which were of "no further use".

The United States Court of Appeals for the D.C. Circuit has already rejected this argument in *United States Brewers' Association, Inc. v. EPA*, 600 F.2d 974 (D.C. Cir. 1979), a lawsuit challenging a beverage container recycling guideline issued by EPA under Section 1008(a)(1) of RCRA. The petitioners in that proceeding contended, *inter alia*, that beverage containers were not "solid waste" until "discarded" and therefore that EPA had no authority under Section 1008(a)(1) to issue solid waste management guidelines requiring that beverages be sold in returnable containers, or that a minimum deposit be charged on containers (to encourage their return). The Court of Appeals gave short shrift to this contention, noting that it:

> flies squarely in the face of the explicit definition in the statute. Section 1008(a) directs EPA to publish "suggested guidelines for solid waste management", which, as defined in section 1004(30) expressly includes "planning or management respecting resource recovery and resource conservation" . . . and "utilization of recovered resources" [600 F. 2d at 982-983].

We think the Court's conclusion is applicable to the rest of RCRA as well. It seems highly improbable that Congress would have intended the term "solid waste" to include recycled wastes under Section 1008(a)(1) but not under Subtitle C. Indeed, RCRA and its legislative history evidence a clear Congressional intent that the terms "solid waste" and "hazardous waste" encompass wastes that are used, re-used, recycled or recovered wherever such terms are used in the statute.

For example, Section 1004 of RCRA contains numerous definitions—including the definition of "Hazardous Waste Management", the title of Subtitle C—which would be self contradictory if the terms "solid waste" and "hazardous waste" did not include wastes which were used, re-used, recycled or recovered. *See, e.g.*, Sections 1004(7), (18)–(24), (29) and (34). The repeated references to resource recovery and conservation in the statute would be similarly meaningless if solid wastes were never recycled, recovered or reclaimed. *See, e.g.*, Sections 1002(c)(2) and (3), 1003(1) and (5)–(8), 2003, 4002(c)(10), 4003(5) and (6), 4008(a)(2)(A) and (d), 5001, 5002 and 6002(c)–(g).

The legislative history of RCRA further supports this construction of the terms "solid waste" and "discarded material". The report of the House Committee on Interstate and Foreign Commerce on RCRA, for example, makes it clear that the term "discarded material" is meant to *expand*, not limit, the common meaning of the term "solid waste" (H.R. Rep. at 2). Other references in the legislative history confirm that the term "discarded material" covers wastes which are being recycled (*see, e.g., H.R. Rep.* at 3, 10). Several of the damage incidents cited by Congress as justification for establishing a national hazardous waste management system resulted from recycling or re-use activities (H.R. Rep. at 17, 19 and 22). Discussions of resource conservation and recovery activities presume the existence of a solid waste from which valuable resources can be reclaimed.

See, e.g., H.R. Rep. at 3, 4, 10, 11; S. Rep. at 2, 4, 6 (1976).

In short, under RCRA solid wastes do not cease to be solid wastes simply because they are being used, re-used, recycled or reclaimed. Rather, use, re-use, recycling, resource recovery and reclamation are ways of managing solid wastes which, if properly conducted, can avoid environmental hazards, protect scarce land supply, and reduce the nation's reliance on foreign energy and materials (H.R. Rep. at 4).

A number of commenters suggested that Congress could not have intended the term "solid waste" to include hazardous wastes which are used, re-used, recycled or reclaimed because the regulation of such wastes under Subtitle C would thwart RCRA's broad resource conservation and recovery objectives.

EPA does not agree. Although promoting waste re-use and recovery is certainly one of the goals of RCRA, Subtitle C does not require EPA to consider resource recovery implications in establishing hazardous waste management standards; nor does it suggest that promoting resource recovery should take precedence over assuring proper management of hazardous wastes. Furthermore, EPA does not agree that frustrating resource recovery is an inevitable result of requiring hazardous waste to be properly managed. As discussed below, EPA believes it may be possible to achieve a workable balance between Subtitle C's mandate that hazardous wastes be handled in an environmentally sound manner and RCRA's overall objective of encouraging th re-use and reclamation of wastes. However, in the event such a balance cannot be achieved, Congress' "overriding concern"—the safe handling of hazardous wastes (H.R. Rep. at 3) and the elimination of "the last remaining loophole" in environmental regulation (H.R. Rep. at 4)—must prevail.

2. *Assuring Proper Management of Hazardous Waste and Encouraging Resource Recovery.* The comments which EPA received on its proposal to regulate the use, re-use, recycling and recovery of hazardous waste in many ways mirrored the competing objectives which the Agency was trying to achieve in its proposal. Many commenters argued that EPA's approach would discourage the beneficial use and recycling of hazardous wastes by so escalating the cost of using or recycling wastes that they could no longer compete with virgin products, by increasing administrative burdens for the waste user or reclaimer, and by labeling recycling activities as another form of "hazardous waste" management. These commenters also suggested that the regulation of waste uses and reclamation would pose serious practical problems—*e.g.,* distinguishing between wastes and commercial by-products and intermediates, issuing permits for certain types of re-uses—and that EPA's proposed Section 3004 standards were not appropiate for many waste use and reclamation activities. Other commenters, citing the types of considerations outlined above, applauded EPA's regulation of the use and reclamation of hazardous wastes and urged that its proposed list of regulated waste re-uses and recycling operations be expanded to include the reclamation of waste solvents, the burning of spent catalysts and other organic wastes for energy, the use of metal-bearing sludges as fertilizers, the use of waste acids, and the re-use of contaminated drums. Still other commenters suggested that, at a minimum, wastes destined for re-use, or reclamation be properly stored and manifested.

EPA does not agree with the largely unsubstantiated claims of commenters that controlling the use and recycling of hazardous waste will necessarily discourage *bona fide,* environmentally sound re-use and reclamation activities. The impact of EPA's regulations on waste use and recovery will, in the Agency's opinion, hinge almost exclusively on the relative costs of re-use versus disposal. As disposal costs increase, it seems reasonable to expect that it will become profitable or more profitable to recycle or re-use wastes (even if regulated) than to dispose of them. EPA received no data during the comment period to suggest the contrary.

Commenters' claims about the chilling effect of regulating recycle and re-use activities also seem somewhat exaggerated. In many cases, Federal or State regulation of these activities should legitimatize, not stigmatize, them in the eyes of the public and increase the flow of wastes to well-operated facilities. Indeed, EPA received comments from several waste recyclers urging the Agency to extend Subtitle C control to their operations for these very reasons.

EPA does agree, however, that its proposed Section 3004 treatment and disposal standards (as well as the standards promulgated today) may not be well-suited for regulating all hazardous waste recovery and reclamation facilities or for regulating all uses and re-uses of hazardous waste. These standards are designed primarily to minimize the health and environmental hazards posed by traditional hazardous waste treatment and disposal facilities—such as incinerators and landfills. In many cases, the health and environmental dangers associated with the use or re-use of hazardous waste or with the recycle and reclamation operations are different in nature or degree, and therefore may justify the imposition of different management standards. For example, air emissions generated by the burning of waste oil for energy recovery can probably be effectively controlled without requiring boilers to meet hazardous waste incinerator requirements. Similarly, the leaching of metals from slag used in roadbeds can probably be successfully minimized without requiring compliance with Section 3004 landfill criteria.

At the same time, EPA also concedes that its proposed Section 3001 regulations probably did not go far enough in controlling the re-use and reclamation of hazardous waste. For example, there are a number of waste recycling operations which were not covered by EPA's proposed regulation—*e.g.,* solvent reclamation—which have been known to cause serious health and environmental hazards and should be subject to Subtitle C regulation. The long-term storage of hazardous wastes prior to recycling is another area where there have been damage incidents (*e.g.,* the incident at the Silresim Chemical Company) and where Subtitle C controls would appear to be essential for environmental protection.

In short, EPA acknowledges that it could have done a better job in its proposed regulations of attempting to balance Subtitle C's mandate that hazardous wastes be properly managed with RCRA's overall objective of promoting resource recovery. As we discovered during the comment period, however, this is not an easy task, and given other priorities in developing the regulations promulgated today, we have only been able to complete the first phase of it to date. That first phase, as well as EPA's long term plans for regulating the use, re-use, recycling and reclamation of hazardous wastes are discussed in sections IV.B.3. and IV.B.4., respectively, of this preamble. As indicated in those sections, we believe this program, when completed, will be responsive to the two major deficiencies in EPA's proposed regulation identified above.

3. *Regulating the Storage and Transportation of Hazardous Wastes Prior to Use, Re-use, Recycling or Reclamation; Defining "Waste".* As discussed above, EPA generally agrees

that many of its proposed (and final) treatment and disposal standards were not particularly well-suited for hazardous waste recycling and reclamation operations or for uses and re-uses of hazardous wastes. Because of the need to resolve other, more pressing issues in the rule published today, we have not been able to formulate more appropriate standards to date. We are therefore deferring Subtitle C regulation of the actual use and re-use of hazardous wastes and hazardous waste recycling and reclamation activities until such standards can be developed (§ 261.6(a)). As noted in section IV.B.4., we hope to begin issuing those standards later this year.

This temporary deferral, it should be noted, is confined to *bona fide* "legitimate" and "beneficial" uses and recycling of hazardous wastes. Sham uses and recovery or reclamation activities—*e.g.*, "landfilling" or "land reclamation" which is actually disposal and burning organic wastes that have little or no heat value in industrial boilers under the guise of energy recovery—are not within its scope and, if conducted in violation of Subtitle C requirements, will be subject to enforcement under Section 3008 of RCRA. In enforcing this provision, EPA will be particularly suspicious of use, and reclamation operations which were not conducted prior to the publication of these regulations.

We do not think that the types of criticisms which have been made of EPA's proposal to apply its treatment and disposal standards to the use, re-use, recycling and reclamation of hazardous waste are applicable to those regulations which govern waste management prior to actual use, re-use, recycling or reclamation—*i.e.*, the standards for generators, transporters and owners and operators of storage facilities. During these stages of the waste handling process, wastes present essentially the same hazards, and should therefore require essentially the same management, irrespective of whether they are destined for disposal or for re-use and recycling.

EPA has concluded, therefore, that although we are not now prepared to issue standards regulating the actual use, re-use, recycling and reclamation of hazardous wastes, we can and should begin to control the transportation and storage of wastes prior to use, re-use, recycling and reclamation, and that the general management standards set forth in Parts 262, 263 and selected sections of Parts 264 and 265 are entirely appropriate for that purpose.

The decision to regulate hazardous waste use and recycling necessitates the development of a working definition of "waste" which can appropriately distinguish between "wastes" and other materials (such as products and chemical intermediates) for purposes of determining whether their use is subject to RCRA's jurisdiction. Indeed, many commenters criticized EPA for failing to clearly distinguish between wastes and other materials in its proposed regulations and suggested language or conceptual approaches which they contended would draw that distinction.

We have carefully reviewed these suggestions; most, however, were not very useful. For example, a number of commenters suggested that the line of demarcation between a "waste" and other materials was whether a substance had value. This definition makes no sense in the context of recycle and re-use activities, since a waste which is being re-used or recycled by definition "has value". *See* H.R. Rep. at 3. Definitions keyed to whether a waste has a commercial use raise similar problems.

Other commenters contended that the proper inquiry was whether a material was "historically reused" or was "sometimes discarded". We think this is a much more productive line of analysis and is more consistent with the language and legislative history of RCRA and the purposes of Subtitle C.

A review of both RCRA and its legislative history indicate that Congress intended to regulate four broad categories of materials as solid wastes under RCRA, and particularly Subtitle C, irrespective of their ultimate disposition. The common thread linking all these materials is that they are "sometimes discarded." Because they are "sometimes discarded," they not only fall within the general rubric "waste", but also may become part of the "discarded materials disposal problem" (H.R. Rep. at 2) which Congress sought to remedy under RCRA. Proper tracking and management of these materials under Subtitle C would assure that they did not become part of this problem because they would be either properly disposed of or properly used or reclaimed.

The first category of materials which are regulated as "wastes" under RCRA are "garbage, refuse (and) sludge" (Section 1004(27)). These materials are almost always thrown away, and it is clear from both Section 1004(27) of the statute and its legislative history (H.R. Rep. at 2–4; S. Rep. at 5) that Congress regarded them as "wastes" regardless of their intended end use.

Of those materials which are not garbage, refuse or sludge, it also seems clear that any material which is intended to be or is in fact thrown away, abandoned or destroyed is a "waste." As noted above, there appears to be no disagreement among commenters on this point and of course it is fully supported by the legislative history of RCRA.

Of those materials which do not fall into either of these two categories—*i.e.*, materials other than garbage, refuse or sludge which are (or are intended to be) used, re-used, recycled or reclaimed—it appears that there are two types of substances which Congress intended to be regulated as "wastes" under RCRA.

The first are materials like waste solvents, paint wastes, waste acids, used drums and waste oil. These are what Congress referred to in the legislative history as "post-consumer wastes" or wastes which have "served their intended purpose" (H.R. Rep. at 2 and 9). While acknowledging that some of these post-consumer wastes might be recycled (*see* H.R. Rep. at 3, 10), Congress also recognized that they were sometimes discarded, and therefore were "wastes" (*see* H.R. Rep. at 9–10).

The second are tars, residues, slags and other materials which are incidentally generated as part of a manufacturing or mining process. A major concern of Congress in enacting RCRA was to assure regulation of "the waste by-products of the nation's manufacturing processes" (H.R. Rep. at 2) and "the by-products of the productive process" (H.R. Rep. at 9). There is nothing in the legislative history which suggests that these terms refer only to the by-products of pollution control. Indeed, even the definition of sludge in Section 1004(26A) indicates Congress was not simply concerned about wastewater treatment slurries and sludges and emission control dusts, but also materials having "similar characteristics and effects". The term "similar characteristics" would suggest that such materials not only contain similar types of substances but, like pollution control sludges and dusts, are also incidentally produced as a result of industrial processes; the term "similar . . . effects" implies that such materials, like wastewater and emission control sludges, are also sometimes discarded in ways that pose environmental problems.

EPA has incorporated these concepts into a definition of "solid waste" in § 261.2. This term is defined to include "garbage", "refuse", "sludge" and "other waste material" (§ 261.2(a)). "Other waste material" is in turn defined as (i) materials which are discarded (or stored or accumulated for that purpose), (ii) materials which have served their original intended purpose and are sometimes discarded and (iii) materials which are incidentally generated during

manufacturing or mining operations and are sometimes discarded (§ 261.2(b)). This latter category of materials expressly excludes primary products and product intermediates (§ 261.2(d)).

We are fairly confident that this definition will properly differentiate between "wastes" and other material with respect to those particular solid wastes that have been listed as hazardous wastes in Subpart D. In developing Subpart D, EPA has been careful to list only those materials that are either sludges, used materials which are typically discarded (*e.g.*, spent solvents) or manufacturing by-products which are typically discarded (*e.g.*, distillation residues). We have tried to avoid listing materials that are always used for manufacturing other products, because we believe that those are actually product intermediates, not wastes. Given the complexity of many manufacturing operations, however, it is possible that we might have erred in a few cases and we urge the public to bring these to our attention.

We are somewhat less confident that our definition of solid waste, particularly its inclusion of used materials and by-products, will work for all the materials which might exhibit the Subtitle C characteristics. For this reason, we are at the present time confining our regulation of the storage and transportation of wastes prior to use, re-use, recycling and reclamation to sludges, wastes listed in Subpart D and waste mixtures containing wastes listed in Subpart D (§ 261.6(b)). As discussed above, we are fairly sure that all these materials are "wastes" whose use, re-use, recycling and reclamation is subject to jurisdiction under RCRA.

As noted in Section III.B., the definition of "solid waste" is being issued as an interim final regulation. We are expressly soliciting comment on whether its application to unlisted materials (as well as listed wastes) leads to absurd results, and, if so, what these situations are and how they might be remedied by specific revisions to § 261.2.

4. *Regulating the Actual Use, Re-Use, Recycling and Reclamation of Hazardous Wastes.* One approach to regulating the use, re-use, recycling and reclamation of hazardous wastes which a number of commenters suggested and which EPA is considering very seriously is waste-specific, use-specific management standards. This approach would help avoid the problems, discussed above, of attempting to apply standards which are designed to deal with traditional waste disposal and treatment operations, such as landfills, to re-use and recycle activities.

EPA intends to begin issuing such standards in the fall of 1980. In some cases, these standards may require full or partial compliance with existing Subtitle C requirements; in others, they may include a special set of requirements (to be established in Part 266) which have been developed for a particular hazardous waste use or recovery operation. Using this regulatory approach, we believe we can not only better tailor Subtitle C management standards to the health and environmental hazards posed by use and recycling activities but also achieve a better balance between RCRA's dual goals of protecting human health and the environment and promoting resource conservation and recovery.

In the fall of 1980, we expect to start dealing with the following hazardous waste use and recovery operations:

Waste	Use or Recovery
Spent solvents listed in Subpart D.	Reclamation Burning as a fuel
Radioactive uranium mining and phosphate mining and processing wastes.	Land reclamation Use in building products
Waste oil	Road oiling and use in other land applications Burning as a fuel Reclaiming and re-refining
Residues from the production of chlorinated hydrocarbons.	Burning as a fuel

These operations were identified by commenters as being among those which posed the most serious potential health or environmental hazards and/or were the most ubiquitous. EPA agrees, and therefore will begin establishing standards for these activities first.

At a later date, possibly by the fall of 1981, we intend to address the re-use and recycling of other hazardous wastes, including but not limited to the following:

Waste	Use or Recovery
Residues from the production of organic chemicals listed in Subpart D (other than chlorinated hydrocarbons).	Burning as a fuel
Activated carbon used to treat hazardous wastes.	Regeneration
Wastewater and air emission treatment sludges listed in Subpart D.	Fertilizers and soil conditioners Other uses on the land

Eventually, EPA hopes to regulate the use, re-use, recycling and reclamation of all hazardous wastes listed in Subpart D which are known to be used, re-used or recycled. Our plans for extending regulatory coverage to unlisted hazardous wastes are less certain at this time because we do not have a good inventory of these wastes. As data are collected through the Section 3010 notification and annual reporting under Parts 262, 264 and 265, we hope to develop a more specific plan for regulating the use and recycling of these wastes.

EPA is anxious to obtain public comment on this approach. We specifically invite comments on the following questions:

1. Are there other hazardous wastes, particularly wastes listed in Subpart D, that should be placed on the above lists and given priority?

2. Are the above-listed wastes used or recycled in other ways that require regulation? If so, what types of regulatory controls would be appropriate?

3. Is there any reason not to prohibit the land disposal of spent solvents listed in Subpart D and require that they be reclaimed or destroyed? Is it necessary to manifest these wastes to assure that they are delivered to reclamation or treatment facilities? Can such facilities be effectively regulated by rule—*i.e.*, without individual permits?

4. Can the radiation hazards posed by radioactive mining wastes and phosphate mining and processing wastes be adequately controlled by (a) prohibiting the use of these wastes in residential construction and (b) imposing a few simple requirements on the use of these wastes as fill for land where habitable structures might be built?

5. Can facilities which burn waste oil as a fuel or reclaim or refine waste oil be adequately regulated by rule—*i.e.*, without individual permits? Is there any reason not to prohibit the use of waste oil for road oiling, dust suppression and other land (and water) applications?

6. Should full Subtitle C standards be applied to the use, re-use, recycling and reclamation of residues from the production of chlorinated hydrocarbons? From the production of other organic chemicals? If not, for what residues and uses should special standards be applied and what should those standards be?

7. Should full Subtitle C standards be applied to the regeneration of activated carbon? If not, what standards should be applied?

8. Can sites where waste treatment sludges are used as fertilizers, as soil conditioners or in other land applications be effectively regulated by rule—*i.e.*, without individual permits?

In each of the foregoing areas of inquiry, EPA would appreciate the submission of any relevant facts and data. Unsubstantiated opinions are generally not very helpful to us in coming to grips with these types of issues. On the other hand, information on the quantity of waste which is used

or recycled, management practices, environmental emissions that attend use or recycling, health and environmental effects resulting from use and recycling and other specific data are very useful.

We also invite commenters to submit specific proposed standards or suggestions for how standards might be developed. For example, where wastes might be burned as a supplemental fuel in industrial boilers, proposals on fuel ratios, burning temperatures, emission control requirements and residue disposal requirements would be useful. Obviously, the more specific and constructive the suggestions, the more helpful they will be in our rulemaking.

C. Section 261.3 (Definition of Hazardous Waste)

This section is a new provision which does not have a direct counterpart in the proposed regulations. It has been added for purposes of clarification and in response to questions raised during the comment period concerning waste mixtures and when hazardous wastes become subject to and cease to be subject to the Subtitle C hazardous waste management system.

If a material is a hazardous waste within the meaning of this section it must be managed in accordance with EPA's Part 262 through 265 standards and its Part 122 through 124 permitting requirements unless covered by one of the exclusions in those regulations or one of the Part 261 special management provisions (§§ 261.5 and 261.6).

1. *What is a Hazardous Waste?* Paragraph (a) of this section defines what a hazardous waste is. It provides that a solid waste is a hazardous waste if it is not excluded under § 261.4(b) and it either (1) is listed as a hazardous waste in Subpart D, (2) is a waste mixture containing one or more hazardous wastes listed in Subpart D or (3) exhibits one or more characteristics of hazardous waste identified in Subpart C. A listed waste or a solid waste mixture containing a listed waste which is generated by a particular facility may be excluded under the rulemaking procedures prescribed in §§ 260.20 and 260.22 (see section VIII.C., below). In that event, it will be considered a hazardous waste only if it exhibits one or more of the characteristics.

Except for waste mixtures, all these provisions were contained in EPA's December 18, 1978 proposal (*see* §§ 250.10 (b) and (d)(2), 250.13 and 250.14). The waste mixtures provision is a clarification which has been added in response to inquiries about whether mixtures of hazardous and nonhazardous wastes would be subject to Subtitle C requirements. This is a very real issue in real-world waste management, since many hazardous wastes are mixed with non-hazardous wastes or other hazardous wastes during storage, treatment, or disposal.

Although it was not expressly stated in the proposed regulation, EPA intended waste mixtures containing listed hazardous wastes to be considered a hazardous waste and managed accordingly. Without such a rule, generators could evade Subtitle C requirements simply by commingling listed wastes with nonhazardous solid waste. Most of these waste mixtures would not be caught by the Subpart C characteristics because they would contain wastes which were listed for reasons other than that they exhibit the characteristics (*e.g.*, they contain carcinogens, mutagens or toxic organic materials). Obviously, this would leave a major loophole in the Subtitle C management system and create inconsistencies in how wastes must be managed under that system.

EPA recognizes that designating all waste mixtures containing listed wastes as hazardous wastes under Subtitle C may create some inequities. For example, this approach may result in some waste mixtures which contain only very small amounts of listed hazardous wastes or which commingle waste in a way which renders them nonhazardous (*e.g.*, neutralization) having to be managed under Subtitle C. We have tried to address this problem by establishing provisions for amending this paragraph to exclude waste mixtures produced by individual facilities, if they can show that the mixture (or each constituent listed hazardous waste) is not hazardous, based on the criteria for which the consistuent hazardous wastes were listed. Because this is a rulemaking procedure, it will, as a practical matter, only be useful for facilities which routinely mix wastes in relatively constant proportions. With a regulated community potentially numbering in the hundreds of thousands, we simply do not have the resources to process petitions for exempting "one-shot" waste mixtures. Moreover, in most of these one-time cases, it seems likely that the burden of having to manage a waste mixture as a hazardous waste could be easily avoided by carefully segregating hazardous and non-hazardous waste.

We know of no other effective regulatory mechanism for dealing with waste mixtures containing listed hazardous wastes. Because the potential combinations of listed wastes and other wastes are infinite, we have been unable to devise any workable, broadly applicable formula which would distinguish between those waste mixtures which are and are not hazardous. If any members of the public have suggestions for other approaches, we would appreciate having them brought to our attention for future rulemaking.

Waste mixtures containing only wastes which meet the characteristics are treated just like any other solid waste *i.e.*, they will be considered hazardous only if they exhibit the characteristics. EPA recognizes that this may not be an altogether satisfactory regulatory approach. While it would no doubt encourage some desirable mixing of wastes, it would also allow some wastes (principally wastes caught by EPA's extraction procedure) to escape regulation merely by being mixed with other wastes or other materials. We know of no solution to this problem which does not create major inconsistencies in the way wastes are determined to be hazardous under Subpart C of this regulation. Again, if the public has suggestions for other ways of dealing with this issue, we would like to receive them.

2. *When Does a Waste Become a Hazardous Waste?* Paragraph (b) provides three simple rules for determining when a solid waste becomes a hazardous waste and therefore must be managed under Subtitle C. It has been provided in response to comment requesting clarification on this issue.

Paragraph (b) states that a solid waste which is a hazardous waste because it is listed in Subpart D must begin to be managed as a hazardous waste when it first meets the Subpart D listing description. Most of the hazardous wastes listed in §§ 261.31 and 261.32 of Subpart D are process residues, emission control dusts, or wastewater treatment sludges, and the point in time when they are created is generally well-defined. For those used materials which are listed as hazardous wastes in those sections or § 261.33 (*e.g.*, spent solvents), the point at which they meet the listing description is somewhat less well-defined, but generally occurs when their intended use has ceased, and they begin to be accumulated or stored for disposal, re-use or reclamation.

In the case of a waste mixture containing a listed hazardous waste, paragraph (b) requires that the waste mixture be managed as a hazardous waste as soon as the listed waste is added to it. The listed waste, of course, must be handled as a hazardous waste prior to that time.

Finally, paragraph (b) provides that a solid waste is a hazardous waste

whenever it exhibits one or more of the characteristics. As a practical matter, this means that persons handling solid wastes must determine whether they meet the characteristics whenever the management of the solid wastes would potentially be subject to EPA's Part 262 through 265 regulations.

The following examples illustrate how this provision would operate in practice:

- The ABC Company stores waste acid on-site in containers prior to transport off-site for disposal. The company must determine whether the acid meets Subpart C characteristics when it is poured into the containers.
- The DEF Company pipes waste acid into a tank, where it is neutralized by adding lime. The company must determine whether the acid meets Subpart C characteristics when it enters the neutralization tank. The neutralization operation is a treatment process.
- The GHI Company pipes waste acid into a tank truck for transport to an off-site treatment facility. The company must determine whether the acid meets Subpart C characteristics when it enters the tank truck.
- The JKL Company produces a wastewater which is piped into a surface impoundment, for the purposes of treatment prior to point-source discharge into surface waters. During treatment a sludge forms. This sludge is periodically dredged from the impoundment and disposed of. The company must determine (1) whether the wastewater meets Subpart C characteristics when it enters the impoundment and (2) whether the sludge meets Subpart C characteristics when it begins to accumulate on the bottom of the impoundment.

In drafting paragraph (b), EPA has attempted to cover the most common types of waste generation and management scenarios. The Agency recognizes, however, that some companies may generate and handle wastes in ways not contemplated by EPA and for which a strict application of paragraph (b) would make no sense. We would appreciate having those instances brought to our attention so that we can decide whether additional rulemaking or issuing guidance is appropriate for dealing with these situations.

3. When Does a Hazardous Waste Cease to be a Hazardous Waste?

Paragraphs (c) and (d) of this section explain when a hazardous waste ceases to be a hazardous waste and therefore is no longer subject to Subtitle C requirements. These are new provisions which have been added both in response to comment and as a logical outgrowth of paragraph (b).

Paragraph (c) provides that a hazardous waste remains a hazardous waste unless and until (1) it does not exhibit any of the characteristics identified in Subpart C and (2) where the waste is listed in Subpart D (or is a mixture containing a waste listed in Subpart D), the waste (or each of its constitutent listed wastes) is also excluded from paragraph (c) under the rulemaking procedures outlined in §§ 260.20 and 260.22. As a practical matter, this means that facilities which store, dispose of or treat hazardous waste must be considered hazardous waste management facilities for as long as they continue to contain hazardous waste and that any wastes removed from such facilities—including spills, discharges or leaks—must be managed as hazardous wastes.

EPA believes this is a very reasonable and rational rule. Wastes are typically stored for relatively short periods of time. Although solids in the waste may settle and the volume of the waste may be reduced by evaporation during this period, major chemical or biological changes affecting the hazardous character of the waste are unlikely to occur. Hazardous wastes which are disposed of in a landfill are more likely to undergo change (principally through leaching and anaerobic degradation), but only very slowly and over a long period of time.

Hazardous wastes placed in treatment facilities (including incinerators, surface impoundments and land treatment facilities) will, by definition, change character. However, treatment does not necessarily "render [a] waste nonhazardous" (Section 1004(34)). It may only make it "amenable for recovery, amenable for storage or reduced in volume"; or it may only eliminate one of several hazardous properties. Moreover, even in those cases where treatment does ultimately render a waste "nonhazardous", the waste will generally have been hazardous during part or all of the treatment process.

Paragraph (c) establishes a similar rule with respect to solid wastes generated by storage, disposal and treatment—including leachate and treatment residues such as sludges and incinerator ash. Here, too, it is reasonable to assume that these wastes, which are derived from hazardous wastes, are themselves hazardous.

Leachate is produced by the percolation of liquid through wastes; it typically contains solubilized heavy metals and organic materials and is virtually always highly toxic. Treatment residues, by definition, contain waste constituents which were removed during treatment or which were not completely destroyed by treatment. Sludges from wastewater treatment typically contain concentrated amounts of the toxic substances which were in the wastewater. Ash from the incineration of hazardous wastes often contains heavy metals and, if combustion is not complete, undestroyed toxic organic materials.

This is the best regulatory approach we can devise at this time for dealing with solid wastes generated by hazardous waste management facilities. We are not now in a position to prescribe waste-specific treatment standards which would identify those processes which do and do not render wastes or treatment residues nonhazardous. To list treatment residues on case-by-case basis would be an enormous job, and one which we think, given the reasons outlined above, is unnecessary.

This approach obviously is not without deficiencies. For example, one effect of treating wastes containing synthetic organic materials may be to create new hazardous constituents in the waste or treatment residue. This regulation obviously does not deal with those new constituents. It also does not cover run-off from hazardous waste facilities on the theory that the water in precipitation run-off in many cases may not have had sufficient contact with the waste to solubilize waste constituents. (Of course if collected, run-off would be a solid waste and, if it exhibited any of the characteristics, would have to be managed as a hazardous waste). For purposes of future rulemaking, we would be interested in any suggestions the public has for dealing with these issues.

D. Section 261.4 (Exclusions)

EPA's proposed Section 3001 regulations identified a number of wastes which would not be subject to Subtitle C requirements because they were either excluded from the statutory definition of solid waste (§ 250.11(a)(7)), not intended by Congress to be regulated under Subtitle C (§ 250.10(d)(2)(i) and (ii)), or subject to regulation under other EPA statutes (§ 250.10(d)(2)(iii)).

EPA received a number of comments on these proposed exclusions. Some commenters simply urged EPA to clarify which wastes were covered by each of the exclusions. Others challenged EPA's justification for some of its proposed exclusions. Still others contended that additional wastes should be exempted from regulation based on legislative history or an alleged lack of demonstrated harm to human health or the environment.

The exclusions contained in § 261.4 are based on interpretations of the statutory definition of "solid waste" and on those parts of RCRA's legislative history which indicate a Congressional intent that certain waste streams should not be regulated. Some commenters suggested that certain waste streams would never be hazardous and therefore should be excluded from these regulations. Those commenters did not, however, provide sufficient information on which EPA could base such sweeping determinations. Generators of solid wastes that are not hazardous may determine that their wastes are non-hazardous under these regulations. As these regulations are implemented more information will be developed about specific waste streams. EPA will then be in a better position to make categorical judgments about the lack of risk presented by certain wastes. At this time, however, EPA has limited the exclusions in § 261.4 to those which are based on expressed Congressional intent.

The following is a discussion of the specific exclusions contained in § 261.4:

1. *Domestic Sewage.* In defining "solid waste" Section 1004(27) specifically excludes "solid or dissolved material in domestic sewage." The proposed regulation did not specifically define "domestic sewage", but did contain provisions that were based on an interpretation of that term. Section 250.40(c)(3) of the proposed regulation exempted owners and operators of POTW's from all portions of the Section 3004 standards except those involving the manifest system, recordkeeping and reporting with respect to hazardous wastes received by truck or rail. As described in the preamble to the proposed regulation, that decision was based on the idea that the mixing of a hazardous waste with domestic sewage made the entire mixture a domestic sewage excluded under Section 1004(27).

Commenters raised several objections to this approach. First, commenters argued that the only basis for an exclusion under Section 3004 is one based on health or environmental risk rather than public ownership. Second, commenters argued that some POTW's will handle significant quantities of hazardous waste and that such facilities present the same environmental risks as private facilities that treat, store or dispose of hazardous waste. Third, some commenters merely argued that if POTW's are excluded because they handle a significant portion of domestic sewage, other private parties that handle wastes of a similar mix should be excluded also. Fourth, a commenter said that the proposed regulation did not clearly indicate whether a POTW could ever be subject to Subtitle C jurisdiction if it only treated industrial waste.

The term "domestic sewage" generally denotes sanitary wastes that pass through a sewer system. A waste stream comprised entirely of sanitary waste, that passes through a sewer system is "domestic sewage" under any reasonable interpretation of the statutory exemption. This exemption applies regardless of whether the sewer system or the treatment works to which it connects is publicly or privately owned.

A more difficult question is presented when pure sanitary wastes are mixed with other types of wastes in a sewer system. The issue of whether such mixed waste streams are within RCRA's jurisdiction has broad implications and thus it is necessary to carefully consider the Congressional purpose behind the exemption.

The legislative history of RCRA does not specifically address the exemption because it was a carry-over from the Solid Waste Disposal Act, which RCRA amended. The "domestic sewage" exemption first appeared in the definition of "solid waste" found in the Solid Waste Disposal Act of 1965. The legislative history of that act indicates that the exemption was based on a recommendation, made to the Congress by the Administration, that "organic solids in untreated domestic sewage" be excluded from coverage because such wastes were already subject to controls under the Federal Water Pollution Control Act (FWPCA). At that time, the portion of the FWPCA that addressed "untreated sewage" was the Federal construction grant program, which gave money to States and municipalities to construct treatment works and to study combined sewer systems.

This legislative history suggests a Congressional intent that the scope of the "domestic sewage" exemption must depend, in part, on the capacity of the Agency's construction grants program to address the environmental problems arising from any exempted waste streams. At the time the exemption was enacted, and under the present Clean Water Act, the Agency has grant programs that assist states and localities in the treatment of sanitary sewage by POTW's.

EPA believes that the Congressional policy reflected in the legislative history of the "domestic sewage" exemption should guide the Agency in its regulation of mixtures of sanitary waste with other waste streams. Mixed waste streams that pass through sewer systems to publicly-owned treatment works (POTW's) will be subject to controls under the Clean Water Act. The Agency's construction grants program provides financial assistance for the proper treatment of these wastes. In addition the Agency's pretreatment program provides a basis for EPA and the local communities to insure that users of sewer and treatment systems do not dump wastes into the system that will present environmental problems. Under these circumstances EPA believes that it is appropriate to include within the "domestic sewage" exemption mixtures of sanitary wastes and other wastes that pass to POTW's. Since the treatment of sewage by privately-owned treatment works is not similarly controlled through the Agency's construction grant and pretreatment program, the exemption would not be available for mixed waste streams going to such treatment works.

The "domestic sewage" exemption is only applicable to non-domestic wastes that *mix* with sanitary wastes in a sewer system leading to a POTW. An industrial waste stream that never mixes with sanitary wastes in the sewer prior to treatment or storage does not fall within the exemption, regardless of the public or private ownership of the treatment works. Defining the point at which "mixture" occurs may seem to be a relatively straightforward task. Practical problems arise, however, in defining the point at which mixture of sanitary and other wastes occurs in a complex sewer system. Moreover it is particularly difficult to define this point for regulatory purposes in such a way that all parties understand when RCRA obligations begin and end.

EPA has, therefore, decided that a waste falls within the domestic sewage exemption when it first enters a sewer system that will mix it with sanitary wastes prior to storage or treatment by a POTW. EPA recognizes that this interpretation brings various wastes within the exemption before they are actually mixed with sanitary wastes. In light of the fact that the wastes will be mixed prior to treatment and that the mixture will be properly treated by the POTW, EPA believes that the need for administrative clarity in this otherwise complicated regulatory program warrants such an approach.

In response to the comments on the exclusion of POTW's from Section 3004 standards, EPA has changed these regulations to make clear that the statutory exemption is one for "domestic sewage" rather than POTW's. Facilities receiving waste streams that are exclusively made up of sanitary wastes will not be subject to these regulations

regardless of the public or private ownership of the facility. Likewise a POTW receiving industrial wastes that do not mix with sanitary wastes prior to treatment would be handling a solid waste subject to these regulations.

The exclusion of domestic sewage and mixtures that pass through sewer systems to POTW's is based on Congressional intent, not an Agency determination about the relative health and environmental risks presented by such waste streams. The Agency acknowledges that some mixtures of domestic sewage with other wastes may present environmental risks and that some non-domestic wastes may have properties similar to these of exempted domestic wastes. In response EPA can only assume that such factors were not determinative in the Congress' creation of the exclusion.

The proposed regulation did not contain a specific definition of domestic sewage. EPA believes that the definition of domestic sewage, and the provision relating to mixtures of wastes with domestic sewage, contained in these regulations is a reasonable interpretation of RCRA's statutory language and legislative history. The Agency has decided, however, to promulgate this part of the regulation as interim final in order to gain the benefit of public comment on the concepts involved. The Agency considered several options for defining domestic sewage and classifying mixtures of such sewage with other wastes. Those options included:

(1) Defining "domestic sewage" to include all wastes mixed with sanitary wastes;

(2) Limiting the exemption to only sanitary wastes, treating any mixture of sanitary wastes and other wastes as solid wastes;

(3) Defining "domestic sewage" as any waste made up primarily (i.e. more than 50% by volume) of sanitary waste streams; and

(4) Linking the exemption for mixtures to those that flowed into a "publicly-serving" or "constructed-to-serve-the-public" treatment works, rather than POTW's.

The Agency is interested in comments on these options and the selected approach, as well as any other suggested interpretations of the provision. Commenters should recognize that the Agency's selected approach is based on an interpretation of Congressional intent. The Agency is interested generally in comments about the impact of this approach on regulated parties, but it particularly seeks comment on how such effects relate to the Congressional purpose of the exemption expressed in RCRA's legislative history.

These regulations, then, define domestic sewage as untreated sanitary wastes that pass through a sewer system. Such wastes are excluded from regulation as solid wastes under these regulations. In addition mixtures of wastes with domestic sewage that pass through a sewer system to a publicly-owned treatment works for treatment are also excluded from regulation as solid wastes.

2. *Industrial Point Source Discharges.* The statutory definition of "solid waste" in Section 1004(27) of RCRA excludes "solid or dissolved materials in . . . industrial discharges which are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act". In its proposed regulations, EPA construed this phrase to include only actual discharges into navigable waters, not industrial wastewaters upstream from the point of discharge. The effect of this interpretation was to require surface impoundments, tanks, lagoons, holding ponds and other facilities used to treat or store hazardous industrial wastewater to meet Section 3004 standards and to obtain a Section 3005 permit. *See* 43 FR 58993 and proposed §§ 250.45–3 and 250.45–4.

The application of Subtitle C requirements to wastewater treatment impoundments was one of the most controversial aspects of EPA's proposed hazardous waste regulations. Most of commenters' objections to EPA's proposal as they pertain to Section 3004 interim status requirements are discussed in the preamble to the Section 3004 regulations published elsewhere in today's Federal Register. The only one addressed here is commenters' argument that the "industrial discharge" exclusion in Section 1004(27) refers to the entire wastewater stream, not simply the point source discharge, and that EPA therefore has no authority under RCRA to regulate industrial wastewater holding or treatment facilities.

This contention is not supported by either the plain language of the statute or its legislative history. The obvious purpose of the industrial point source discharge exclusion in Section 1004(27) was to avoid duplicative regulation of point source discharges under RCRA and the Clean Water Act. Without such a provision, the discharge of wastewater into navigable waters would be "disposal" of solid waste, and potentially subject to regulation under both the Clean Water Act and Subtitle C. These considerations do not apply to industrial wastewaters prior to discharge since most of the environmental hazards posed by wastewaters in treatment and holding facilities—primarily groundwater contamination—cannot be controlled under the Clean Water Act or other EPA statutes.

Had Congress intended to exempt industrial wastewaters in storage and treatment facilities from all RCRA requirements, it seems unlikely that the House Report on RCRA would have cited, as justification for the development of a national hazardous waste management program, numerous damage incidents which appear to have involved leakage or overflow from industrial wastewater impoundments. *See, e.g.,* H.R. Rep. at 21. Nor would Congress have used the term "discharge" in Section 1004(27). This is a term of art under the Clean Water Act (Section 504(12)) and refers only to the "addition of any pollutant to navigable waters", not to industrial wastewaters prior to and during treatment.

Since the comment period closed on EPA's regulations, both Houses of Congress have passed amendments to RCRA which are designed to provide EPA with more flexibility under Subtitle C in setting standards for and issuing permits to existing facilities which treat or store hazardous wastewater. *See* Section 3(a)(2) of H.R. 3994 and Section 7 of S. 1156. *See also* S. Rep. No. 96–172, 96th Cong., 1st Sess. 3 (1979); Cong. Rec. S6819, June 4, 1979 (daily ed.,); Cong. Rec. H1094–1096, February 20, 1980 (daily ed.). These proposed amendments and the accompanying legislative history should lay to rest any question of whether Congress intended industrial wastewaters in holding or treatment facilities to be regulated as "solid waste" under RCRA.

3. *Other Statutory Exclusions.* The definition of "solid waste" in Section 1004(27) excludes two other classes of wastes. "Solid or dissolved materials in irrigation return flows" and "source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954" are not "solid waste" under RCRA.

In § 250.40(e) of the proposed regulation these two categories of wastes were excluded from regulation under Section 3004. No substantial comment was received on these exclusions. In these final regulations under Section 3001, the Agency has specifically excluded these materials from regulation as solid waste in accord with the statutory definition of "solid waste."

4. *Household Wastes.* Under § 250.20(c)(4) of the proposed regulation, a person or Federal agency who

generated only household refuse or household septic tank pumpings was excluded from regulation as a generator of hazardous waste. "Household refuse" was defined as trash or rubbish ordinarily produced by a family at their home. This exclusion, which also was available to apartment houses, condominiums and hotels, was based on the legislative history of RCRA.

The few commenters that addressed this provision made two general points. First they said that the "ordinarily produced" portion of the proposed "household refuse" definition might not include certain materials such as medicinal drugs and ointments, household cleaning agents and solvents, waste oils, paints and pesticides that might be purchased at a grocery, drug or hardware store. Second, a commenter pointed out that a Federal agency could not, by definition, produce household wastes.

The Agency has retained the general concept contained in proposed § 250.20(c)(4) in these regulations. The provision is stated, however, as an exclusion of a waste stream—namely "household wastes"—rather than as an exclusion of a class of generators. This change is more in accord with legislative intent. The exclusion is based on language in the Senate Report which states:

> (The hazardous waste program) is not to be used to control the disposal of substances used in households or to extend control over general municipal wastes based on the presence of such substances.
>
> (S. Rep. No. 94–988, 94th Cong., 2nd Sess., at 16.)

This indicates Congressional intent to exclude *waste streams* generated by consumers at the household level. Since the wastes generated at hotels and motels are essentially the same as those generated by consumers in their households, EPA believes that such wastes should be within the exclusion.

The Senate language makes it clear that household waste does not lose the exclusion simply because it has been collected. Since household waste is excluded in all phases of its management, residues remaining after treatment (e.g. incineration, thermal treatment) are not subject to regulation as hazardous waste. Such wastes, however, must be transported, stored, treated and disposed in accord with applicable State and federal requirements concerning management of solid waste (including any requirements specified in regulations under Subtitle D of RCRA.)

When household waste is mixed with other hazardous wastes, however, the mixture will be deemed hazardous in accord with § 261.3(a)(2)(ii) of these regulations except when they are mixed with hazardous wastes produced by small quantity generators (see § 261.5). While household waste may not be hazardous per se, it is like any other solid waste. Thus a mixture of household and hazardous (except those just noted) wastes is also regulated as a hazardous waste under these regulations.

Because of comments on this matter, the relationship of this exclusion to refuse-derived fuel (RDF) should also be explained. RDF is a processed material (usually shredded) that is produced from solid waste and used as a fuel. RDF production usually involves the extraction of inorganic components from the waste leaving the combustible organic component for its fuel value. In the same sense that residue from the treatment of household wastes is not subject to regulation as a hazardous waste, as discussed above, neither is RDF subject to such regulation. Moreover, RDF is not a "solid waste" under § 261.2 because it is not an "other discarded material;" it is or is not intended to be discarded (§ 261.2(b)(1)), it is not a material that has served its original intended purpose (§ 261.2(b)(2)) and it is not a manufacturing or mining by-product (§ 261.2(b)(3)).

EPA agrees with those commenters who suggested that Federal agencies cannot qualify as households. Therefore wastes generated by such agencies are not within the household waste exclusion. In addition EPA believes that medicinal drugs and ointments, household cleaning agents and solvents, waste oils, paints and pesticides purchased at grocery, drug or hardware stores may be disposed of as part of a consumer's household wastes. If a household disposes of such wastes, the wastes may be subject to the household waste exclusion.

Septic tank pumpings were included in the exclusion contained in § 250.20(c)(4) of the proposed regulation. After further examination of this provision, EPA has concluded that such pumpings should be excluded from regulation as hazardous wastes to the extent that they constitute household waste. Households often use septic tanks to dispose of a portion of their wastes. As with all household wastes, these sanitary wastes in household septic tanks are excluded from regulation as a hazardous waste in all phases of their management. Thus septic tank pumpings drawn from household septic tanks are not regulated as hazardous wastes under these regulations. Any wastes drawn from non-household septic tanks are regulated like any other solid waste under these regulations.

5. *Agricultural Wastes.* Under § 250.10(d)(2)(i) of the proposed regulation, agricultural wastes (including manures and crop residues) which are returned to the soil as fertilizers or soil conditioners were excluded from regulation as hazardous waste. The exclusion was based on the legislative history of RCRA which specifically calls for such an exclusion. See H. Rep. No. 94–1491, 94th Cong. 2nd Sess. 2 (1976). Commenters generally accepted this exclusion, and EPA has decided to retain it because the need for such an exclusion is so clearly identified in RCRA's legislative history.

Some commenters asked the Agency, however, to go beyond the specific language of the legislative history and expand the exclusion to include silvicultural wastes. They argued that the foliage and branches left in the forest after trees have been cut are not hazardous and that such wastes help to enrich the soil and control erosion. EPA has decided not to provide a specific exclusion for such wastes because there is no indication in the legislative history of RCRA that the Congress meant to include silvicultural wastes in the exclusion otherwise applicable to agricultural wastes. Moreover EPA has no basis to make a general determination that all silvicultural wastes will not pose environmental problems if mismanaged.

In response to the specific comment about tree branches, it must be recognized that the obligation placed on generators of solid waste is to determine whether their waste is hazardous. Tree branches are not listed as hazardous wastes. Therefore, the only obligation placed on a timber operation is to determine whether its wastes exhibit hazardous characteristics. EPA expects that, in the case of tree branches that are not hazardous, it will be a relatively easy task for the generator to determine that his waste is not hazardous.

6. *Mining Waste.* Section 250.10(d)(2)(ii) of the proposed regulation excluded overburden intended for return to the mine site from regulation under Subtitle C unless such overburden had been specifically listed as a hazardous waste. This exemption was based on the legislative history of RCRA.

Generally commenters accepted this exemption but sought a clearer specification of what wastes fall within the exclusion. Thus commenters sought a definition of both "overburden" and "mine site." Commenters also sought a

clearer interpretation of the time within which the "*return* to the mine site" would have to occur. Finally, several commenters objected to that portion of the proposed regulation which allowed EPA to list and regulate specific overburden materials otherwise covered by the exclusion. EPA had invoked this provision when listing uranium mining overburden and waste rock and phosphate mining overburden in the proposed regulation. These same commenters had also objected to the proposed listing of such wastes.

After review of the comments and further analysis, EPA has decided to retain an exemption for "mining overburden returned to the mine site", defining it as "any material overlying an economic mineral deposit which is removed to gain access to that deposit and is then used for reclamation of a surface mine."

In enacting RCRA, the Congress specifically included mining wastes within the Section 1004(27) definition of "solid waste." Therefore unless the statute or legislative history clearly indicate that mining wastes are to be exempt the presumption is that they are to be regulated like any other solid or hazardous waste. Portions of RCRA's legislative history in both the Senate and House of Representatives suggest, however, that certain kinds of mining overburden are not within the Act's jurisdiction. In discussing RCRA's scope the House Report states:

> [O]verburden resulting from mining operations and intended for return to the mine site is not considered to be discarded material within the meaning of this legislation. This however does not preclude any finding by the Administrator that specific mine wastes are hazardous within the scope of this legislation.

In the Senate this issue was discussed during the floor debate when Senator Domenici asked about the effect of RCRA on mining operations, particularly strip mining. As part of his response Senator Randolph stated:

> The measure would not affect surface mining activities. Reclamation is not solid waste disposal.

Reclamation of surface mines will commonly involve the return to the mine site of waste overburden that has been removed to gain access to the ore deposit. Since it is assumed that both the Senate and House had similar objectives in passing RCRA, the "returned to the mine site" language in the House Report must be read in light of the Senate's concern that mining wastes used to reclaim surface mines should not be subject to RCRA. EPA believes, therefore, that the most reasonable interpretation of the "return to the mine site" phrase is one that limits the exemption to mining waste used to reclaim surface mines.

Commenters suggested that EPA define overburden as any material removed to gain access to the "economic mineral" or the "mineral being mined for use." While both terms basically convey the same meaning, EPA has decided to use "economic mineral" because it may have a clearer meaning to mining operators. The intent of the term is to identify the material that the mining operator is in the business to extract from the ground.

In keeping with the Congressional intent that this exclusion is designed for overburden used to reclaim surface mines, the definition is limited to overburden "overlying" a mineral deposit. The Department of the Interior makes a similar distinction in the definition of overburden in its regulations under the Surface Mining Control Act. EPA does not intend this definition of overburden to be limited exclusively to the material located directly above a mineral deposit. Some material is removed from the sides of a mining pit to permit safe access to the economic mineral, and such material should be treated as overburden. EPA urges the public to provide suggestions about how the definition may be refined if there appears to be any confusion about the meaining of "overlying" in this context.

Overburden material must be "returned to the mine site" before it is excluded from regulation under RCRA. As indicated earlier, the purpose of the exemption is to assure that mining wastes used to reclaim surface mines are not subject to regulation as solid or hazardous waste. EPA recognizes that reclamation does not necessarily involve replacement of overburden into the portion of the ground from which it was taken. EPA also recognizes that surface mining reclamation may be subject to State or Federal regulation, making it difficulut to provide a national definition of what constitutes reclamation. In particular it is difficult to provide a general definition of "mine site" that will fit with the various State and federal requirements for reclamation.

EPA has decided, therefore, not to define what is meant by reclamation of a surface mine. Several commenters indicated that most reclamation activities are subject to State or Federal regulation. EPA expects that any permits or reclamation plans developed to satisfy such regulatory agencies will specify the reclaimed area, and these actions should provide an acceptable and understandable specification of the "mine site" as that term is used in this definition. EPA contemplated limiting the exemption to reclamation that was approved by State or Federal agencies. While such a requirement is not part of this regulation, EPA is considering whether such a requirement should be part of the final definition. EPA seeks public comment on such a modification and is particularly interested to discover the extent to which environmentally sound reclamation activity occurs in the absence of Federal and State regulation.

This approach addresses two specific suggestions made in comments. First it clarifies the time component of the "returned to the mine site" concept because it ties the exemption to reclamation activity. Particularly where the mining operation is subject to State or Federal regulation, it should be reasonably clear what portion of the mine's overburden will be used over what period of time to implement a reclamation plan. Second, as indicated above, it eliminates the need for a specific definition of mine site. In any case, EPA does not believe, as one commenter suggested, that the definition of "mine" used in the Agency's Effluent Limitations Guidelines for the Ore Mining and Dressing Point Source Category (under the Clean Water Act) is appropriate for this definition. The CWA definition is designed to identify a full range of mining and associated activities that should be regulated because they generate pollutants which may potentially discharge into navigable waters. The RCRA definition of "mine site" is to identify a reclaimed area that may receive a waste material which will thereby be excluded from environmental regulation under RCRA.

Finally the Agency has eliminated the part of the proposed exemption that would allow exempted overburden to be brought within RCRA jurisdiction through specific listing as a hazardous waste. (EPA believes, however, that uranium mining overburden and phosphate mining overburden will be brought back under Subtitle C jurisdiction, as discussed below.) The only overburden exempted is that which is used for reclamation purposes. EPA expects that the State and Federal agencies that regulate such reclamation will consider the overburden's potential to adversely affect public health and the environment.

EPA believes strongly that portions of the overburden from uranium and phospate mining should be regulated under Subtitle C with respect to their potential emissions of radon gas and gamma radiation. The Agency

recognizes that this is an issue currently before the Congress in amendments to RCRA. One such amendment would provide specific authority for EPA to regulate these overburdens. If this amendment is enacted, the "overburden returned to the mine site" exclusion will be modified accordingly.

Commenters also questioned the application of the Subtitle C system to in-situ mining wastes. In-situ mining of oil shale, uranium and other minerals may involve the placement of certain solvent solutions directly to a mineral deposit in the ground. This solvent passes through the earth, solubilizing the economic mineral as it goes. The mineral and solvent mixture leaches down to underground extraction wells which remove the solution.

EPA does not believe that the soil through which these solvent solutions pass is a waste to be regulated under RCRA for two reasons. First the removal of materials from their natural state does not transform all remaining elements of that environment into a waste material. For example, picking an apple from a tree does not transform the tree into a solid waste. Likewise the removal of minerals from the land does not make the earth a solid waste.

Second, the soil from which minerals are extracted by in-situ mining does not need to be managed as solid wastes. As indicated in *United States Brewers' Association, Inc.* v. *EPA, supra.*, the definition of "solid waste" under RCRA must be read in conjunction with Section 1004(28), the definition of "solid waste management," which sets forth the broad set of activities that RCRA is to regulate. None of the management activities identified in Section 1004(28), including "disposal," are relevant to in-place materials located hundreds, even thousands of feet below the ground. Only when these materials are actually removed from the ground can it be reasonable to establish regulations governing the management of those materials. Accordingly in-situ mining wastes, not removed from the ground, are not regulated as solid wastes under these regulations.

A final issue raised in the public comments concerns the relationship between these regulations and the study of mining wastes required under Section 8002(f) of RCRA. Commenters argued that all mining wastes should be excluded from coverage under RCRA regulatory programs (including Subtitle C) pending the outcome of that study.

While the study will certainly assist the Agency in refining these regulations to address the particular environmental problems presented by mining wastes, the Agency does not believe that mining wastes should be excluded from regulation, any more than any other solid or hazardous waste, until the study is completed. RCRA certainly does not require such a deferral. The fact that the Congress may have perceived a need for further information about mining wastes does not raise the implication that RCRA's regulatory programs should not address the environmental problems presented by such wastes. The definition of "solid waste" in Section 1004(27) specifically includes wastes from mining operations and no other statutory provision otherwise links EPA's jurisdiction over such wastes to completion of the study under Section 8002(f).

It is important to note that pending amendments to RCRA may provide for deferral of regulation of certain mining wastes until completion of the mining waste study. Clearly that indicates a Congressional belief that any deferral of regulation pending the outcome of the study was not contained in RCRA as originally enacted. Certainly if the legislative amendment is passed EPA will modify these regulations accordingly. The Agency has not, however, created such a deferral in anticipation of such an amendment because the amendment is contained in the bill of only one house. Thus the Agency cannot be certain that such an amendment will be part of the final legislation.

7. *Sewage Sludge.* Unlike the proposed regulation this regulation does not exclude from regulation under Subtitle C sewage sludge from publicly-owned treatment works (POTW's). Several commenters objected to the exclusion contained in the proposed regulation, arguing that it was inconsistent to exclude sewage sludge from POTW's and not exclude sewage sludge from privately-owned systems. They urged EPA to exclude sewage sludge from such private systems. Other commenters urged EPA to exclude wastewater treatment sludges from certain industries such as the meat packing and food processing industries because these sludges are very similar to domestic sewage sludge.

Finally, other commenters objected to the proposed exclusion of sewage sludge from POTW's and urged that this exclusion be dropped. They claimed that POTW sludge often is very contaminated and thereby can be a hazardous waste. They urged that it not enjoy an arbitrary exclusion. EPA has thoroughly re-examined this issue in light of the comments and has decided not to exclude POTW sludge and not to add exclusions for any other types of sludge.

The regulation of sewage sludge is necessarily a complex matter because such sludges fall within the jurisdiction of several Federal environmental programs. Under Section 1004(27) of RCRA, the definition of "solid waste" specifically includes "sludge from a waste treatment plant." In defining "sludge," Section 1004(26A) includes wastes from a "*municipal* wastewater treatment plant."

Because of these very clear statutory expressions, EPA must regulate sewage sludge under RCRA—either under Subtitle D, where it has already promulgated regulations covering sewage sludge (see 44 FR 53438 *et. seq.*), or under Subtitle C where these sludges that are deemed by EPA to be hazardous wastes should be regulated.

Under Section 102 of the Marine Protection, Research and Sanctuaries Act, EPA regulates the ocean dumping of sludge, including sewage sludge. In addition EPA establishes, under Section 405 of the Clean Water Act (CWA), guidelines for the disposal and utilization of sewage sludge. Under Section 405(e), owners and operators of publicly owned treatment works (POTW's) must comply with these guidelines. Sewage sludge often contains valuable organic matter and plant nutrients, and it may be distributed to the public as a soil conditioner or fertilizer. Such distribution of sewage sludge may be regulated under the Consumer Product Safety Act (CPSA) or the Toxic Substances Control Act (TSCA), in addition to Section 405 of the CWA.

Where such overlapping jurisdiction exists, EPA seeks to integrate and coordinate its regulatory actions to the extent feasible. Such efforts give the regulated community a clear picture of its obligations and improve the administrative efficiency of the Agency, both of which advance the environmental objectives contained in EPA's various statutory authorities. Section 1006 of RCRA specifically recognizes the need to integrate the solid and hazardous waste programs with other EPA regulatory programs.

To that end EPA has decided to develop a comprehensive set of regulations to deal with sewage sludge management. Such regulations would be co-promulgated under RCRA (Subtitles C and D), the Clean Water Act, the Marine Protection, Research and Sanctuaries Act and possibly the Toxic Substances Control Act and/or the Consumer Product Safety Act. These regulations will address sewage sludge

from both private and public sources, including septic tank pumpings.

In devising such regulations the Agency will, of course, make the distinctions and classifications necessary to make the regulation comport with the goals and requirements of each statute. Under such a comprehensive regulation, sewage sludge that would otherwise meet the test for being hazardous under Subtitle C will be subject to requirements providing a level of protection to human health and the environment equivalent to that found in the Subtitle C regulations.

The Agency has issued and is developing regulations which will eventually be part of the comprehensive sewage sludge regulation. For example the Agency promulgated Criteria for the Classification of Solid Waste Disposal Facilities and Practices (44 FR 53438) on September 13, 1979. These regulations, which apply to sewage sludge, include special provisions for the land application of solid waste to food chain crops and for the prevention of disease from pathogens contained in sewage sludge and septic tank pumpings. EPA issued the Criteria under the authority of Sections 1008(a)(3) and 4004(a) of RCRA as well as Section 405(d) of the CWA. EPA has also published two technical bulletins that provide guidance on sludge management: "Municipal Sludge Management: Environmental Factors" (42 FR 57420) and "Application of Sludges and Wastewater to Agricultural Land; A Planning and Education Guide."

In addition the Agency is in the process of developing regulations on the distribution and marketing of sewage sludge which will focus on the use of such material as a soil conditioner or fertilizer. These regulations will, at a minimum, be promulgated under Section 405(d) of the CWA. The Agency is also examining whether TSCA or CPSA authorities may be used in developing these regulations.

The Agency's strategy for the development of a comprehensive sewage sludge management regulation will eventually result in the establishment of a separate regulation. Once such a regulation is in place, sewage sludge will be exempted from coverage under other sets of regulations. In particular sewage sludge that qualifies as a hazardous waste will be exempted from this Part and Parts 262 through 265 once this separate sewage sludge regulation, which will provide an equivalent level of protection, is issued in final form.

Pending promulgation of this comprehensive sewage sludge regulation, sewage sludge will not be specifically excluded from Subtitle C. Like any other solid waste, sewage sludge that exhibits any of the characteristics of hazardous waste established in this regulation must be managed as a hazardous waste.

Some commenters urged EPA to list sewage sludge as a hazardous waste, contending that it was particularly hazardous when used in the growing of food chain crops because of the potential plant uptake of cadmium, PCB's and other contaminants. The Agency has decided not to specifically list sewage sludge as a hazardous waste at this time.

It is difficult to make general determinations about the hazardousness of sewage sludge, particularly those produced by POTW's, because of the wide variations in sludge quality. The makeup of a given community's sewage sludge, for example, reflects the range of contaminants generated by the industrial and commercial activities in the area. The sludges of two POTW's will differ as much as the communities themselves.

Determinations about the hazardousness of sewage sludge must, therefore, involve the making of some distinctions between types of sludge. EPA anticipates that it may make such distinctions as part of its comprehensive sewage sludge management regulations. Thus, it is reasonable for EPA to determine whether categorical classifications of sewage sludges are appropriate as part of the Agency's effort to develop such a regulation.

In addition it should be recognized that the particular hazard identified by the commenters, namely uptake of contaminants in food-chain crops, is being addressed by existing regulations. As mentioned above, EPA has issued the Criteria for the Classification of Solid Waste Disposal Facilities and Practices under Subtitle D of RCRA, which place limits on the application of solid waste (including sewage sludge) to food-chain crops. In addition, it is developing regulations covering the distribution and marketing of sewage sludge, which often is used by consumers in gardens for growing food crops. EPA believes that these regulations address the commenter's particular concern about cadmium and PCB contamination in sludge.

E. Section 261.5 (Special Requirements for Hazardous Waste Produced by Small Quantity Generators)

1. *Introduction.* In enacting RCRA, Congress was responding to a problem of unknown magnitude and dimension. With specific reference to the generation of hazardous waste, the House Committee stated:

> One of the major problems to be addressed in the hazardous waste area is the lack of information concerning the components, volumes and sources of hazardous waste. To date there has been no survey or other wide ranging investigation of the sources of hazardous or potentially hazardous waste generation or disposal. As a result, little is known about the actual volume of hazardous waste being generated, the geographical distribution of the generators or the extent to which hazardous wastes are transported [H.R. Rep. at 26].

In the proposed regulation, EPA recognized that the principal focus of the regulatory program should be directed towards effectively controlling the hazardous waste generated by the larger sources of hazardous waste. The Agency was uncertain, however, about the most appropriate manner of regulating generators of small quantities of hazardous waste. The proposed regulations exempted from regulation retailers and any person who generated and disposed of hazardous waste in quantities of less than 100 kilograms in any one month period, provided that these generators disposed of their waste in a waste disposal facility meeting the RCRA Section 4004 criteria or in a facility permitted to manage hazardous waste. In the preamble to the proposal, EPA explained the rationale for this exemption as follows:

> The principal element of this issue is how to balance the need to protect human health and the environment from the adverse impact of potential mismanagement of small quantities of hazardous waste with the need to hold the administrative and economic burden of management of these wastes under RCRA within reasonable and practical limits (43 FR 58970).

Since the time of proposal, the Agency has received and developed considerable information on the issue of the appropriate degree and manner of regulating small quantities of hazardous waste. The information obtained in this process indicates that the number of persons generating hazardous wastes is staggering. There are an estimated 760,000 large and small generators of hazardous wastes producing over 60 million tons of hazardous waste a year. The greatest amount of these wastes comes from very large generators, typically large manufacturing facilities. Just over 5 percent, or 40,000, of the total number of generators produce more than 5000 kg/mo of hazardous wastes; yet, these large generators produce 97.7 percent of the total quantity of hazardous waste. Roughly 91 percent, or 695,000 of the generators, produce less than 1000 kg/mo, yet contribute only one

percent, or 600,000 tons per year, of the total hazardous waste generated. At levels of generation below 100 kg/mo, 74 percent, or 563,000, of the generators produce only 0.23 percent, or 138,000 tons per year of hazardous waste.

The types of business activity generating small quantities of hazardous waste differ markedly from those generating large quantities of hazardous waste. In contrast to large quantity generators, which are almost entirely from the manufacturing sector, over 89 percent of the small generators—those producing hazardous waste at rates of less than 1000 kg/mo—are from the non-manufacturing sector. These generators are scattered among such diverse sectors as construction, special trade contractors (e.g. plumbers, electricians), secondary schools, and local transportation systems. Gasoline service stations and automobile repair garages (for wastes *other* than waste lubricating oil) comprise nearly 30 percent of these non-manufacturing small generators of hazardous waste.

The Agency has determined that the enormous number of small generators, if brought entirely within the Subtitle C regulatory system, would far outstrip the limited Agency resources necessary to achieve effective implementation.

The information developed in the rulemaking process has led EPA to adopt, in the final regulations, a system which incorporates various aspects of the different approaches suggested in the preamble to the proposed rule. The final regulation sets low (1 to 100 kg/mo) quantity exclusion limits for certain extremely hazardous wastes; sets an initial general exclusion limit for generators of less than 1000 kg/mo of all other hazardous wastes; and conditions this general exclusion to assure that excluded wastes are disposed of in either authorized hazardous waste management facilities or facilities approved by a State for municipal or industrial wastes. EPA believes the approach adopted will allow EPA and the States to initially focus implementation and enforcement of the Subtitle C regulatory program on those generators of hazardous waste who are presently producing 99 percent of all hazardous waste. In addition, the Agency will initiate rulemaking within 2 to 5 years to phase-in expanded Subtitle C coverage of small generators down to those generating more than 100 kg/mo quantities.

The final rule does not exempt retailers from coverage as did the proposed regulations. In the preamble to the proposed rule the Agency stated its belief that retailers rarely generate more than 100 kg/mo. However, commenters argued, and the Agency agrees, that some retailers may generate extremely hazardous wastes. Furthermore, some generators, such as large hardware or garden stores may generate substantial quantities of hazardous waste. To the extent that retailers do generate only very small quantities, they will be exempted by the exclusion level provided in the regulations. Thus, in the final regulation, retailers who generate hazardous waste are subject to the same requirements as any other generator.

The background document responds fully to the diverse and numerous comments received on the proposed exemption of generators of small quantities of hazardous waste. This preamble will discuss the issue raised most frequently during the comment period—the consideration of hazard in establishing quantity limitations for hazardous wastes—and the rationale for setting an initial quantity exclusion of 1000 kg/mo and for phasing down the exclusion to 100 kg/mo.

2. *Consideration of Hazard in Establishing Quantity Limitations.* A number of commenters stated that EPA should use consideration of hazard in determining the scope of regulatory coverage. Two methods were suggested: (1) Using quantity to define hazardous waste pursuant to Section 1005(5) of RCRA, i.e., determining the level for each waste below which it does not pose a substantial hazard to human health and the environment when improperly managed; or, (2) considering the degree of hazard presented by a particular waste to establish different levels or types of controls. Although both approaches are attractive, the Agency lacks at present the ability to use either approach in any extensive fashion, and therefore has had to adopt a general exclusion level.

3. *Using Quantity to Determine That a Waste is Hazardous.* The Agency considered whether the small quantity issue could be addressed through consideration of quantity in the definition of hazardous waste. Specifically, the Agency considered whether small quantity exclusion limits could be established by defining *de minimis* quantities below which a waste would not be hazardous under the statutory definition in Section 1005(5) of RCRA, i.e., below which no substantial hazard to human health and the environment exists under conditions of improper management. However, the Agency has not been able to find a way of determining *de minimis* quantities. To do so would require knowledge not only about the intrinsic properties of a waste but also about the possible *exposures* that attend various small quantities of waste under various plausible scenarios of waste mismanagement. Such exposure assessments require consideration of waste properties, numerous site-specific conditions, and alternative management scenarios. For example, the levels of exposure and hazard which could result from leaching of toxic constituents from a particular hazardous sludge in a landfill would depend on factors such as the persistence of the waste, site hydrogeology, depth to the groundwater, the attenuation of the constituent in the underground environment (including degradation of the constituent and its dilution in the groundwater), and the location of persons using the groundwater. The problem is made more complex by the fact that many wastes may be managed in several alternative ways, such as land disposal, treatment, or incineration, and each of these types of management exhibits different exposure and risk patterns.

Given current knowledge and information, these assessments cannot be made for most wastes with sufficient precision to determine the specific quantities which represent a threshold for finding a waste hazardous. Therefore, the Agency has not been able to establish *de minimis* quantities for defining hazardous wastes. The Agency must therefore consider all quantities of any waste listed or identified in Part 261 to be hazardous.

4. *Inability of the Agency to Use Degree of Hazard.* Because the Agency was unable to use quantity in determining whether a waste is hazardous, it considered using degree of hazard in determining the appropriate quantity exclusion level. Commenters heavily supported establishing exclusion limits based on degree of hazard of various wastes. These suggestions were part of a broader set of comments which recommended that the Agency establish a degree of hazard system that placed wastes into two or more levels of hazard depending on the risk that those wastes present to public health and the environment. Commenters argued that such a system could be used as a basis for phasing regulatory coverage, tailoring waste management standards, and establishing small quantity exclusion levels.

The Agency's response to the full scope of the degree of hazard proposals is included in the preamble to the Part 264 and 265 regulations being promulgated today. As explained there, the Agency has not adopted a degree of hazard system in the final regulations. Among other reasons, the Agency

concluded that none of the degree of hazard systems suggested by commenters, nor any it could itself conceive, is capable of comprehensively distinguishing different degrees of hazard among the myriad of hazardous wastes without application of very subjective judgment. This precluded establishing small quantity exemptions based on a hierarchy of hazard levels.

While the Agency has not found it possible to establish a comprehensive hazard ranking system, the Agency has attempted on a limited basis to make hazard distinctions in establishing small quantity cutoffs. The Agency has established very low exclusion limits for certain very acutely toxic or otherwise hazardous chemical products (if discarded), off-specification derivatives of those products, and the product containers and spill residues: The Agency may in the future establish specific (low) exclusion limits for other highly hazardous wastes on a case-by-case basis.

5. *Limited Administrative Resources Require Setting the Initial Exclusion Level at 1000 kg/mo.* EPA has decided to adopt for the present time, a general exclusion level of 1000 kg/mo. The Agency's basis for this decision is the current lack of sufficient administrative resources to allow the Agency and the States to effectively regulate all hazardous waste. Given that resource constraint, the Agency believes that the overall level of environmental protection which can be provided will be greater if the Agency focuses available resources on fully regulating wastes from large generators during the early years of regulation implementation rather than expanding the scope of regulatory coverage and achieving ineffectual implementation of a more ambitious program.

The primary reason for selecting 1000 kg/mo, i.e., the administrative impossibility of implementing at lower levels, deserves some elaboration. As noted earlier, regulation of all generators of hazardous waste would bring 760,000 persons into the regulatory system. Regulating only those persons who generate more than 100 kg/mo would exclude from the program 560,000 generators, 73.9 percent of the total. If the exclusion level were set at 1000 kg/mo, 695,000 generators or 91.2 percent would be excluded from regulation. At a 5000 kg/mo level, 722,000 generators or 94.7 percent would be excluded.

In 1981, the first full year of implementing the Subtitle C controls, analyses of Agency and State workload requirements and available resources to implement the Subtitle C controls indicate that, if all generators were fully regulated, workload requirements would exceed resources available by 1100 to 1200 workyears. If generators of less than 100 kg/mo quantities were exempted from full regulation, the shortfall would be much less, but still a substantial 200 to 300 workyears. However, if generators of less than 1000 kg/mo quantities are exempted, the shortfall is projected to be less than 100 workyears, about 5 percent of the total workload requirements.

The resource constraints and shortfalls have direct significance for the operation of the entire regulatory program. To expand the coverage to smaller generators would require direct sacrifices from other elements of the program, most notably regulation and enforcement of large generators, permitting of treatment, storage and disposal facilities, and enforcement and inspection of these facilities. Furthermore, with greater resource demands and projected shortfalls, greater difficulties are likely in the ability of States to obtain authorization to administer the program in lieu of the Federal government.

Given the enormity of the implementation task and the limited administrative resources, EPA has been forced to make difficult allocation decisions. Expanding the coverage of generators would entail direct sacrifices from other essential program components. The determination of the proper exclusion level in the final regulation represents a complicated balancing of a variety of factors. The decision reflects a judgment by the Agency that the overall environmental objectives will be best served by selecting a level which promises full and effective implementation of all elements of the program rather than one that promises ineffective implementation of a more ambitious program.

Accordingly, EPA has decided to establish for the present time a conditioned exclusion of hazardous wastes from generators who produce less than 1000 kilograms a month. This level will enable EPA to direct its attention to the effective regulation of 99 percent of the total wastes generated, and will entail only insignificant, if any, sacrifices in the task of issuing permits to hazardous waste management facilities.

In addition, the exclusion is not unqualified; generators of small quantities of hazardous waste must ensure that their wastes go to facilities that are approved by the State to handle municipal or industrial wastes. For most of these facilities the commingling of small quantities of hazardous waste with large quantities of non-hazardous waste is likely to minimize environmental problems attributable to the hazardous waste, particularly since dilution levels at a 1000 kg exclusion are generally at least 100 to 1. Importantly, this approach will give State agencies more flexibility in dealing with small quantity generators. If a State determines that certain types of exempted hazardous waste should not be managed in a particular non-hazardous facility, it can deal with that situation directly.

The Agency considered other types of reduced administrative or technical requirements for exempted generators, including various subsets of the full Subtitle C requirements. A limited number of commenters suggested particular reduced requirements which they felt would provide limited but necessary controls. The Agency's analysis of various reduced Subtitle C requirements indicated that they would either provide an insignificant level of additional control, or that they would not substantially reduce the administrative burden of the full Subtitle C requirements. Thus, the Agency decided to impose only the condition stated above.

6. *Phasing Down the Coverage of Small Quantity Generators.* On the basis of information presently available to the Agency, it appears that a general exclusion level of 100 kg/mo would better achieve the environmental protection objectives of Subtitle C. Therefore, EPA intends to initiate rulemaking within 2 to 5 years to expand Subtitle C coverage down to generators of 100 kg/mo. During this process, the Agency will consider the need for any special regulatory requirements to deal with any unique problems associated with these wastes.

A number of commenters argued that phasing regulatory coverage of small generators would significantly benefit the administration of the hazardous waste management program. The Agency believes that because of limited resources, the Agency *must* phase its regulation of small generators to be able to fully implement the Subtitle C controls on large generators, transporters, and waste management facilities.

7. *Environmental Considerations.* The information that the Agency was able to develop on the environmental impacts of different quantity cutoff levels was not fully conclusive. However, the data indicate that an exclusion level of 100 kg/mo, coupled with lower exclusions for certain highly hazardous wastes, and disposal of excluded waste in Subtitle C or State approved facilities will, in most

cases, minimize adverse impacts on human health and the environment.

The review of damage cases tends to support a 100 kg/mo exclusion level. First, there were very few damage cases involving quantities below that level. Second, those few cases involved indiscriminate dumping rather than disposal in managed facilities. This suggested that disposal of quantities less than 100 kilograms in a managed facility might provide sufficient environmental protection, even if the managed facility was not authorized to handle hazardous waste. Of the 11 damage incidents involving the disposal of less than 1000 kg quantities of hazardous waste in managed facilities the environmental damage or personal injury occurred in nine of the incidents because of mismanagement of single containers, i.e., 55 gallon drums of ignitable, corrosive or reactive materials. Setting the exclusion level at 100 kg/mo would in most cases ensure that single, full drums would be properly packaged and labeled, manifested and sent to Subtitle C facilities. A higher exclusion level would not provide this assurance.

Wastes generated by small quantity generators at the 100 kg/mo exclusion level comprise only 0.23 percent of all hazardous waste. The environmental analysis showed that these small generator hazardous wastes are typically mixed by the generator with non-hazardous wastes and subsequently disposed of in waste management facilities for municipal waste. If these mixed wastes were evenly distributed to such facilities, the dilution ratio of non-hazardous to hazardous waste would be roughly 900 to 1 at a 100 kg/mo exclusion limit.

Although even distribution will not occur, EPA believes that very large dilution ratios will result in most situations with a 100 kg/mo exclusion level. This is because 92 percent of the small generators (producing less than 100 kg/mo) are in the non-manufacturing sector and are distributed in reasonable proportion to population and, therefore, in reasonable proportion to quantities of diluting non-hazardous municipal wastes. The effect of even distribution and high dilution is to spread and, thereby, minimize exposure and risk. Although this effect cannot be assessed with great precision, it is not unreasonable to assume that human health exposure and risk is significantly reduced at dilution ratios of several hundred to 1.

8. *Resource Considerations.* Projecting administrative resources into the future is inherently speculative, requiring various assumptions and estimates of State and Agency budgets, and implementation workloads. The Agency studies assumed constant budgets, and predicted the administrative shortfall to become exacerbated, rather than reduced over time. Other projections, presented in the background document for small generators, also suggest some resource difficulties in phasing-in the coverage of small generators, but these projections show that the resource picture may improve over time. The Agency, however, believes it is appropriate to expand its regulatory coverage of small quantity generators, and will be seeking the budgetary increases necessary to accomplish that phasing. Additionally, once the regulatory apparatus is in place and operating, the Agency will be able to reassess the ability to achieve more comprehensive coverage by means of allocating its resources differently than presently projected.

F. Section 261.6 (Special Requirements for Hazardous Waste Which Is Used, Re-used, Recycled or Reclaimed)

This section sets forth the applicability of the Subtitle C regulations to the storage and transportation of hazardous waste sludges and hazardous wastes listed in Subpart D that are used, re-used, recycled or reclaimed. It also provides for the exclusion from regulation of all other aspects of the use, re-use, recycling or reclamation of hazardous waste until EPA promulgates regulations to the contrary. The content of and rulemaking considerations that went into this section are fully discussed in Section IV. B. of this preamble.

V. Subpart B—Criteria for Identifying Characteristics of Hazardous Waste and for Listing Hazardous Waste

A. Section 261.10 (Criteria for Identifying the Characteristics of Hazardous Wastes)

Section 3001 of the Act requires EPA to develop and promulgate criteria for identifying the characteristics of hazardous waste. The proposed regulations identified two such criteria. The first criterion was that the characteristic be capable of being defined in terms of physical, chemical or other properties which cause the waste to meet the definition of hazardous waste in the Act. This criterion embodied the simple but fundamental notion that a characteristic of hazardous waste must be one which causes the waste to be a hazardous waste within the meaning of the statutory definition. The second criterion was that the properties defining the characteristic be measurable by standardized and available testing protocols. EPA adopted this second criterion in recognition that the primary responsibility for determining whether wastes exhibit the characteristics rests with generators. It believed that unless generators were provided with widely available and uncomplicated test methods for determining whether their wastes exhibited the characteristics, the system would prove unworkable. Largely in reliance on this second criterion, EPA refrained from adding organic toxicity, carcinogenicity, mutagenicity, teratogenicity, bioaccumulation potential and phytotoxicity to the set of proposed characteristics and instead left it to listing mechanism to capture wastes exhibiting these properties. EPA considered the available test protocols for measuring these characteristics to be either insufficiently developed or too complex and too highly dependent on the use of skilled personnel and special equipment. Additionally, given the current state of the knowledge concerning such properties, EPA did not feel that it could define with any confidence the numerical threshold level at which wastes exhibiting these characteristics would present a substantial hazard. Furthermore, it questioned whether these tests sufficiently took into account the multiple factors which bore on the question of the hazardousness of such wastes.

EPA received a few comments on its proposed criteria for identifying characteristics, the most significant of which addressed the appropriate use of the identified characteristics. A number of commenters contended that EPA did not have authority to require generators to assess their wastes in accordance with the characteristics. These commenters were generally concerned about the burden placed on generators by such a requirement and argued that the characteristrics should only be used by the Agency in listing hazardous wastes. Other commenters believed that EPA was fully justified in requiring generators to assess their wastes in accordance with the identified characteristics and felt that this would assure the broadest possible coverage for hazardous wastes.

EPA disagrees with those commenters who argue that EPA has no authority to require generators to determine if their wastes exhibit any of the characteristics. Throughout the statute, Congress made reference to two alternative mechanisms for bringing a waste into the hazardous waste system—identification through characteristics, and listing. If Congress

had intended the identified characteristics to be used solely by EPA in listing wastes, then there would have been no point in making a distinction between these two mechanisms. Consequently, since the determination of whether a waste exhibits the characteristics appears to require some action by someone other than EPA, the most reasonable interpretation of the statutory language is that it requires generators to assess their wastes in accordance with the EPA-identified characteristics. This interpretation of the statutory language is substantially reinforced by the provision in Section 3002(4) that generators may be required to furnish information on the general chemical composition of their waste—a requirement which presumes testing.

The final regulation makes a few slight changes in the language of the criteria for identifying characteristics in an attempt to clarify the meaning of the regulation and better reflect EPA's regulatory intent. First, EPA has omitted reference to damage incidents and scientific and technical information as bases for identifying characteristics, out of a conviction that this reference is unnecessary and in partial agreement with those who argued that damage incidents should not be heavily relied on in identifying characteristics. Second, EPA has omitted the redundant phrase "can be defined in terms of specific, physical, chemical, toxic, infectious, or other properties of a solid waste." Third, EPA has expanded the criterion of "measurability" to make clear that any test for measuring characteristics must be within the capability of the generator community and to provide that characteristics such as reactivity need not be accompanied by a testing protocol if the characteristic can be "reasonably detected by generators . . . through their knowledge of the waste."

B. Section 261.11 (Criteria for Listing Hazardous Waste)

In the proposed regulation, EPA specified two criteria for listing hazardous waste. The first criterion was that the waste possess one or more of the identified characteristics. The second criterion was that the waste meet the definition of hazardous waste found in Section 1004(5) of the Act.

The first criterion to a large extent reflected EPA's regulatory strategy at the time of the proposal. Under that strategy, EPA planned to identify and quantitatively define all of the characteristics of hazardous waste, including organic toxicity, carcinogenicity, mutagenicity, teratogenicity, bioaccumulation potential and phytotoxicity. Generators would be required to assess their wastes in accordance with these characteristics and EPA would list hazardous wastes where it had data indicating the wastes exhibited one of the identified characteristics. Listing would thus play a largely supplementary function and would serve as a device for injecting certainty into the process of hazardous waste determination. As noted above, however, EPA has found it impossible to fully effectuate this strategy because of the lack of suitably uncomplicated test protocols, the difficulty of establishing numerical hazardous threshold levels for these additional characteristics, and the failure of the available test protocols to fully incorporate all of the multiple factors bearing on the hazards presented by such characteristics.

The second criterion was adopted against the backdrop of this inability to capture all hazardous wastes through identified characteristics, and was intended to give the Agency an independent basis for capturing such wastes. Although this proposed criterion was admittedly somewhat general in nature, it implicitly incorporated the more specific criteria embodied in the delisting requirements and the waste codes which accompanied each listing—provisions which made it clear that EPA was specifically concerned with radioactive, mutagenic, bioaccumulative, toxic organic and infectious wastes. Thus, although EPA appeared to have prescribed for itself a very broad and inexact listing standard in the proposed regulation, in actuality the Agency followed a fairly particularized set of criteria in listing wastes.

EPA received a large number of comments in response to its proposed criteria for listing. None of these commenters objected to EPA's first criterion for listing wastes that exhibit one of the characteristics. A large number of commenters, however, objected to the second criterion. Many of these commenters felt that the mere articulation of the statutory definition as the basis for listing was circular and constituted an abrogation of EPA's statutory duty to establish criteria for listing which expand upon the statutory definition. Others argued that the second criterion was inappropriate because it failed to take into consideration such things as concentration, degradation potential and bioaccumulation potential—factors which are specifically mentioned by the Act.

EPA agrees that the proposed criterion for listing wastes which do not exhibit any of the characteristics was as a general matter, too broad. Accordingly, we have promulgated a considerably expanded and more specific set of criteria to take the place of the proposed criterion. These criteria are broken down into two categories—criteria for listing acutely hazardous waste and criteria for listing toxic waste.

The criteria for listing acutely hazardous waste are intended by EPA to serve as the criteria for identifying wastes which are so hazardous that they can be said to meet part (A) of the statutory definition of hazardous waste—i.e., wastes which may "cause, or significantly contribute to an increase in serious irreversible, or incapacitating reversible, illness", regardless of how they are managed. It is EPA's conviction that most wastes are hazardous only because they "pose a substantial present or potential hazard to human health or the environment *when improperly managed*" and thus meet part (B) of the statutory definition of hazardous waste. Nevertheless, EPA recognizes that there are wastes which are so acutely hazardous that they can be considered to present a substantial hazard whether improperly managed or not. EPA has defined this category of wastes to include those which have been shown to be fatal to humans in low doses or have been shown in mammalian studies to have an oral LD 50 toxicity of less than 50 milligrams per kilogram, (as determined using rats), an inhalation LC 50 toxicity of less than 2000 milligrams per cubic meter (as determined using rats), or a dermal LD 50 toxicity of less than 200 milligrams per kilogram (as determined using rabbits). Numerous government agencies and private organizations, including the Department of Transportation, the Consumer Product Safety Commission and the National Academy of Sciences, recognize that substances exhibiting these LD 50 and LC 50 toxicities are so potentially lethal as to be considered poisonous or acutely toxic. EPA has also defined this category of wastes to include wastes, such as explosives, which otherwise meet part (A) of the statutory definition of hazardous waste. This has been done in recognition that wastes may be acutely hazardous even if they are not toxic. Inasmuch as a waste will meet the acutely hazardous criteria only when the whole waste, rather than just its constituents, presents an acute hazard, EPA has employed and intends to employ these criteria primarily to list the discarded pure chemical substances and associated materials specified in § 261.33. EPA recognizes, however, that there may be

wastes such as wastes containing substantial concentrations of potent carcinogens which meet these criteria even though they are not pure substances.

. The criteria for listing toxic wastes are intended by EPA to identify all those wastes which are toxic, carcinogenic, mutagenic, teratogenic, phytotoxic, or toxic to aquatic species. These criteria provide that a waste will be listed where it contains any of a number of designated toxic constituents—unless, after consideration of certain specified factors, EPA concludes that the waste does not meet part (B) of the statutory definition of hazardous waste. As in the proposed regulation, the ultimate requirement for listing a waste as hazardous is whether it meets the definition of hazardous waste found in the Act. Unlike the proposed regulation, however, the final criteria significantly channel the route the Agency must follow in determining whether a waste meets the statutory definition. The first inquiry which must be made under the final criteria is whether the waste contains any of the toxic constituents listed in Appendix VIII. These constituents are ones which have been shown in reputable scientific studies to have toxic, carcinogenic, mutagenic or teratogenic effects on humans or other life forms and include such substances as those identified by the Agency's Carcinogen Assessment Group. Consequently, the presence of any of these constituents in the waste is presumed to be sufficient to list the waste unless after consideration of the designated multiple factors, EPA concludes the waste is not hazardous. These multiple factors include the type of toxic threat posed, the concentrations of the toxic constituents in the waste, the migration potential, persistence and degradation potential of the toxic constituents, the degree to which the toxic constituents bioaccumulate in ecosystems, the plausible types of improper management to which the waste could be subjected, the quantities of waste generated, and other factors not explicitly designated by the Act, including damage incidents involving wastes containing the toxic constituents and actions taken by other governmental agencies with respect to the waste or its toxic constituents.

EPA has adopted this flexible, multiple factor approach to listing rather than the formulaic approach embodied in the characteristics because it considers this approach to be better able to accommodate itself to complex determinations of hazard. EPA further believes that this multiple factor approach was to some extent contemplated by Congress. Most of the factors selected are specifically mentioned in Section 3001 of the Act. Additionally, the report which accompanied the Senate bill provided that at a minimum the Administrator should designate as hazardous each mixture of solid waste which contained a toxic or hazardous substance listed in section 112 of the Clean Air Act or section 307(a) and section 311(b) of the Clean Water Act unless he determined that the waste did not meet the criteria for identifying hazardous wastes. Senate Report 94-988, 94th Cong., 2d Sess. at 14. Thus the Senate bill, like EPA's final regulations, envisioned a presumption in favor of listing based on the presence of a toxic constituent in the waste which is rebuttable by a consideration of further factors. Although the Senate version of the bill was not adopted, the concept embodied therein was not specifically rejected in the final statute, providing some further basis for concluding that EPA's approach for listing toxic wastes reflects congressional intent.

As can be seen from the above discussion, the final criteria for listing reflect a change in emphasis in the Agency's regulatory strategy. EPA is not fully confident that it can suitably define and construct testing protocols for the characteristics of organic toxicity, carcinogenicity, mutagenicity, teratogenicity, bioaccumulation potential, phytotoxicity, radioactivity and infectiousness, and is consequently relying on the listing mechanism to bring wastes exhibiting these properties into the system. One negative aspect of this change in approach is that it shifts to EPA the primary burden for identifying, analyzing and evaluating these wastes with the result that it may take longer to achieve full regulatory coverage. This negative aspect is substantially offset, however, by the greater flexibility and assurance which the listing approach provides, especially when accompanied by the delisting procedure.

A notable difference between the approach embodied in the characteristics and the approach embodied in the criteria for listing is that EPA attaches less emphasis to waste constituent migration and subsequent environmental fate in the listing mechanism than in the characteristics. This is nowhere better demonstrated than in the listing of waste which contain primary drinking water standards contaminants. In listing wastes which contain primary drinking water standards contaminants EPA has elected to focus, in the first instance, on the actual presence of the toxic constituent in the waste and to treat other factors such as migration potential as essentially mitigating considerations which might render the waste non-hazardous. EPA feels justified in concentrating primarily on the composition of the waste because the listing mechanism allows for a more individualized consideration of hazard and because the delisting procedure affords generators an opportunity to demonstrate, through reliance on the specified factors, that their waste is not in fact hazardous. In the case of wastes exhibiting the characteristic of EP toxicity, on the other hand, there is no opportunity to make such a demonstration—since the test prescribed in the characteristic constitutes a final determination of hazard. Consequently, out of concern that the characteristic not be overinclusive, EPA has placed somewhat greater emphasis on migration potential and has rigorously incorporated this consideration into the EP test.

As noted in section III.A.3. of this preamble, EPA intends to supplement the listing criteria to allow listing of radioactive and infectious wastes. We are deferring promulgation of the criteria for listing radioactive wastes because we want to wait until Congress has spoken on this issue and because deferral will give EPA more time to refine its standards for listing these wastes and to coordinate these standards with the regulations governing used, re-used recovered, and reclaimed wastes. We are similarly deferring promulgation of the criteria for listing infectious wastes because we have not finished developing the treatment standards applicable to such wastes.

A few clarifying changes have been added to the final regulation. First, the regulation provides that EPA may list classes or types of wastes if it has reason to believe that all wastes within the class or type typically or frequently are hazardous. Second, the regulation provides that the criteria for listing will be used to establish the exclusion limits for acutely toxic wastes generated by small generators. These exclusion limits are referred to in § 261.5(c).

VI. Subpart C—Characteristics of Hazardous Waste

A. Section 261.20—General

This section is largely self-explanatory. It states that a solid waste is a hazardous waste if it exhibits any of the characteristics of hazardous waste, explains the assignment of EPA Hazardous Waste Numbers, and

explains the method for obtaining a representative sample in testing for characteristics. Rather than specifying particular procedures to be used in obtaining representative samples, EPA is simply requiring the regulated community to obtain samples which meet the definition of representative sample found in Part 260 of the regulations. To provide some guidance concerning compliance with this requirement, EPA will consider any sample obtained using the sampling methods indexed in Appendix I to be a representative sample within the meaning of the Part 260 definition. Since, however, these sampling methods are not being officially required by EPA anyone desiring to use a different sampling method may do so without demonstrating the equivalency of that method under the procedures set forth in § 260.21.

B. Section 261.21 (Characteristic of Ignitability)

In the proposed regulation, EPA defined ignitable waste to include the following: (1) Liquids having a flashpoint of less than 140° F (60° C) (2) non-liquids liable to cause fires through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or liable, when ignited, to burn so vigorously and persistently as to create a hazard (3) ignitable compressed gases and (4) oxidizers.

EPA's objective was to identify wastes capable of causing fires during routine transportation, storage and disposal and wastes capable of severely exacerbating a fire once started. Such fires, EPA recognized, pose a particular danger to transportation and disposal personnel and also threaten the general public by generating toxic fumes and creating convection currents which transport toxic particulates to the surrounding area. EPA adopted the Department of Transportation's definitions of ignitable compressed gas and oxidizer and borrowed heavily from the Department of Transportation's definition of non-liquid ignitable because it believed these definitions adequately reflected routine waste management conditions. At the same time, it chose a flashpoint limit for ignitable liquid wastes different from that specified by the Department of Transportation's "flammable" liquid category because it believed that the flashpoint limit specified by the Department of Transportation did not fully reflect conditions likely to be encountered during routine waste management.

A large number of commenters argued that EPA should adopt the Department of Transportation's 100° F flashpoint for flammable liquids. These commenters argued that EPA's adoption of a different flashpoint limit from the Department of Transportation is not justified by conditions likely to be encountered during waste management and will create undue confusion in the regulated community.

The Agency disagrees with these commenters. A number of EPA studies reveal that ambient temperatures of 140° F are regularly encountered during landfill disposal. In such environments, liquid wastes with flashpoints lower than 140° F will readily volatilize and can be easily ignited by the numerous ignition sources to which wastes are exposed during management. The need to regulate such wastes is borne out by an early Department of Transportation study which recommended that the Department of Transportation adopt a flashpoint limit of 140° F for flammable liquids because temperatures of this order can be encountered during transportation. The commenters who argue that EPA's 140° F flashpoint limit is not justified by waste management conditions forget that, through the creation of its "combustible liquid" category, the Department of Transportation regulates liquids with flashpoints of up to 200° F—a tacit acknowledgement that EPA's 140° F flashpoint is well within the sphere of potential concern.

EPA does not believe that its ignitable liquids category will create undue confusion in the regulated community. The term "ignitable" was specifically chosen to eliminate confusion between EPA's "ignitable" liquids category and the Department of Transportation's "flammable" liquids category. Furthermore, EPA's ignitable liquids category is one with which the regulated community should already be familiar since it encompasses Class I and Class II liquids in the National Fire Protection Association's classification scheme. While EPA believes that maintaining consistency between its definitions of hazard and those of the Department of Transportation is a desirable goal, it does not believe that such consistency should be achieved at the expense of human health and environmental protection.

A number of commenters argued that the 140° F flashpoint for liquids improperly included many liquid wastes such as wine and some latex paints which exhibit low flashpoints because of their alcohol content but do not sustain combustion because of the high percentage of water present.

EPA agrees that such wastes should not be designated as hazardous, but unfortunately has no data on hand which identifies the correlation between the concentration of alcohol in such wastes and the established flashpoint of 140° F. Accordingly, it has for the time being opted to follow the Department of Transportation's lead and exclude from its ignitable liquids category aqueous solutions containing less than 24 percent of alcohol by volume. This exclusion will remove from the ignitability characteristic liquid wastes which the Agency knows may flash but not sustain combustion. In the meantime, EPA hopes to undertake further study to determine whether another exclusion limit is more appropriate and to evaluate tests which might be capable of identifying wastes which exhibit this phenomenon.

Many commenters argued that the proposed definition of solid ignitable wastes was too vague and that a testing protocol was needed to provide proper guidance. A number of these commenters took particular issue with the phrase ". . . or when ignited burns so vigorously and persistently as to create a hazard during its management . . ." which they felt could be construed to include such non-hazardous materials as bark, wood chips, wastepaper, sawdust, corrugated boxes, etc.

EPA agrees that the proposed definition of solid ignitable wastes was perhaps imprecise and could stand clarification. It has no intention of designating such things as wastepaper and sawdust to be hazardous and is only interested in capturing the small class of thermally unstable solids which are liable to cause fires through friction, absorption of moisture or spontaneous chemical changes. Accordingly, to eliminate any misunderstanding, we have changed the definition of ignitable solid to read ". . . *and* when ignited burns so vigorously and persistently that it creates a hazard."

Although EPA would have preferred providing a test method for identifying ignitable solids, it has determined, after diligent inquiry, that there are no test methods capable of accurately identifying the small class of ignitable solids to which its regulation is directed. EPA is presently working with the Department of Transportation and other organizations to correct this deficiency. In the meantime, the absence of a test should not cause too much of a problem since generators of thermally unstable solids, like generators of reactive wastes, are likely to be aware that their waste exhibits this property.

A number of commenters argued that EPA improperly included in its definition of ignitable solids, wastes such as slags which are liable to cause

fires through "retained heat from manufacturing or processing."

EPA agrees that these wastes should not be designated as hazardous and has accordingly deleted the phrase "or retained heat from manufacturing or processing" from the definition of ignitable solids. EPA was originally concerned that wastes such as slags, if placed in a landfill, could present a hazard by raising the temperature of other wastes to their flashpoints. It is now convinced that the likelihood of such high volume wastes being placed in a landfill is sufficiently small as not to warrant their regulation.

C. Section 261.22 (Characteristic of Corrosivity)

In the proposed regulation, EPA defined corrosive wastes to include (1) aqueous wastes exhibiting a pH of less than or equal to 3 or greater than or equal to 12 and (2) liquid wastes capable or corroding steel at a rate greater than 0.250 inches per year. This definition attempted to address the various hazards presented by corrosive wastes. EPA chose pH as one barometer of corrosivity because wastes exhibiting low or high pH can cause harm to human tissue, promote the migration of toxic contaminants from other wastes, react dangerously with other wastes, and harm aquatic life. EPA chose metal corrosion rate as its other barometer of corrosivity because wastes capable of corroding metal can escape from the containers in which they are segregated and liberate other wastes.

A majority of commenters argued that the proposed pH limits were unduly stringent. These commenters pointed out that the proposed upper pH limit of 12.0 would include many otherwise non-hazardous lime-stabilized wastes and sludges, thereby discouraging use of this valuable treatment technique. They further pointed out that the proposed lower pH limit of 3.0 would include a number of substances generally thought to be innocuous and many industrial wastewaters prior to neutralization. They questioned EPA's assertion that the proposed lower pH limit was needed to protect against tissue damage.

EPA agrees that the proposed pH limits were unnecessarily stringent and has accordingly adjusted the upper pH limit to 12.5 and the lower pH limit to 2.0. In originally establishing the proposed limits, EPA was confronted with the difficulty that while the tendency to promote the solubilization of heavy metal contaminants and to cause harmful reactions generally increases as pH approaches the upper and lower limits of the pH scale, there are no threshold levels for these effects. Consequently, to a significant extent, EPA based the proposed pH levels on studies demonstrating a correlation between pH and eye tissue damage. Since eye tissue is considered to be more sensitive than other human tissue, the proposed pH levels were unnecessarily conservative and had the unintended effect of inhibiting the use of such beneficial processes as the lime stabilization of wastes. The expanded pH range being adopted today rectifies this problem by excluding such things as lime stabilized wastes from the system. It also addresses the problem of tissue damage more realistically while at the same time providing ample protection against the solubilization of toxic contaminants and dangerous reactions.

A number of commenters commented on the need for addressing percent acidity and alkalinity in the pH provision of the corrosivity characteristic. A few commenters favored adding percent acidity/alkalinity to the pH provision because it would provide useful information for disposal purposes. Most commenters, however, felt that percent acidity/alkalinity should not be addressed because it would not add significantly to the determination of hazard and would require the use of a more complicated measurement technique.

EPA agrees with most commenters that the addition of percent acidity/alkalinity to the pH provision is unnecessary. Percent acidity/alkalinity provides an indication of the capacity of a waste to resist a change in pH and therefore to aid in the assessment of the hazard presented by a waste over the long term. However, it adds little to the assessment of the hazard posed by the waste during transportation, storage and initial disposal. Furthermore, because the capacity of a waste to retain low or high pH is as much a function of its disposal or storage environment as of its percent acidity/alkalinity, the Agency knows of no scientifically valid basis upon which to establish hazardous threshold levels of percent acidity/alkalinity. Accordingly, EPA has elected not to address percent acidity/alkalinity in the corrosivity characteristic.

A few comments were received on the need for including corrosive solids in the corrosivity characteristic. All advocated including solids in the corrosivity characteristic but none described situations where the improper disposal of such wastes would be likely to cause damage.

EPA has concluded that, inasmuch as the great majority of wastes are presumed to be in liquid or semi-liquid form, there is no demonstrated need to address corrosive solids at this time. EPA will, however, continue to seek information on the dangers presented by these wastes and will consider specific regulatory measures if the need for more control becomes apparent.

A number of commenters suggested that the corrosivity characteristic should address tissue damage more directly and employ a skin corrosion test. Several of these commenters pointed to a Consumer Product Safety Commission survey which ostensibly casts doubt on the ability of pH to predict tissue damage.

EPA believes that there is sufficient correlation between pH and tissue damage to justify the use of pH in a regulatory context, especially in view of the fact that it is using pH as a multi-purpose measure of many elements of concern. Requiring the regulated community to conduct skin corrosion tests, which necessitate the maintenance of special facilities and skilled personnel, would prove unnecessarily burdensome and would yield little in the way of extra results. Accordingly, EPA is not including a skin corrosion test in the final regulation.

At least one commenter noted that the NACE metal corrosion test specified in the proposed regulations permits variation in a number of test conditions.

To correct this problem, EPA has standardized the conditions of the NACE test in its test methods guidance manual and has required generators to utilize this standardized version in running the test.

D. Section 261.23 (Characteristic of reactivity)

The proposed regulation defined reactive wastes to include wastes which (1) readily undergo violent chemical change (2) react violently or form potentially explosive mixtures with water (3) generate toxic fumes when mixed with water or, in the case of cyanide or sulfide bearing wastes, when exposed to mild acidic or basic conditions (4) explode when subjected to a strong initiating force (5) explode at normal temperatures and pressures or (6) fit within the Department of Transportation's forbidden explosives, Class A explosives, or Class B explosives classifications.

This definition was intended to identify wastes which, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process. The definition was to a large extent a paraphrase of the narrative definition employed by the National Fire Protection Association, although test protocols for measuring thermal and shock instability were

prescribed as a partial aid in assessing reactivity. The Agency chose to rely on a descriptive, prose definition of reactivity because the available tests for measuring the variegated class of effects embraced by the reactivity definition suffered from a number of deficiencies.

EPA received a large number of comments which argued that the prose definition of reactivity employed by EPA is too indefinite and vague and gives generators inadequate guidance in assessing the reactivity of their waste. These comments advocated replacing the prose definition with a numerically quantified definition accompanied by appropriate testing protocols.

EPA has attempted where possible to define hazardous waste characteristics in terms of specific, numerically quantified properties measurable by standardized testing protocols. The available test methods for reactivity, however, suffer from a number of generic and individual shortcomings which make a numerically quantified definition with accompanying test protocols inappropriate. First, these tests are too restrictive in scope and confine themselves to measuring how one specific aspect of reactivity correlates with a specific initiating condition or stress. No test is sufficiently general to even begin to measure the variety of different stresses and reactions found within the reactive classification. Second, because the reactivity of a waste sample is a function not just of its intensive properties such as density and composition but also of its extensive properties such as mass and surface area, the reactivity of the sample as measured by the tests will not necessarily reflect the reactivity of the whole waste. Third, most of the available tests are not of the "pass-fail" type and require subjective interpretation of the results.

The unavailability of suitable test methods for measuring reactivity should not cause problems. Most generators of reactive wastes are aware that their wastes possess this property and require special handling. This in because such wastes are dangerous to the generators' own operations and are rarely generated from unreactive feed stocks. Consequently, the prose definition should provide generators with sufficient guidance to enable them to determine whether their wastes are reactive.

A number of commenters argued that the two proposed test methods for measuring reactivity were, among other things, unreliable and difficult to interpret. EPA agrees with these commenters that the two proposed test methods—the Explosion Temperature Test and the Bureau of Explosives shock instability test suffer from a number of inadequacies and add little to the prose definition. Although the Explosion Temperature Test was originally thought to be a suitable method for measuring one aspect of reactivity, field testing demonstrates that this test requires subjective interpretation of the results. Re-evaluation of the shock instability test suggests that it too possesses problems which make its utility as a measure of reactivity questionable—especially in view of its narrow scope. Accordingly, EPA has stricken these two tests from the regulations except to the extent the Department of Transportation's definition of Class A explosives requires use of the shock instability test.

Several commenters took issue with the inclusion in the reactivity definition of any waste which "generates toxic gases, vapors or fumes when mixed with water" and "any cyanide or sulfide bearing waste which can generate toxic gases, vapors or fumes when exposed to mild acidic or basic conditions." These commenters complained that this language lacks specificity. As an example, they noted that quite a few things contain sulfides and cyanides in trace amounts and can generate minute quantities of hydrogen sulfide or hydrogen cyanide under acidic or basic conditions.

EPA agrees that the language in question could benefit from clarification. It has accordingly amended the regulation to include only those wastes which generate toxic gases, vapors and fumes in *"a quantity sufficient to present a danger to human health or the environment"*. It has also specified that, by mild acidic or basic conditions, it means pH conditions of between 2 and 12.5. This pH range was chosen because only waste inside this pH range can be managed without regard to the prohibitions imposed by Subtitle C. Consequently, these pH conditions are likely to be the most stringent encountered by cyanide and sulfide bearing wastes.

E. Section 261.24 (Characteristic of EP Toxicity)

There is persuasive evidence that the contamination of groundwater through the leaching of waste contaminants from land disposed wastes is one of the most prevalent pathways by which toxic waste constituents migrate to the environment. EPA's damage files contain numerous incidents of groundwater pollution resulting from the indiscriminate dumping and improper landfilling of wastes. Additionally, the legislative history of RCRA is replete with indications that such groundwater contamination was one of Congress' primary areas of concern. In the proposed regulation, EPA addressed this problem by developing a test procedure called the Extraction Procedure (EP) designed to identify wastes likely to leach hazardous concentrations of particular toxic constituents into the groundwater under conditions of improper management. Under this procedure, constituents were extracted from the waste in a manner designed to simulate the leaching action that occurs in landfills. This extract was then analyzed to determine whether it possessed any of the toxic contaminants identified in the National Interim Primary Drinking Water Standards (NIPDWS). If the extract contained any of the contaminants in concentrations 10 times greater than that specified in the National Interim Primary Drinking Water Standards, the waste was considered to be hazardous.

Like other test procedures employed to identify hazardous characteristics, the EP was intended to serve as a quick test for identifying wastes which are capable of posing a substantial present or potential hazard when improperly managed. Consequently, in devising the test, EPA necessarily had to make certain assumptions about the improper management to which toxic wastes capable of contaminating groundwater are likely to be subjected. In making such assumptions, EPA believed it important to employ a reasonably conservative mismanagement scenario—in view of the statutory mandate to protect human health and the environment, the broad statutory definition of hazardous waste and also because the phenomenon of long term leaching is only incompletely understood. On the other hand, EPA considered it important not to utilize a wholly implausible mismanagement scenario, since by doing so it would end up regulating as hazardous those wastes which were quite unlikely to ever cause a problem.

The result of these deliberations was a decision to model the EP upon a mismanagement scenario for toxic wastes which constitutes a prevalent form of improper management—namely, the co-disposal of toxic wastes in an actively decomposing municipal landfill which overlies a groundwater aquifer. EPA realized in making its co-disposal assumption that actively decomposing municipal waste landfills generate more aggressive leachate media than other landfills and thus, that its assumption was a relatively conservative one. It

nevertheless believed the co-disposal assumption to be reasonable, first, because wastes are customarily landfilled, second, because most categories of waste have the potential to be disposed of in municipal waste landfills, third, because the predicted degree of contaminant concentration in leachate could occur with respect to wastes which are not likely to be disposed of in municipal landfills and fourth, because Congress expressed particular concern about the disposal of toxic wastes in municipal landfills. EPA also realized its assumption that the landfill overlies a groundwater aquifer was a relatively conservative one. It believed, however, that this assumption was consistent with its concern for the disposal of wastes in environmentally sensitive areas and with the fact that a groundwater body, once contaminated, may remain contaminated for a number of years. Furthermore, it believed this assumption to be somewhat mitigated by its further assumption that there would be some attenuation in the concentration of toxicants in the leachate between the point the leachate leaves the disposal site and the point the toxicants reach environmental receptors.

Taking these assumptions as its framework, EPA developed the EP test to simulate the physical processes which would occur in an actual landfill characterized by these assumptions. To simulate the acidic leaching medium which occurs in actively decomposing municipal landfills, EPA chose to employ an acetic acid leaching medium with a pH of 5.0 (±0.2). To simulate the leaching process, EPA specified a procedure requiring mixing of the solid component of the waste with the acidic leaching medium for a period of 24 hours. To duplicate the attenuation in concentration expected to occur between the point of leachate generation and the point of human or environmental exposure, EPA applied a dilution factor of 10 to the concentration of toxic constituents observed in the test extract.

EPA was convinced that the proposed EP represented a valid and acceptable test for identifying wastes likely to leach toxic constituents into groundwater. Because, however, this test was innovative in character and reflected a fair amount of groundbreaking inquiry, it drew the greatest response from the public of all the test protocols utilized in identifying the characteristics. The most important of these comments are discussed below.

A number of commenters expressed disagreement with EPA's proposed use of a 10-fold dilution factor to calculate the attenuation in toxicant concentration expected to occur between the point at which the leachate leaves the waste and the point of human or environmental exposure. Some commenters thought that the 10-fold dilution factor was too liberal and that no dilution factor would be more appropriate. The majority felt that the 10-fold dilution factor was too conservative and that a higher dilution factor would be more appropriate.

Choosing an attentuation factor which reasonably represents the amount of attenuation likely to occur in the real world was one of the most difficult problems EPA faced in formulating the EP—a problem which reflects in microcosm many of the difficulties of modeling complex physical processes with a short term test. As leachate migrates vertically from the landfill site towards the groundwater strata, a number of attenuating processes can occur—including adsorption, absorption, ion exchange, filtration, and dilution. When the leachate enters the groundwater zone its movement changes from vertical to horizontal and it will tend to form a slug or plume of contaminated water rather than mix generally with the groundwater flow. This plume of contaminants may experience some dilution, depending on the local geology, the groundwater flow, and the nature of the contaminants. Once the plume of contaminated water is drawn into a pumping well, some further dilution tends to take place, depending upon the amount of water withdrawn and the rate at which it is withdrawn. Unfortunately, all these attenuation mechanisms are dependent upon site specific conditions. While some sites may exhibit attenuation of 500-fold, others will exhibit very little attenuation at all. Moreover over time, a site that originally exhibits 500-fold attenuation may become so saturated that the attenuation mechanisms no longer work and the site begins to flush at the same rate at which it is charged.

In order to formulate a reasonable dilution factor, EPA assumed in the proposed regulations that leachate from the landfill passed unattenuated through the soil underlying the landfill to the groundwater zone and that drinking water wells were situated 500 feet down gradient from the landfill site. Relying on projections from a mathematical model which incorporated these assumptions and on empirical data from field analyses, EPA concluded that a dilution factor of 10 was a conservative, but reasonable, figure.

EPA has had an opportunity to carefully re-evaluate its original choice of a dilution factor and is now of the opinion that the 10-fold dilution factor was inappropriate. A number of considerations have prompted it to come to this conclusion. In the first place, EPA is concerned that, while the dilution factor plays a critically important role in determining the scope of coverage of the EP, there is relatively little empirical data upon which to base such an attenuation factor. It is consequently somewhat troubled by its assumption that the soil underlying the landfill is a delay mechanism only and that there is no attenuation in the concentration of toxic contaminants between the point of actual leachate generation and arrival at the groundwater aquifer. Second, in view of this uncertainty, EPA attaches some importance to the fact that there is no variance or "delisting" procedure for wastes which fail the EP. This absence of a variance procedure, while perfectly permissible, tends to magnify the consequences of a wastes being anomalously brought into the system by the EP. Third, EPA believes the EP to be a somewhat less precise instrument than the listing mechanism for determining hazard, inasmuch as the EP fails to take into account factors such as the concentration of toxicants in the waste itself and the quantity of waste generated which could have a bearing on the hazardousness of the waste. EPA consequently prefers to entrust determinations of marginal hazard to the listing mechanism rather than to the EP.

On the basis of these considerations, EPA has decided, pending the completion of further studies, to alter the proposed dilution factor by adopting an attenuation factor of 100. EPA is adopting a 100-fold attenuation factor because it is confident that anything which fails the EP at this factor has the potential to present a substantial hazard regardless of the attentuation mechanisms at play. If forthcoming studies demonstrate that another attenuation factor is more appropriate EPA will adjust the dilution factor accordingly.

EPA does not intend this alteration in the dilution factor to constitute what may be perceived as an untoward relaxation of the EP. It is simply electing to exercise a degree of caution in the face of the lack of empirical substantiation for its EP leaching test to ensure that the EP only captures wastes which are certain to present a substantial hazard. Since this alteration of the attenuation factor is based as much on EPA's desire to engage in

cautionary rulemaking as on an environmental re-evaluation of the attenuative processes which influence concentrations in leachate, EPA has listed and intends to continue to list wastes which have extract concentrations of less than 100-times drinking water standards. This listing will to a significant degree compensate for the alteration in the attenuation factor and will prevent the overall coverage of the Subtitle C regulations from being measurably reduced.

A number of commenters argued that EPA improperly based the EP on a mismanagement scenario which assumed co-disposal in the acidic environment of a municipal waste landfill. These commenters generally argued that the co-disposal assumption is inapplicable to numerous classes of waste which are never co-disposed with municipal wastes and which do not leach at the aggressive rates characteristic of co-disposal situations. These commenters suggested that EPA employ an alternative leachate medium, such as distilled water, for those wastes which are unlikely to be co-disposed with municipal wastes.

EPA disagrees with these commenters. EPA believes that the level of leachate concentration predicted by the EP is reasonably in keeping with the concentrations which could realistically occur in most waste management situations and that employment of an acidic leaching medium is therefore appropriate. Most wastes, even those which are unlikely to be disposed of in a municipal landfill, are likely to come into contact with some form of acidic leaching media during their management histories or could otherwise encounter environments which could cause them to leach comparable levels of toxic constitutents. Furthermore, inasmuch as the phenomenon of long term leaching is not well understood and there is no consensus within the scientific community on a short term leaching test, EPA believes it has the power to employ a leaching model which fails to take into account the physical processes affecting particular generators even if this model errs on the side of caution. See, *Ethyl Corp.* v. *EPA*, 541 F.2d 1, 24–29 (D.C. Cir. 1976 *en banc*); *Hercules, Inc.* v. *EPA*, 598 F.2d 91, 104–106 (D.C. Cir. 1978).

In any event, the change to an attenuation factor of 100 lays to rest the concerns of those who argued that the acidic leaching medium was too aggressive to apply to them. EPA is quite convinced that any waste which fails the EP at the 100-times standard presents the potential for substantial hazard if improperly managed no matter what leaching media it is actually exposed to.

A number of commenters argued that the EP is not sufficiently reproducible for use in defining hazardous waste. Some commenters, basing their argument on studies which have been conducted on the reproducibility of the EP, argued that these studies demonstrate an unacceptable variability in the results obtained by the EP. Other commenters, who did not base their arguments on these studies, argued simply that EPA has not shown the EP to be reproducible and therefore may not appropriately employ the EP in a regulatory framework.

EPA disagrees. Sensitive throughout the process of developing the EP to the issue of ensuring reproducibility, EPA commissioned a number of studies to evaluate the EP, including a study by the NUS Corporation, a study by the American Electroplaters' Society, and an ongoing study being conducted by the Oak Ridge National Laboratory. In addition, a study commissioned by the Electric Power Research Institute (EPRI) has been completed. None of these studies present enough data to draw any hard and fast conclusions. However, data from the EPRI report—the only report which was able to separate out the reproducibility of the EP from the reproducibility of the analytical procedures—suggests that the reproducibility of the EP itself is of the same order of magnitude as the analytical procedures used to analyze the toxic constituents in the extract. Since these analytical procedures have proven to be widely acceptable to private industry, EPA believes that the EP should also prove acceptable.

EPA concedes that the preliminary data indicate some variability in the results obtained by the EP. This, however, is true of all analytical procedures and test methods, especially those which are novel in character. Furthermore, variability can be easily corrected by running further replicates of the test to achieve greater certainty in the results. To accommodate any problems with variability, EPA intends to provide generators with guidance on the number of extractions which they can perform if they want to ensure confidence in the result. In addition, EPA is engaged in research studies which will enable it to further isolate and get a handle on the causes of this variability.

A number of commenters argued that extract from the EP should be tested for toxic contaminants other than those specified in the National Interim Primary Drinking Water Standards.

EPA originally intended the extraction procedure to identify toxic contaminants other than those specified in the National Interim Primary Drinking Water Standards. EPA has been unable to do this, however, because no other chronic exposure threshold levels relating to drinking water consumption have been established for other contaminants. This should not cause a problem, because EPA is regulating wastes containing non-drinking water standard contaminants through the listing process. EPA will reassess its position on this issue, when thresholds are developed for additional contaminants or when the Clean Water Act Water Quality Criteria are adopted in final form.

The proposed EP required generators to separate the liquid and solid portions of their waste as the first step of the procedure, based on the assumption that the liquid portion of the waste would flow out of the landfill independent of any leaching action. Generators were then required to mix the separated solid portion with the acidic leaching medium and, after a further separation, combine the resulting extract with the originally separated liquid portion for analysis. EPA gave generators the option of using either centrifugation or filtration to perform the initial solid-liquid separation and to perform the subsequent separation of solid from leaching solution. However, information obtained since publication of the proposed regulation indicates that use of centrifugation alone is not as efficient as filtration and can lead to carryover of particles larger than 0.45 um. Since a filter the size of 0.45 um was originally selected because particles larger than 0.45 um are expected to be filtered out by the soil prior to reaching the groundwater, EPA has revised the EP to require filtration of both the liquid portion and the extract prior to analysis.

A number of commenters said they encountered severe operational problems when performing the EP on liquids containing very small percentages of solids. To accommodate this problem, EPA is amending the proposed regulation so generators need not perform the EP on liquids containing less than 0.5% solids. Instead, the liquid itself, after filtration, should be considered the extract and directly analyzed for its toxic constituents.

VII. Subpart D

A. Sections 261.31 and 261.32 (Hazardous Wastes From Specific and Non-Specific Sources)

1. *Methodology for Listing Hazardous Waste Streams.* Detailed justification

for listing each hazardous waste in Subpart D is contained in specific background documents, and so will not be set forth in this preamble. The general methodology used to support listings will, however, briefly be described.

The listing documents are based on the listing criteria contained in § 261.11. The documents are organized in the following sequence: (1) A summary of the Administrator's basis for listing each identified waste stream; (2) a brief description of the industry (or industries) generating the listed waste stream; (3a) a description of the manufacturing process or other activity which generates the waste, (3b) identification of waste composition, constituent concentrations, and annual quantity generated,[1] and (3c) a description of waste management methods; (4) a discussion of the basis for listing each waste stream (described more fully below); and (5) a summary of the adverse health effects of each of the waste constituents of concern. The documents also contain appendices describing in more detail the adverse health effects of the waste constituents of concern, and (for certain documents) compiling available environmental fate and transport data (including data on waste constituent solubility, volatility, and environmental persistence) for each such waste constituent.

a. *Basis for Listing Toxic Wastes.* (1) Outline of Listing Discussion.

For hazardous wastes listed because they meet the criteria of toxicity, the discussion of the basis for listing identifies the waste constituents of concern, whether these constituents are present in significant concentrations, and the hazards associated with each waste constituent. The discussion then addresses whether these waste constituents, if the waste are managed improperly, could migrate from waste management sites, persist in the environment, and reach environmental receptors so as to cause substantial hazard. The analysis generally follows a physical continuum: whether waste constituents are inherently capable of migrating from the matrix of the waste in concentrations sufficient to cause substantial hazard, whether waste mismanagement could lead to environmental release of the migrating waste constituents, and whether waste constituents are mobile and persistent enough to reach environmental receptors and cause substantial hazard upon environmental release. In some cases, actual damage incidents involving the waste or waste constituents demonstrate empirically that waste constituents may migrate, persist, and cause substantial harm if mismanaged.[2]

A word as to the types of mismanagement situations considered. The Agency has limited its discussion to waste management situations which could plausibly occur with regard to the waste at issue. In the Agency's view, the hazard posed by a waste are not "substantial" (Section 1004(5)(B)) if hazards could arise only as a result of implausible types of waste mismanagement. Thus, the Agency would not examine possible hazards arising from improper waste incineration if the waste in question is not likely to be incinerated. On the other hand, the fact that a waste is properly managed by particular generators or particular classes of generators does *not* make the waste non-hazardous, as the statute requires that EPA determine whether a waste is hazardous if substantial hazard could result when wastes are "improperly treated, stored, transported, or disposed of, or otherwise managed." The potential of the waste to cause hazard is therefore the key factor. Consequently, if most or all generators of an otherwise hazardous waste dispose of the waste properly, for example in lined lagoons, the Agency may still consider hazards which could result from improper waste lagooning.[3]

(2) Relative Importance Attached to Identity of Waste Constituents and Constituents' Transport and Fate in Making Toxicity Listing Determinations.

It must be emphasized that in making listing determinations, the Agency's principal focus is on the identity of the waste's constituents, and on constituent concentrations in the waste and the nature of the toxicity presented by the constituents. Where a waste contains significant concentrations of hazardous waste constituents, the Agency is likely to list the waste as hazardous unless it is evident that the waste constituents are incapable of migrating in significant concentrations even if improperly managed, or that the waste constituents are not mobile or persistent should they migrate. This is particularly true where the waste constituents include suspect or proven carcinogens. As EPA recently stated, "(T)here is no scientific basis for estimating 'safe' levels of carcinogens. The draft criteria for carcinogens therefore state that the recommended concentration for maximum protection of human health is zero." (EPA *Water Quality Criteria*, 44 FR 15926, 15930 (March 15, 1979).) Thus, if suspect or known carcinogens are present, an additional cancer may result should the waste constituent migrate and reach a receptor in any concentration, certainly a sufficient risk to constitute a "substantial present or potential hazard" (Section 1004(5)(B)). In this situation, the Agency would require virtual assurance that waste constituents will not migrate and persist if improperly managed to justify a decision not to list the waste.

The Agency therefore does not seek to demonstrate that waste constituents will migrate and persist in sufficient concentrations to cause substantial hazard. Rather, fate and transport information is relevant to show that the potential for harm inherent in the waste (by virtue of its composition) will not eventuate. But, as stated, there must be a very strong likelihood that hazardous constituents are unable to migrate or persist to cause substantial harm before the Agency will decide not to list a waste.[4]

The Agency believes that this methodology is fully in accord with statutory requirements. Thus, this approach accords with the requirement of Section 3001(a) that environmental fate be considered in identifying wastes as hazardous. At the same time, the key focus is on the inherent potential of waste constituents to cause substantial harm, in accord with the definition of hazardous waste, which requires only that a waste "may pose a substantial present or *potential* hazard" to be hazardous. (Section 1004(5)(B), emphasis added.)

(3) Data Base for Toxicity Listing Determinations.

The Agency anticipates arguments that these toxicity listing determinations are made on the basis of inadequate data, and that listings be deferred until further information is gathered. EPA recognizes that these listing

[1] Waste composition and constituent concentrations have been determined either by actual analysis of waste samples, through literature searches, or on the basis of process engineering and process chemistry assumptions. When process assumptions are used to identify waste constituents and concentrations, the bases for the assumptions are contained in the document.

[2] Other factors identified in § 261.11(a)(3) are also considered when relevant, and when information is available. These factors include the quantities of waste managed, and actions of other governmental agencies or regulatory programs with regard to health or environmental hazards posed by the waste or by waste constituents.

[3] Indeed, in this hypothetical example, the fact that an industry takes special precautions in managing the waste suggests that the industry itself regards the waste as hazardous.

[4] § 261.11(a)(3) reflects that the waste's composition is the key factor in determining to list wastes as hazardous, since wastes containing enumerated constituents are to be listed unless consideration of particular additional factors demonstrates that the wastes do not meet the statutory hazardous waste definition.

determinations are essentially qualitative judgments, generally involving expert assumptions based on available physical data rather than precise field determinations of waste composition or of how the wastes will act under identified conditions. However, the statute requires only that a qualitative judgment be made, namely that the wastes, if mismanaged, pose sufficient potentiality of hazard to warrant careful regulation. The Agency believes that it has compiled sufficient information on which to make this judgment. Nor would the delay necessary to compile in-depth (though quite likely cumulative or redundant) information on potentially hazardous wastes be sufferable in light of the urgent need for rapid implementation of the hazardous waste management program.[5] In any case, opportunity is afforded by means of a new comment period for affected parties to present additional information on the listed waste streams, and such comments are solicited.

b. Basis for Listing Ignitable, Corrosive, Reactive or EP Toxic Wastes

The basis for listing ignitable, corrosive, or reactive wastes is much simpler. These wastes, to be listed, must possess the appropriate characteristic, and the listing discussion is directed toward making this demonstration.

2. *Legal Authority to List Wastes Generically.* A number of commenters challenged the Agency's legal authority to list wastes generically. They stated that under Section 3001(b), the Administrator is to list "particular hazardous wastes," arguing that this language requires wastes to be listed individually, rather than as a generic class. These commenters also argued that the statute's legislative history supports their view, noting that the House report to RCRA states that "the Administrator shall promulgate regulations identifying and *specifically listing* those hazardous wastes subject to this title." H.R. Rep. at 56 (empasis added). The Agency disagrees with this interpretation. Although Congress clearly intended to distinguish the promulgation of hazardous waste characteristics from the listing of hazardous wastes, there is no clear indication that Congress further intended to limit the Administrator's discretion by precluding listing of classes of wastes. In the Agency's view, a class of wastes may be listed generically so long as most of the wastes in the class are typically or frequently hazardous, and so long as the listing description is sufficiently specific and particularized for individual generators to determine whether their wastes streams are included within the listing.

Thus, Section 3001(a), far from prohibiting listing of wastes by classes, simply distinguishes the use of criteria to idenfity hazardousness characteristics and to identify listed hazardous wastes.

> The Administrator shall * * * develop and promulgate criteria for identifying the characteristics of hazardous waste, and for listing hazardous waste * * *

Section 3001(b) carries forward this distinction:

> [T]he Administrator shall promulgate regulations identifying the characteristics of hazardous waste and listing particular hazardous wastes * * * Such regulations shall be based on the criteria promulgated under subsection (a) * * *.

To argue that Section 3001(b) was intended to bar any listing of wastes by class consequently reads far too much into the language of that provision. Indeed, Section 3001(a) does *not* refer to listing of particular wastes. This wording certainly militates against attaching too much importance to the reference to "particular wastes" in Section 3001(b).[6]

The legislative history likewise indicates that Congress' concern was that the identification of wastes through characteristics or through listing be regulatorily distinct mechanisms, and that the listing criteria not be confused with hazardous wastes themselves, *not* that generic listing be prohibited. The House report to RCRA thus refers to a "bifurcation of developing the criteria for what is a hazardous waste separate from the identification and listing of the hazardous wastes * * * *" and cautions that "the critera for determining what should be considered hazardous should not be confused with an actual hazardous waste * * *" H.R. Rep. at 25.

Moreover, Congress itself, in the principal report to RCRA, used generic waste descriptions to identify hazardous wastes involved in damage incidents. Examples include identification of "electroplating wastes" (H.R. Rep. at 18), waste "petrochemicals" (*id.* at 18, 19), and "munitions waste" (*id.* at 20). This means of identification again suggests strongly that Congress envisioned generic identification as a means of bringing hazardous wastes into the Subtitle C management system.

Some commenters went on the argue that the statutory requirement to take factors such as toxicity, persistence, potential for bioaccumulation, quantity, and concentration into account in making listing determinations (see Sections 3001(a) and 1004(5); *see also* H.R. Rep. at 25) demonstrates Congresssional intent to prohibit generic listings because "(t)hese factors by their very nature are specific to particular hazardous waste rather than to generic categories." (Comments of Dow Chemical Co., October 10, 1979, p. 10). The Agency again disagrees. A class of wastes may exhibit sufficient unformity of hazard to warrant listing on a class basis. (The Agency of course, must demonstrate that sufficient uniformity exists or is likely to exist). Furthermore, the commenters' argument, taken to its logical conclusion, would mean that the Agency could only list wastes on a generator by generator basis, since waste streams will vary to some degree with respect to these factors depending upon the precise composition of the individual waste (although the degree of difference ordinarily will not be of regulatory significance). Yet Congress clearly did not envision site-by-site listing.

The Agency therefore intends to list generically those wastes which demonstrate a reasonable likelihood of hazard as a class. The listing descriptions will be sufficiently specific to allow generators to determine if their wastes are covered, and, as discussed above, the listing of wastes will be distinct from their identification by means of hazardousness characteristics. This approach, we believe, is fully in accord with Congressional intent.

3. *Changes in Proposed Waste Listing Descriptions and Proposed Waste Lists.* Certain of the waste listing descriptions proposed in December, 1978 have been revised in the lists contained in §§ 261.31 and 261.32. These changes generally were made to clarify where in the process wastes are generated so as to enable generators to determine more easily if their wastes are listed. Since the coverage of these clarified listing descriptions remains identical with the

[5] *See, e.g., Report on Hazardous Waste Management and the Implementation of the Resource Conservation and Recovery Act,* Senate Subcommittee on Oversight of Government Management of the Senate Committee on Governmental Affairs, 96th Cong., 2d Sess. 7 (1980).

[6] In any case, the words "particular" and "specific" do not necessarily connote "individualized." For instance, the first definition of "specific" in Webster's *New Collegiate Dictionary* is "constituting or falling into a specifiable category." Similarly, the same source defines "particular" as "distinctive among others of the same general category." Thus, the statutory language, far from requiring individualized listing, requires that listing be done with sufficient particularity to distinguish listed and unlisted wastes.

proposal, the revised descriptions are not being reproposed.

Certain other listed waste streams arise out of waste generation processes listed in the December proposal, but are newly identified. These waste streams are being proposed today, rather than issued in interim final form.

Finally, some of the waste streams initially proposed are not contained in the present list of wastes. The Agency's reasons for this action are discussed in Section III A.

B. Section 261.33 (Discarded Commercial Chemical Products, Off-Specification Species, Containers, and Spill Residues Thereof)

The proposed regulation contained three appendices listing a variety of materials which the Agency proposed to treat as hazardous waste if discarded. Appendix III listed selected cancelled pesticides or pesticides undergoing RPAR (Rebuttable presumption against registration) review within the Agency that were not listed elsewhere in the proposed regulation. Appendix IV listed selected substances regulated by the Department of Transportation (DOT) and classified as Poison A, Poison B, or ORM–A that were also not listed elsewhere. Appendix V listed substances which are being regulated as toxic priority pollutants under the Clean Water Act. In addition to the substances themselves, the regulation proposed to regulate (1) off-specification materials, which if they had met specifications, would have been shipped using the names of the substances listed in these appendices (2) containers, unless triple rinsed, containing the materials listed in the appendices, and (3) spill clean-up residues and debris from spills of materials listed in these appendices. Subsequently, in a supplemental proposed rule, EPA published another appendix (Appendix XII) listing thirty-three chemicals found to be human carcinogens or potential human carcinogens by the International Agency for Research on Cancer. 44 FR 49404 (August 22, 1979). In the proposed regulation, these materials were to be subject to the general exemption level of 100 kg/mo. Quantities of these materials below this level were not subject to full Subtitle C regulation.

In listing these materials in the proposed rule, EPA intended to encompass those chemical products which possessed toxic or other hazardous properties and which, for various reasons, are sometimes thrown away in pure or undiluted form. The reasons for discarding these materials might be that the materials did not meet required specifications, that inventories were being reduced, or that the product line had changed. The regulation was intended to designate chemicals themselves as hazardous wastes, if discarded, not to list all wastes which might contain these chemical constituents. In drawing up these lists, the Agency drew heavily upon previous work by EPA and other organizations identifying substances of particular concern.

On the basis of comments received and also EPA's own re-examination of the proposed rule, we have substantially revised this regulation. In the final regulations, commercial chemicals are treated in two separate provisions. First, substances listed in § 261.33(f) of the regulations are considered hazardous wastes if they or their off-specification species are thrown away in their pure form. These substances are regulated in the same manner as other hazardous wastes and are subject to the general exclusion level in § 261.5 (a) and (b) for the generation of small quantities of hazardous waste. Second, a number of the substances, which meet the criterion for listing acutely hazardous wastes, are separately listed in § 261.33(e). This section applies to the chemical substances if they or their off-specification species are thrown away in their pure form, containers and inner liners containing these materials, and spill residue and debris created by spills of these listed materials. Section 261.5(c) establishes low quantity exclusion levels for these acutely hazardous materials.

1. *Section 261.33(f) (Commercial Chemical Products).* A number of commenters stated that, as proposed, the materials listed in the various appendices were not tied to any of the criteria for listing, and, accordingly, the reasons for their listing were unclear. The Agency agrees that the basis for its proposed listings was not adequately specified. A table accompanying the background document on commercial chemical products sets forth the specific basis for including each substance on the list published today.

Commenters also expressed some uncertainty as to whether the proposed regulations made hazardous any waste that contained the listed substance as a constituent of the waste. The intent of the regulation was to encompass only those materials which were being thrown away in their pure form or as an off-specification species of the listed material, as well as the contaminated residues and debris from those materials. The final regulation has been redrafted to limit the application of this section to the commercial chemical product itself, its off-specification species and derived spill residues and debris.

Several commenters argued that the wholesale incorporation of lists developed by EPA or other Federal agencies for other regulatory purposes was not appropriate. In the proposal, EPA had, for example, listed all materials that DOT lists as ORM–A materials pursuant to its authority under the Hazardous Materials Transportation Act. A number of commenters argued that these substances should not be listed by EPA because DOT's basis for listing used different criteria—the potential for interfering with transportation. DOT's standard is very broad and somewhat vague; ORM–A material is one that has "an anesthetic, irritating, noxious, toxic or similar property which can cause extreme annoyance of discomfort to passengers and are in the event of leakage during transportation." 49 CFR 173.500(a)(1).

EPA agrees with these comments and, rather than adopting lists of substances on a wholesale basis, has evaluated each against EPA's criteria for listing. Included in § 261.33(f) are those chemical substances which are toxic and which meet the listing criteria set forth in § 261.11(a)(3). These hazardous properties have been documented in EPA rulemaking, studies and other materials, including health effects documents prepared in support of these regulations materials supporting RPAR actions background documents supporting National Interim Primary Drinking Water Standards, materials produced by EPA's Cancer Assessment Group and, in the case of chlorofluorcarbons, documents supporting regulations under TSCA.

This approach has led to certain deletions from the lists of hazardous wastes contained in the proposed rules. A table accompanying the background document sets forth the disposition of all 295 chemicals originally listed in the proposed rules. Eight substances have been deleted from the list because they did not meet any of the criteria for listing hazardous wastes; sixteen were deleted because the listing description was not precise enough to enable generators to determine whether particular materials fell within that description. Examples of these deletions are "medicines N.O.S." and "motor fuel antiknock compound." In addition, thirty-one substances are not presently listed because EPA lacks data to assess the propriety of listing them on the basis of the listing. These substances are presently under review by the Agency to

determine whether they should be included on the § 261.33(f) list.

This process has reduced the chemical products listed, to those substances which are demonstrated to pose a substantial threat to human health or the environment. These materials, their off-specification variants, and contaminated residues and debris from the spills of these materials are subject to full regulation under Subtitle C in the same manner as other hazardous wastes.

2. *Section 261.33(e) (Commercial Chemical Products).* In considering the hazards presented by commercial chemical products, EPA recognized that some substances in their pure form possessed extremely hazardous properties. To account for these substances, EPA has established a new criterion for listing which examines the potentially lethal capacity of chemical substances in very small quantities. The basis for this criterion is explained in section V.B. above.

Applying this criterion to the proposed lists of chemicals products has led the Agency to list 122 substances in § 261.33(e). As with the substances listed in § 261.33(f), the regulatory language has been clarified to restrict the application of this section to chemical products, or their off-specification species, and not to wastes which contain these materials as a constituents. Because of their acutely hazardous nature, however, containers and inner liners which contained these materials and spill cleanup debris and residues resulting from spill of these materials are also included.

At the suggestion of commenters, EPA also reviewed chemical substances on the TSCA inventory list for inclusion on the § 261.33(e) list. A number of those substances do meet the acutely hazardous criterion and accordingly have been added to the list. However, because all interested persons have not had an opportunity to comment on the listing of these materials, the Agency is promulgating them in interim final (together with the remainder of Subpart D).

The final regulations establish stringent quantity cutoff levels for materials listed in § 261.33(e). In the proposed regulation, all hazardous wastes in quantities generated or disposed of at rates greater than 100 kg/mo were subject to full Subtitle C regulation. Although the Agency recognized that many, if not all, of the proposed chemicals listed possessed acutely hazardous characteristics, it did not propose lesser limits for these substances because the general exclusion level—less than ½ of a 55 gallon drum—appeared sufficient to regulate most of the chemical products that would be thrown away. For the reasons discussed in section IV. E., above, the general exclusion level has been raised to 1000 kg/mo. This higher level undercuts the original rationale for proposing a single exclusion level for all hazardous wastes. Many commenters urged that EPA employ a degree of hazard system for determining exclusion levels, for allocating Agency resources and determining priorities, and for establishing management standards. Although EPA is unable to adopt a degree of hazard system, we agree with the commenters that considerations of hazard are appropriate in establishing quantity exclusion levels for those substances which posses acutely hazardous properties. The criterion used in listing these substances ensures that those materials that are listed in § 261.33(e) are those which are lethal in very small quantities.

Accordingly, the Agency has adopted very low exclusion levels for these chemical products and their off-specification variants, containers and inner liners which contained these materials, and spill residues and debris. The selection of these levels reflects the judgment of the Agency that, although even lesser quantities may be hazardous, the levels selected, on the basis of probable exposure scenarios, are sufficient to minimize the threat to human health and the environment while enabling the Agency to implement and enforce these regulations. The one kilogram level for the chemicals will, in the Agency's judgment, bring under full regulation virtually all of the substances being thrown away. The quantity limit for containers which have not been triple rinsed (20 liters) represents the Agency's judgment of probable exposure and consequential injury from the use of discarded containers. The Agency has records of damage incidents resulting from improperly disposed containers that occurred when people salvaged large containers for such uses as garbage containers and barbecue pits. The levels chosen for inner liners and spill residue and debris represent the same type of judgment based on probable exposure.

A number of commenters suggested that the proposed rule regarding containers be revised. The proposal had included within its scope all containers which had not been triple-rinsed. Some commenters argued that there were other effective ways of cleaning containers and therefore the rule was unduly restrictive. One commenter pointed out, for example, that the EPA registered label for certain pesticides requires different rinsing procedures from those specified in the proposed rule. EPA agrees with these comments and has revised the regulation to allow other cleaning methods provided they are equally effective.

The listing of spill residues and debris attracted several comments. One commenter suggested that small quantities of contaminated spill clean-up be excluded. EPA has, in the final regulation, excluded aggregate amounts of less than 100 kilograms. Another commenter felt that EPA should define the term "spill debris" more precisely to avoid including wrecked rail cars or trucks. EPA has chosen not to exclude such debris by definition. If contaminated, these items pose a substantial threat to human health and the environment and should be handled carefully. EPA presumes, however, that in virtually all cases, heavy equipment can be decontaminated and therefore will not become part of the contaminated debris.

C. Delisting

EPA's proposed regulations contained procedures allowing a person to show that a listed waste generated by an individual facility was not hazardous beause of plant-specific variations in raw materials, processes or other factors (§ 250.15). These demonstrations of non-hazardousness were to be based on the results of specific tests for each of the hazardous properties for which the waste was listed (§ 250.15(a)) and submitted and processed in accordance with procedures set forth in § 250.15(c) through (h) of the proposed regulations.

Although virtually all commenters supported the concept of a "delisting" process in principle, most were dissatisfied with the specifics of EPA's proposal. Many criticized the delisting standards as being too inflexible, too vague, and based on tests which EPA itself was unwilling to propose as characteristics or use as listing criteria; some specifically urged that other factors—including how a waste was managed at an individual facility—be considered in determining whether a waste should be delisted. Other commenters objected to the procedures themselves, urging EPA to provide trial-type hearings on delisting petitions, extensive procedural safeguards and multiple administrative appeals.

After re-examining its proposed regulation and considering public comments, EPA has concluded that its delisting procedures should be revised and simplified in four major respects.

First, EPA has concluded that the delisting of a waste from a particular

facility is really a modification of its original listing determination and therefore should take the form of a regulatory amendment to the lists of wastes in Subpart D. The informational requirements for petitions to amend Subpart D to exclude wastes from a particular generating facility are set forth in §§ 260.20 and 260.22 of this Chapter. EPA will follow the Administrative Procedures Act's informal rulemaking procedures in acting on them (*see* § 260.20).

Some commenters argued that EPA's delisting regulations should provide for elaborate adjudicatory hearings with administrative law judges. EPA thinks such procedures would be unduly costly, burdensome and time-consuming and that the relevant issues can be adequately aired and decided in informal rulemaking procedures. EPA is on firm legal ground in this regard, for RCRA requires only informal rulemaking here. The Supreme Court has recently confirmed that an agency need not provide more formal procedures than are specifically required by statute (*Vermont Yankee* v. *NRDC,* 435 U.S. 519, 524 (1978)).

The second major change which EPA has made in its delisting procedures pertains to the effect of filing a petition. In its proposal, EPA stated that a requested exclusion would take effect 90 days after submission, but that the Administrator could revoke the effectiveness at any time thereafter simply by disapproving the demonstration (§ 250.15(d)). In the regulations promulgated today, no exclusion will be deemed effective until either (i) EPA has taken final action under § 260.20(e), or (ii) EPA has granted a temporary exclusion on the grounds of substantial likelihood of success under § 260.22(m).

EPA has concluded that it would be inappropriate to consider a delisting petition effective until EPA has taken some affirmative action in response. Once a listing has been established through rulemaking procedures it must be presumed valid, and those seeking to amend any portion of it should have the burden of establishing the correctness of their position. The proposed provision allowing a demonstration to become effective without EPA action improperly shifted the burden. At the same time, new § 260.22(m) will benefit generators because EPA will be able to grant temporary exclusions in appropriate cases before the rulemaking process is complete.

The third major change which EPA has made to its proposed delisting regulations is to key the standards for approving a delisting petition to the criteria which EPA used to list the waste in the first place. This approach not only is consistent with EPA's decision to treat delisting as a rulemaking, but also is responsive to commenters' criticisms that EPA's proposed delisting standards were unrelated to its listing criteria. Moreover, because the listing criteria have been substantially clarified and expanded (see section V.B.), it is also responsive to objections that those standards were vague, inflexible and failed to consider the multiple factors which might cause a waste to be hazardous.

Two points concerning the standards for granting a delisting petition are deserving of special comment. First, the fact that a waste is properly managed by an individual facility is not grounds for delisting it, any more than the fact that a waste is generally properly managed by industry is grounds for not listing it (see section VII.A.). Second, in the case of a waste which has been listed for acute toxicity, a generator will be required to show not only that the waste does not meet EPA's acute toxicity criterion but also that it does not meet its general toxicity criterion. Although an off-specification acutely toxic waste or a mixture containing an acutely toxic waste may no longer be deadly, it may still continue to pose a substantial hazard to human health and the environment.

The final major revision which EPA has made in its proposed regulations relates to the effect of successful delisting petition. Under the regulations published today, a decision to exclude a waste from the hazardous waste lists in Subpart D is not a decision that the waste is not hazardous. It simply relegates the waste to the same general category as any other unlisted waste—*i.e.*, if the waste exhibits one of the characteristics, it must be regulated as hazardous waste. This approach is necessitated by the fact that wastes from individual facilities may exhibit characteristics not exhibited by waste in general and that, in deciding to list a waste, EPA has not tested it against every one of the characteristics.

VIII. Environmental, Economic and Regulatory Impacts

In accordance with Executive Order 11821, as amended by Executive Order 11949, and Executive Order 12044, EPA has prepared an Environmental Impact Analysis and a Regulatory Analysis of all of its Section 3001 through 3004 regulations. The Agency has also voluntarily prepared an Environmental Impact Statement for these regulations under the National Environmental Policy Act, 42 U.S.C. 4321 *et seq.*

Copies of these documents, and EPA's Reports Impact Analysis and Operations Resources Impact Analysis for Sections 3001 through 3004, may be reviewed in all EPA Regional Office Libraries, and at the EPA headquarters library, Room 2404, 401 M Street, S.W., Washington, D.C. 20460.

Appendix A—Scheduled June Promulgation

Generics

1. Paint residues generated from industrial painting
2. Wastewater treatment sludges from industrial painting [Comment: The above two listing descriptions have been changed from those originally proposed on December 18, 1978 (43 FR 58957) as: Paint wastes (such as used rags, slops latex sludge, spent solvent); Water-based paint waste; and Waste paint and varnish remover or stripper.]

Process Wastes

1. Woven fabric dying and finishing wastewater treatment sludges
2. Mercury bearing sludges from brine treatment and mercury bearing brine purification muds from the mercury cell process in chlorine production [Comment: This listing description includes two wastes which were originally proposed on December 18, 1978 (43 FR 58958) as: Mercury bearing sludges from brine purification muds from mercury cell process in chlorine production and mercury bearing brine purification muds from mercury cell process in chlorine production.]
3. Wastewater treatment sludge from the diaphragm cell process using graphite anodes in the production of chlorine [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Wastewater treatment sludge from diaphragm cell process in production of chlorine.]
4. Chlorinated hydrocarbon bearing wastes from the diaphragm cell process using graphite anodes in chlorine production [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Chlorinated hydrocarbon wastes from diaphragm cell process in chlorine production.]
5. Wastewater treatment sludges from the production of TiO_2 pigment using chromium bearing ores by the chloride process [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Chromium bearing wastewater treatment sludges from the production of TiO_2 pigment by the chloride process.]

6. Wastewater treatment sludges from the production of TiO_2 pigment using chromium bearing ores by the sulfate process [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Chromium bearing wastewater treatment sludges from the production of TiO_2 pigment by the sulfate process.]
7. Arsenic bearing sludges from the purification process in the production of antimony oxide
8. Antimony bearing wastewater treatment sludge from the production of antimony oxide
9. Solvent cleaning wastes from paint manufacturing
10. Water cleaning wastes from paint manufacturing
11. Caustic cleaning wastes from paint manufacturing
12. Wastewater treatment sludges from paint manufacturing
13. Air pollution control sludges from paint manufacturing [Comment: The above five listing descriptions have been changed from those originally proposed on December 18, 1978 (43 FR 58958) as: Wastewater treatment sludges from paint production and Air pollution control sludges from paint production.]
14. Still bottoms from aniline production
15. Sludges, wastes from tub washers (Ink Formulation)
16. Coking: Decanter tank tar/pitch/sludge [Comment: This listing description includes two wastes which were originally proposed on December 18, 1978 (43 FR 58959) as: Coking: Decanter tank tar and Coking: Decanter tank pitch sludge.]
17. Spend potliners (cathodes) from primary aluminum production
18. Lead bearing wastewater treatment sludges from gray iron foundries
19. Arsenic or organo-arsenic containing wastewater treatment sludges from the production of veterinary pharmaceuticals
20. Distillation residue from the separation of chlorobenzenes in the production of chlorobenzenes [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Distillation residues from fractionating tower for recovery of benzene and chlorobenzenes.]
21. Emission control dust/sludge from ferrochromium-silicon production [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58959) as: Ferrochromesilicon furnace emission control dust or sludge.]
22. Emission control dust/sludge from ferrochrome production [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58959) as: Ferrochrome emissions control: furnace baghouse dust, and ESP dust.]
23. Emission control dust/sludge from ferromanganese production [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58959) as: Ferromanganese emission control: baghouse dusts and scrub water solids.]

Appendix B*—Scheduled Fall Promulgation

Generic

1. Reactor clean-up wastes from the chlorination, dehydrochlorination, or oxychlorination of aliphatic hydrocarbons
2. Fractionation bottoms from the separation of chlorination hydrocarbons
3. Distillation bottoms from the separation of chlorinated aliphatic hydrocarbons
4. Washer wastes from the production of chlorinated aliphatic hydrocarbons
5. Spent catalyst from the production of chlorinated aliphatic hydrocarbons
6. Reactor clean-up wastes from the chlorination of cyclic aliphatic hydrocarbons
7. Fractionation bottoms from the separation of chlorinated cyclic aliphatic hydrocarbons
8. Distillation bottoms from the separation of chlorinated cyclic aliphatic hydrocarbons
9. Washer wastes from the production of chlorinated cyclic aliphatic hydrocarbons
10. Spent catalyst from the production of chlorinated cyclic aliphatic hydrocarbons
11. Batch residues from the batch production of chlorinated polymers
12. Solution residues from the production of chlorinated polymers
13. Reactor clean-up wastes from the chlorination of aromatic hydrocarbons
14. Fractionation bottoms from the separation of chlorinated aromatic hydrocarbons
15. Distillation bottoms from the separation of chlorinated aromatic hydrocarbons
16. Washer wastes from the production of chlorinated aromatic hydrocarbons
17. Waste Oil [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58957) as: Waste lubricating oil and Waste hydraulic or cutting oil.]
18. Polychlorinated biphenyls (PCB) and PCB items as defined in 40 CFR Part 761 [Comment: The Agency indicated in the preamble to the Section 3004 regulations (43 FR 58993), their intention to integrate the TSCA regulations for the disposal of PCB's with the RCRA hazardous waste regulations.]

Process Wastes

1. Sub-ore from underground and surface mining of uranium, overburden from surface mining of uranium and waste rock from underground mining of uranium with a radium-226 activity in excess of 5pCi/gm [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Waste rock and overburden from uranium mining.]
2. Leach zone overburden and discarded phosphate ore from phosphate surface mining and slimes from phosphate ore beneficiation [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Overburden and slimes from phosphate surface mining.]
3. Waste gypsum from processing phosphate ore to produce phosphoric acid [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Waste gypsum from phosphoric acid production.]
4. Slag and fluid bed prills from processing phosphate ore to produce elemental phosphorous [Comment: This listing description was originally proposed on December 18, 1978 (43 FR 58958) as: Slag and fluid bed prills from elemental phosphorous production.]
5. Washwater/sludges from ink printing equipment clean-up [Comment: This listing description includes three wastes which were originally proposed on August 22, 1979 (44 FR 49403 and 49404) as: Waste from equipment cleaning from flexoprinting in the manufacture of paperboard boxes; Waste from press clean-up in newspaper printing and Wash water from printing ink equipment cleaning.]
6. Wastes from photographic processing [Comment: This listing was originally proposed on August 22, 1979 (44 FR 49404) as: Waste Ferricyanide bleach, dichromate bleach, color developer (Agfa), bleach fix (Agfa) and acid solution from photographic processing.]
7. Lead acid storage battery production wastewater treatment sludges
8. Lead acid storage battery production clean-up wastes from cathode and anode paste production

*Since these wastes will not be promulgated until the fall, the listing descriptions for some of these wastes may change as additional information is gathered.

9. Nickel cadmium battery production wastewater treatment sludges
10. Lead slag from lead alkyl production
11. Emission control dust/sludge from reverberatory furnace and converters from primary copper production [Comment: This listing description was included in the listing description originally proposed on December 18, 1978 (43 FR 58959) as: Primary copper smelting and refining electric furnace slag, converter dust, acid plant sludge and reverberatory dust.]

Dated: May 2, 1980.

Douglas M. Costle,

Administrator.

Title 40 of the Code of Federal Regulations is amended by adding the following new Part 261:

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

Subpart A—General

Sec.

Subpart B—Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Wastes

Subpart C—Characteristics of Hazardous Waste

Subpart D—Lists of Hazardous Wastes

Appendices

Authority: Secs. 1006, 2002(a), 3001, and 3002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6905, 6912, 6921 and 6922).

Subpart A—General

§ 261.1 Purpose and scope.

(a) This Part identifies those solid wastes which are subject to regulation as hazardous wastes under Parts 262 through 265 and Parts 122 through 124 of this Chapter and which are subject to the notification requirements of Section 3010 of RCRA. In this Part:

(1) Subpart A defines the terms "solid waste" and "hazardous waste," identifies those wastes which are excluded from regulation under Parts 262 through 265 and 122 through 124 and establishes special management requirements for hazardous waste produced by small quantity generators and hazardous waste which is used, re-used, recycled or reclaimed.

(2) Subpart B sets forth the criteria used by EPA to identify characteristics of hazardous waste and to list particular hazardous wastes.

(3) Subpart C identifies characteristics of hazardous waste.

(4) Subpart D lists particular hazardous wastes.

(b) This Part identifies only some of the materials which are hazardous wastes under Sections 3007 and 7003 of RCRA. A material which is not a hazardous waste identified in this part is still a hazardous waste for purposes of those sections if:

(1) In the case of Section 3007, EPA has reason to believe that the material may be a hazardous waste within the meaning of Section 1004(5) of RCRA.

(2) In the case of Section 7003, the statutory elements are established.

§ 261.2 Definition of solid waste.

(a) A solid waste is any garbage, refuse, sludge or any other waste material which is not excluded under § 261.4(a).

(b) An "other waste material" is any solid, liquid, semi-solid or contained gaseous material, resulting from industrial, commercial, mining or agricultural operations, or from community activities which:

(1) Is discarded or is being accumulated, stored or physically, chemically or biologically treated prior to being discarded; or

(2) Has served its original intended use and sometimes is discarded; or

(3) Is a manufacuring or mining by-product and sometimes is discarded.

(c) A material is "discarded" if it is abandoned (and not used, re-used, reclaimed or recycled) by being:

(1) Disposed of; or

(2) Burned or incinerated, except where the material is being burned as a fuel for the purpose of recovering usable energy; or

(3) Physically, chemically, or biologically treated (other than burned or incinerated) in lieu of or prior to being disposed of.

(d) A material is "disposed of" if it is discharged, deposited, injected, dumped, spilled, leaked or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into ground or surface waters.

(e) A "manufacturing or mining by-product" is a material that is not one of the primary products of a particular manufacturing or mining operation, is a secondary and incidental product of the particular operation and would not be solely and separately manufactured or mined by the particular manufacturing or mining operation. The term does not include an intermediate manufacturing or mining product which results from one of the steps in a manufacturing or mining process and is typically processed through the next step of the process within a short time.

§ 261.3 Definition of hazardous waste.

(a) A solid waste, as defined in § 261.2, is a hazardous waste if:

(1) It is not excluded from regulation as a hazardous waste under § 261.4(b); and

(2) It meets any of the following criteria:

(i) It is listed in Subpart D and has not been excluded from the lists in Subpart D under §§ 260.20 and 260.22 of this Chapter.

(ii) It is a mixture of solid waste and one or more hazardous wastes listed in Subpart D and has not been excluded from this paragraph under §§ 260.20 and 260.22 of this Chapter.

(iii) It exhibits any of the characteristics of hazardous waste identified in Subpart C.

(b) A solid waste which is not excluded from regulation under paragraph (a)(1) of this section becomes a hazardous waste when any of the following events occur:

(1) In the case of a waste listed in Subpart D, when the waste first meets the listing description set forth in Subpart D.

(2) In the case of a mixture of solid waste and one or more listed hazardous wastes, when a hazardous waste listed

in Subpart D is first added to the solid waste.

(3) In the case of any other waste (including a waste mixture), when the waste exhibits any of the characteristics identified in Subpart C.

(c) Unless and until it meets the criteria of paragraph (d):

(1) A hazardous waste will remain a hazardous waste.

(2) Any solid waste generated from the treatment, storage or disposal of a hazardous waste, including any sludge, spill residue, ash, emission control dust or leachate (but not including precipitation run-off), is a hazardous waste.

(d) Any solid waste described in paragraph (c) of this section is not a hazardous waste if it meets the following criteria:

(1) In the case of any solid waste, it does not exhibit any of the characteristics of hazardous waste identified in Subpart C.

(2) In the case of a waste which is a listed waste under Subpart D, contains a waste listed under Subpart D or is derived from a waste listed in Subpart D, it also has been excluded from paragraph (c) under §§ 260.20 and 260.22 of this Chapter.

§ 261.4 Exclusions.

(a) *Materials which are not solid wastes.* The following materials are not solid wastes for the purpose of this Part:

(1) (i) Domestic sewage; and

(ii) Any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly-owned treatment works for treatment. "Domestic sewage" means untreated sanitary wastes that pass through a sewer system.

(2) Industrial wastewater discharges that are point source discharges subject to regulation under Section 402 of the Clean Water Act, as amended.

[Comment: This exclusion applies only to the actual point source discharge. It does not exclude industrial wastewaters while they are being collected, stored or treated before discharge, nor does it exclude sludges that are generated by industrial wastewater treatment.]

(3) Irrigation return flows.

(4) Source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 *et seq.*

(5) Materials subjected to in-situ mining techniques which are not removed from the ground as part of the extraction process.

(b) *Solid wastes which are not hazardous wastes.* The following solid wastes are not hazardous wastes:

(1) Household waste, including household waste that has been collected, transported, stored, treated, disposed, recovered (e.g., refuse-derived fuel) or reused. "Household waste" means any waste material (including garbage, trash and sanitary wastes in septic tanks) derived from households (including single and multiple residences, hotels and motels.)

(2) Solid wastes generated by any of the following and which are returned to the soils as fertilizers:

(i) The growing and harvesting of agricultural crops.

(ii) The raising of animals, including animal manures.

(3) Mining overburden returned to the mine site.

(4) Fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels.

(5) Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy.

§ 261.5 Special requirements for hazardous waste generated by small quantity generators.

(a) Except as otherwise provided in this section, if a person generates, in a calendar month, a total of less than 1000 kilograms of hazardous wastes, those wastes are not subject to regulation under Parts 262 through 265 and Parts 122 through 124 of this Chapter, and the notification requirements of Section 3010 of RCRA.

(b) If a person whose waste has been excluded from regulation under paragraph (a) of this Section accumulates hazardous wastes in quantities greater than 1000 kilograms, those accumulated wastes are subject to regulation under Parts 262 through 265 and Parts 122 through 124 of this Chapter, and the notification requirements of Section 3010 of RCRA.

(c) If a person generates in a calendar month or accumulates at any time any of the following hazardous wastes in quantities greater than set forth below, those wastes are subject to regulation under Parts 262 through 265 and Parts 122 through 124 of this Chapter, and the notification requirements of Section 3010 of RCRA:

(1) One kilogram of any commercial product or manufacturing chemical intermediate having the generic name listed in § 261.33(e).

(2) One kilogram of any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in § 261.33(e).

(3) Any containers identified in § 261.33(c) that are larger than 20 liters in capacity;

(4) 10 kilograms of inner liners from containers identified under § 261.33(c);

(5) 100 kilograms of any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in § 261.33(e).

(d) In order for hazardous waste to be excluded from regulation under this section, the generator must comply with § 262.11 of this Chapter. He must also either treat or dispose of the waste in an on-site facility, or ensure delivery to an off-site treatment, storage or disposal facility, either of which is:

(1) Permitted by EPA under Part 122 of this Chapter, or by a State with a hazardous waste management program authorized under Part 123 of this Chapter;

(2) In interim status under Parts 122 and 265 of this Chapter; or,

(3) Permitted, licensed, or registered by a State to manage municipal or industrial solid waste.

(e) Hazardous waste subject to the reduced requirements of this section may be mixed with non-hazardous waste and remain subject to these reduced requirements even though the resultant mixture exceeds the quantity limitations identified in this section, unless the mixture meets any of the characteristics of hazardous waste identified in Subpart C.

§ 261.6 Special requirements for hazardous waste which is used, re-used, recycled or reclaimed.

(a) Except as otherwise provided in paragraph (b) of this section, a hazardous waste which meets either of the following criteria is not subject to regulation under Parts 262 through 265 or Parts 122 through 124 of this Chapter and is not subject to the notification requirements of Section 3010 of RCRA until such time as the Administrator promulgates regulations to the contrary:

(1) It is being beneficially used or re-used or legitimately recycled or reclaimed.

(2) It is being accumulated, stored or physically, chemically or biologically treated prior to beneficial use or re-use or legitimate recycling or reclamation.

(b) A hazardous waste which is a sludge, or which is listed in Subpart D, or which contains one or more hazardous wastes listed in Subpart D; and which is transported or stored prior

to being used, re-used, recycled or reclaimed is subject to the following requirements with respect to such transportation or storage:

(1) Notification requirements under Section 3010 RCRA.

(2) Part 262 of this Chapter.

(3) Part 263 of this Chapter.

(4) Subparts A, B, C, D and E of Part 264 of this Chapter.

(5) Subparts A, B, C, D, E, G, H, I, J and L of Part 265 of this Chapter.

(6) Parts 122 and 124 of this Chapter, with respect to storage facilities.

Subpart B—Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Waste

§ 261.10 Criteria for identifying the characteristics of hazardous waste.

(a) The Administrator shall identify and define a characteristic of hazardous waste in Subpart C only upon determining that:

(1) A solid waste that exhibits the characteristic may:

(i) Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(ii) Pose a substantial present or potential hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed; and

(2) The characteristic can be:

(i) Measured by an available standardized test method which is reasonably within the capability of generators of solid waste or private sector laboratories that are available to serve generators of solid waste; or

(ii) Reasonably detected by generators of solid waste through their knowledge of their waste.

§ 261.11 Criteria for listing hazardous waste.

(a) The Administrator shall list a solid waste as a hazardous waste only upon determining that the solid waste meets one of the following criteria:

(1) It exhibits any of the characteristics of hazardous waste identified in Subpart C.

(2) It has been found to be fatal to humans in low doses or, in the absence of data on human toxicity, it has been shown in studies to have an oral LD 50 toxicity (rat) of less than 50 milligrams per kilogram, an inhalation LC 50 toxicity (rat) of less than 2 milligrams per liter, or a dermal LD 50 toxicity (rabbit) of less than 200 milligrams per kilogram or is otherwise capable of causing or significantly contributing to an increase in serious irreversible, or incapacitating reversible, illness. (Waste listed in accordance with these criteria will be designated Acute Hazardous Waste.)

(3) It contains any of the toxic constituents listed in Appendix VIII unless, after considering any of the following factors, the Administrator concludes that the waste is not capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed:

(i) The nature of the toxicity presented by the constituent.

(ii) The concentration of the constituent in the waste.

(iii) The potential of the constituent or any toxic degradation product of the constituent to migrate from the waste into the environment under the types of improper management considered in paragraph (a)(3)(vii) of this section.

(iv) The persistence of the constituent or any toxic degradation product of the constituent.

(v) The potential for the constituent or any toxic degradation product of the constituent to degrade into non-harmful constituents and the rate of degradation.

(vi) The degree to which the constituent or any degradation product of the constituent bioaccumulates in ecosystems.

(vii) The plausible types of improper management to which the waste could be subjected.

(viii) The quantities of the waste generated at individual generation sites or on a regional or national basis.

(ix) The nature and severity of the human health and environmental damage that has occurred as a result of the improper management of wastes containing the constituent.

(x) Action taken by other governmental agencies or regulatory programs based on the health or environmental hazard posed by the waste or waste constituent.

(xi) Such other factors as may be appropriate.

Substances will be listed on Appendix VIII only if they have been shown in scientific studies to have toxic, carcinogenic, mutagenic or teratogenic effects on humans or other life forms.

(Wastes listed in accordance with these criteria will be designated Toxic wastes.)

(b) The Administrator may list classes or types of solid waste as hazardous waste if he has reason to believe that individual wastes, within the class or type of waste, typically or frequently are hazardous under the definition of hazardous waste found in Section 1004(5) of the Act.

(c) The Administrator will use the criteria for listing specified in this section to establish the exclusion limits referred to in § 261.5(c).

Subpart C—Characteristics of Hazardous Waste

§ 261.20 General.

(a) A solid waste, as defined in § 261.2, which is not excluded from regulation as a hazardous waste under § 261.4(b), is a hazardous waste if it exhibits any of the characteristics identified in this Subpart.

[Comment: § 262.11 of this Chapter sets forth the generator's responsibility to determine whether his waste exhibits one or more of the characteristics identified in this Subpart]

(b) A hazardous waste which is identified by a characteristic in this subpart, but is not listed as a hazardous waste in Subpart D, is assigned the EPA Hazardous Waste Number set forth in the respective characteristic in this Subpart. This number must be used in complying with the notification requirements of Section 3010 of the Act and certain recordkeeping and reporting requirements under Parts 262 through 265 and Part 122 of this Chapter.

(c) For purposes of this Subpart, the Administrator will consider a sample obtained using any of the applicable sampling methods specified in Appendix I to be a representative sample within the meaning of Part 260 of this Chapter.

[Comment: Since the Appendix I sampling methods are not being formally adopted by the Administrator, a person who desires to employ an alternative sampling method is not required to demonstrate the equivalency of his method under the procedures set forth in §§ 260.20 and 260.21.]

§ 261.21 Characteristic of ignitability.

(a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

(1) It is a liquid, other than an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60°C (140°F), as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D–93–79, or a Setaflash Closed Cup Tester, using the test method specified in ASTM standard D–3278–78, or as determined by an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21.[1]

[1] ASTM Standards are available from ASTM, 1916 Race Street, Philadelphia, PA 19103.

(2) It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that is creates a hazard.

(3) It is an ignitable compressed gas as defined in 49 CFR 173.300 and as determined by the test methods described in that regulation or equivalent test methods approved by the Administrator under §§ 260.20 and 260.21.

(4) It is an oxidizer as defined in 49 CFR 173.151.

(b) A solid waste that exhibits the characteristic of ignitability, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D001.

§ 261.22 Characteristic of corrosivity.

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(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 the test method specified in the "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" [2] (also described in "Methods for Analysis of Water and Wastes" EPA 600/4–79–020, March 1979), or an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21.

(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 [3] as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," or an equivalent test method approved by the Administrator under the procedures set forth in §§ 260.20 and 260.21.

(b) A solid waste that exhibits the characteristic of corrosivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D002.

[2] This document is available from Solid Waste Information, U.S. Environmental Protection Agency, 26 W. St. Clair Street, Cincinnati, Ohio 45268.

[3] The NACE Standard is available from the National Association of Corrosion Engineers, P.O. Box 986, Katy, Texas 77450.

§ 261.23 Characteristic of reactivity.

(a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has *any* of the following properties:

(1) It is normally unstable and readily undergoes violent change without detonating.

(2) It reacts violently with water.

(3) It forms potentially explosive mixtures with water.

(4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

(6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

(7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

(8) It is a forbidden explosive as defined in 49 CFR 173.51, or a Class A explosive as defined in 49 CFR 173.53 or a Class B explosive as defined in 49 CFR 173.88.

(b) A solid waste that exhibits the characteristic of reactivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D003.

§ 261.24 Characteristic of EP Toxicity.

(a) A solid waste exhibits the characteristic of EP toxicity if, using the test methods 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 I 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.

(b) A solid waste that exhibits the characteristic of EP toxicity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

Table I.—Maximum Concentration of Contaminants for Characteristic of EP Toxicity—Continued

EPA hazardous waste number	Contaminant	Maximum concentration (milligrams per liter)
D004	Arsenic	5.0
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano naphthalene.	0.02
D013	Lindane (1,2,3,4,5,6-hexachlorocyclohexane, gamma isomer.	0.4
D014	Methoxychlor (1,1,1-Trichloro-2,2-bis [p-methoxyphenyl]ethane).	10.0
D015	Toxaphene ($C_{10}H_{10}Cl_8$, Technical chlorinated camphene, 67–69 percent chlorine).	0.5
D016	2,4-D, (2,4-Dichlorophenoxyacetic acid).	10.0
D017	2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid).	1.0

Subpart D—Lists of Hazardous Wastes

§ 261.30 General.

(a) A solid waste is a hazardous waste if it is listed in this Subpart, unless it has been excluded from this list under §§ 260.20 and 260.22.

(b) The Administrator will indicate his basis for listing the classes or types of wastes listed in this Subpart by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
EP Toxic Waste	(E)
Acute Hazardous Waste	(H)
Toxic Waste	(T)

Appendix VII identifies the constituent which caused the Administrator to list the waste as an EP Toxic Waste (E) or Toxic Waste (T) in §§ 261.31 and 261.32.

(c) Each hazardous waste listed in this Subpart is assigned an EPA Hazardous Waste Number which precedes the name of the waste. This number must be used in complying with the notification requirements of Section 3010 of the Act and certain recordkeeping and reporting requirements under Parts 262 through 265 and Part 122 of this Chapter.

(d) Certain of the hazardous wastes listed in § 261.31 or § 261.32 have exclusion limits that refer to § 261.5(c)(5).

§ 261.31 Hazardous waste from nonspecific sources.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The spent halogenated solvents used in degreasing, tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and the chlorinated fluorocarbons; and sludges from the recovery of these solvents in degreasing operations.	(T)
F002	The spent halogenated solvents, tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, trichlorofluoromethane and the still bottoms from the recovery of these solvents.	(T)
F003	The spent non-halogenated solvents, xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, n-butyl alcohol, cyclohexanone, and the still bottoms from the recovery of these solvents.	(I)
F004	The spent non-halogenated solvents, cresols and cresylic acid, nitrobenzene, and the still bottoms from the recovery of these solvents	(T)
F005	The spent non-halogenated solvents, methanol, toluene, methyl ethyl ketone, methyl isobutyl ketone, carbon disulfide, isobutanol, pyridine and the still bottoms from the recovery of these solvents.	(I, T)
F006	Wastewater treatment sludges from electroplating operations	(T)
F007	Spent plating bath solutions from electroplating operations	(R, T)
F008	Plating bath sludges from the bottom of plating baths from electroplating operations	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations	(R, T)
F010	Quenching bath sludge from oil baths from metal heat treating operations	(R, T)
F011	Spent solutions from salt bath pot cleaning from metal heat treating operations	(R, T)
F012	Quenching wastewater treatment sludges from metal heat treating operations	(T)
F013	Flotation tailings from selective flotation from mineral metals recovery operations	(T)
F014	Cyanidation wastewater treatment tailing pond sediment from mineral metals recovery operations	(T)
F015	Spent cyanide bath solutions from mineral metals recovery operations	(R, T)
F016	Dewatered air pollution control scrubber sludges from coke ovens and blast furnaces	(T)

§ 261.32 Hazardous waste from specific sources.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Wood Preservation: K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol	(T)
Inorganic Pigments:		
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments	(T)
K003	Wastewater treatment sludge from the production of molybdate orange pigments	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments	(T)
K008	Oven residue from the production of chrome oxide green pigments	(T)
Organic Chemicals:		
K009	Distillation bottoms from the production of acetaldehyde from ethylene	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile	(R, T)
K012	Still bottoms from the final purification of acrylonitrile in the production of acrylonitrile	(T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile	(R, T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile	(T)
K015	Still bottoms from the distillation of benzyl chloride	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride	(T)
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin	(T)
K018	Heavy ends from fractionation in ethyl chloride production	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production	(T)
K022	Distillation bottom tars from the production of phenol/acetone from cumene	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene	(T)
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene	(T)
K026	Stripping still tails from the production of methyl ethyl pyridines	(T)
K027	Centrifuge residue from toluene diisocyanate production	(R, T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane	(T)
K029	Waste from the product stream stripper in the production of 1,1,1-trichloroethane	(T)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene	(T)
Pesticides:		
K031	By-products salts generated in the production of MSMA and cacodylic acid	(T)
K032	Wastewater treatment sludge from the production of chlordane	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane	(T)
K035	Wastewater treatment sludges generated in the production of creosote	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton	(T)
K037	Wastewater treatment sludges from the production of disulfoton	(T)
K038	Wastewater from the washing and stripping of phorate production	(T)
K039	Filter cake from the filtration of diethylphosphorodithoric acid in the production of phorate	(T)
K040	Wastewater treatment sludge from the production of phorate	(T)
K041	Wastewater treatment sludge from the production of toxaphene	(T)
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D	(T)
Explosives:		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	(R)
K045	Spent carbon from the treatment of wastewater containing explosives	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds	(T)
K047	Pink/red water from TNT operations	(R)
Petroleum Refining:		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry	(T)
K049	Slop oil emulsion solids from the petroleum refining industry	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry	(T)
K051	API separator sludge from the petroleum refining industry	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry	(T)
Leather Tanning Finishing:		
K053	Chrome (blue) trimmings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearing.	(T)

§ 261.32 Hazardous waste from specific sources.—Continued

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
K054	Chrome (blue) shavings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.	(T)
K055	Buffing dust generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; and through-the-blue.	(T)
K056	Sewer screenings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.	(T)
K057	Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue and shearling.	(T)
K058	Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; and through-the-blue.	(R, T)
K059	Wastewater treatment sludges generated by the following subcategory of the leather tanning and finishing industry: hair save/non-chrome tan/retan/wet finish.	(R)
Iron and Steel:		
K060	Ammonia still lime sludge from coking operations	(T)
K061	Emission control dust/sludge from the electric furnace production of steel	(T)
K062	Spent pickle liquor from steel finishing operations	(C, T)
K063	Sludge from lime treatment of spent pickle liquor from steel finishing operations	(T)
Primary Copper: K064	Acid plant blowdown slurry/sludge resulting from the thickening of blowdown slurry from primary copper production	(T)
Primary Lead: K065	Surface impoundment solids contained in and dredged from surface impoundments at primary lead smelting facilities	(T)
Primary Zinc:		
K066	Sludge from treatment of process wastewater and/or acid plant blowdown from primary zinc production	(T)
K067	Electrolytic anode slimes/sludges from primary zinc production	(T)
K068	Cadmium plant leach residue (iron oxide) from primary zinc production	(T)
Secondary Lead: K069	Emission control dust/sludge from secondary lead smelting	(T)

§ 261.33 Discarded Commercial Chemical Products, Off-Specification Species, Containers, and Spill Residues Thereof.

The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded:

(a) Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this section.

(b) Any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraphs (e) or (f) of this section.

(c) Any container or inner liner removed from a container that has been used to hold any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraph (e) of this section, unless:

(1) The container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;

(2) The container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or

(3) In the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

(d) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this Section.

[Comment: The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in. . ." refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraphs (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraphs (e) or (f), such waste will be listed in either §§ 261.31 or 261.32 or will be identified as a hazardous waste by the characteristics set forth in Subpart C of this Part.]

(e) The commercial chemical products or manufacturing chemical intermediates, referred to in paragraphs (a) through (d) of this section, are identified as acute hazardous wastes (H) and are subject to the small quantity exclusion defined in § 261.5(c). These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Substance [1]
	1080 see P058
	1081 see P057
	(Acetato)phenylmercury see P092
	Acetone cyanohydrin see P069
P001	3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts
P002	1-Acetyl-2-thiourea
P003	Acrolein
	Agarin see P007
	Agrosan GN 5 see P092
	Aldicarb see P069
	Aldifen see P048

—Continued

Hazardous waste No.	Substance [1]
P004	Aldrin
	Algimycin see P092
P005	Allyl alcohol
P006	Aluminum phosphide (R)
	ALVIT see P037
	Aminoethylene see P054
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-Aminopyridine
	Ammonium metavanadate see P119
P009	Ammonium picrate (R)
	ANTIMUCIN WDR see P092
	ANTURAT see P073
	AQUATHOL see P088
	ARETIT see P020
P010	Arsenic acid
P011	Arsenic pentoxide
P012	Arsenic trioxide
	Athrombin see P001
	AVITROL see P008
	Aziridene see P054
	AZOFOS see P061
	Azophos see P061
	BANTU see P072
P013	Barium cyanide
	BASENITE see P020
	BCME see P016
P014	Benzenethiol
	Benzoepin see P050
P015	Beryllium dust
P016	Bis(chloromethyl) ether
	BLADAN-M see P071
P017	Bromoacetone
P018	Brucine
P019	2-Butanone peroxide
	BUFEN see P092
	Butaphene see P020
P020	2-sec-Butyl-4,6-dinitrophenol
P021	Calcium cyanide
	CALDON see P020
P022	Carbon disulfide
	CERESAN see P092
	CERESAN UNIVERSAL see P092
	CHEMOX GENERAL see P020
	CHEMOX P.E. see P020
	CHEM-TOL see P090
P023	Chloroacetaldehyde
P024	p-Chloroaniline
P025	1-(p-Chlorobenzoyl)-5-methoxy-2-methylindole-3-acetic acid
P026	1-(o-Chlorophenyl)thiourea
P027	3-Chloropropionitrile
P028	alpha-Chlorotoluene
P029	Copper cyanide
	CRETOX see P108
	Coumadin see P001
	Coumafen see P001
P030	Cyanides

Hazardous waste No.	Substance [1]
P031	Cyanogen
P032	Cyanogen bromide
P033	Cyanogen chloride
	Cyclodan see P050
P034	2-Cyclohexyl-4,6-dinitrophenol
	D-CON see P001
	DETHMOR see P001
	DETHNEL see P001
	DFP see P043
P035	2,4-Dichlorophenoxyacetic acid (2,4-D)
P036	Dichlorophenylarsine
	Dicyanogen see P031
P037	Dieldrin
	DIELDREX see P037
P038	Diethylarsine
P039	0,0-Diethyl-S-(2-(ethylthio)ethyl)ester of phosphorothioic acid
P040	0,0-Diethyl-0-(2-pyrazinyl)phosphorothioate
P041	0,0-Diethyl phosphoric acid, 0-p-nitrophenyl ester
P042	3,4-Dihydroxy-alpha-(methylamino)-methyl benzyl alcohol
P043	Di-isopropylfluorophosphate
	DIMETATE see P044
	1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro endo, endo see P060
P044	Dimethoate
P045	3,3-Dimethyl-1-(methylthio)-2-butanone-O-[(methylamino)carbonyl] oxime
P046	alpha,alpha-Dimethylphenethylamine
	Dinitrocyclohexylphenol see P034
P047	4,6-Dinitro-o-cresol and salts
P048	2,4-Dinitrophenol
	DINOSEB see P020
	DINOSEBE see P020
	Disulfoton see P039
P049	2,4-Dithiobiuret
	DNBP see P020
	DOLCO MOUSE CEREAL see P108
	DOW GENERAL see P020
	DOW GENERAL WEED KILLER see P020
	DOW SELECTIVE WEED KILLER see P020
	DOWICIDE G see P090
	DYANACIDE see P092
	EASTERN STATES DUOCIDE see P001
	ELGETOL see P020
P050	Endosulfan
P051	Endrin
	Epinephrine see P042
P052	Ethylcyanide
P053	Ethylenediamine
P054	Ethyleneimine
	FASCO FASCRAT POWDER see P001
	FEMMA see P091
P055	Ferric cyanide
P056	Fluorine
P057	2-Fluoroacetamide
P058	Fluoroacetic acid, sodium salt
	FOLODOL-80 see P071
	FOLODOL M see P071
	FOSFERNO M 50 see P071
	FRATOL see P058
	Fulminate of mercury see P065
	FUNGITOX OR see P092
	FUSSOF see P057
	GALLOTOX see P092
	GEARPHOS see P071
	GERUTOX see P020
P059	Heptachlor
P060	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo, endo-dimethanonaphthalene
	1,4,5,6,7,7-Hexachloro-cyclic-5-norbornene-2,3-dimethanol sulfite see P050
P061	Hexachloropropene
P062	Hexaethyl tetraphosphate
	HOSTAQUICK see P092
	HOSTAQUIK see P092
	Hydrazomethane see P068
P063	Hydrocyanic acid
	ILLOXOL see P037
	INDOCI see P025
	Indomethacin see P025
	INSECTOPHENE see P050
	Isodrin see P060
P064	Isocyanic acid, methyl ester
	KILOSEB see P020
	KOP-THIODAN see P050
	KWIK-KIL see P108
	KWIKSAN see P092
	KUMADER see P001
	KYPFARIN see P001
	LEYTOSAN see P092
	LIQUIPHENE see P092
	MALIK see P050
	MAREVAN see P001
	MAR-FRIN see P001
	MARTIN'D MAR-FRIN see P001
	MAVERAN see P001
	MEGATOX see P005
P065	Mercury fulminate
	MERSOLITE see P092
	METACID 50 see P071
	METAFOS see P071
	METAPHOR see P071
	METAPHOS see P071
	METASOL 30 see P092
P066	Methomyl
P067	2-Methylaziridine
	METHYL-E 605 see P071
P068	Methyl hydrazine
	Methyl isocyanate see P064
P069	2-Methyllactonitrile
P070	2-Methyl-2-(methylthio)propionaldehyde-o-(methylcarbonyl) oxime
	METHYL NITRON see P042
P071	Methyl parathion
	METRON see P071
	MOLE DEATH see P108
	MOUSE-NOTS see P108
	MOUSE-RID see P108
	MOUSE-TOX see P108
	MUSCIMOL see P007
P072	1-Naphthyl-2-thiourea
P073	Nickel carbonyl
P074	Nickel cyanide
P075	Nicotine and salts
P076	Nitric oxide
P077	p-Nitroaniline
P078	Nitrogen dioxide
P079	Nitrogen peroxide
P080	Nitrogen tetroxide
P081	Nitroglycerine (R)
P082	N-Nitrosodimethylamine
P083	N-Nitrosodiphenylamine
P084	N-Nitrosomethylvinylamine
	NYLMERATE see P092
	OCTALOX see P037
P085	Octamethylpyrophosphoramide
	OCTAN see P092
P086	Oleyl alcohol condensed with 2 moles ethylene oxide
	OMPA see P085
	OMPACIDE see P085
	OMPAX see P085
P087	Osmium tetroxide
P088	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
	PANWARFIN see P001
	PANORAM D-31 see P037
	PANTHERINE see P007
	PANWARFIN see P001
P089	Parathion
	PCP see P090
	PENNCAP-M see P071
	PENOXYL CARBON N see P048
P090	Pentachlorophenol
	Pentachlorophenate see P090
	PENTA-KILL see P090
	PENTASOL see P090
	PENWAR see P090
	PERMICIDE see P090
	PERMAGUARD see P090
	PERMATOX see P090
	PERMITE see P090
	PERTOX see P090
	PESTOX III see P085
	PHENMAD see P092
	PHENOTAN see P020
P091	Phenyl dichloroarsine
	Phenyl mercaptan see P014
P092	Phenylmercury acetate
P093	N-Phenylthiourea
	PHILIPS 1861 see P008
	PHIX see P092
P094	Phorate
P095	Phosgene
P096	Phosphine
P097	Phosphorothioic acid, 0,0-dimethyl ester, 0-ester with N,N-dimethyl benzene sulfonamide
	Phosphorothioic acid 0,0-dimethyl-0-(p-nitrophenyl) ester see P071
	PIED PIPER MOUSE SEED see P108
P098	Potassium cyanide
P099	Potassium silver cyanide
	PREMERGE see P020
P100	1,2-Propanediol
	Propargyl alcohol see P102
P101	Propionitrile
P102	2-Propyn-1-ol
	PROTHROMADIN See P001
	QUICKSAM see P092
	QUINTOX see P037
	RAT AND MICE BAIT see P001
	RAT-A-WAY see P001
	RAT-B-GON see P001
	RAT-O-CIDE #2 see P001
	RAT-GUARD see P001
	RAT-KILL see P001
	RAT-MIX see P001
	RATS-NO-MORE see P001
	RAT-OLA see P001
	RATOREX see P001
	RATTUNAL see P001
	RAT-TROL see P001
	RO-DETH see P001
	RO-DEX see P108
	ROSEX see P001
	ROUGH & READY MOUSE MIX see P001
	SANASEED see P108
	SANTOBRITE see P090
	SANTOPHEN see P060
	SANTOPHEN 20 see P090
	SCHRADAN see P085
P103	Selenourea
P104	Silver Cyanide
	SMITE see P105
	SPARIC see P020
	SPOR-KIL see P092
	SPRAY-TROL BRAND RODEN-TROL see P001
	SPURGE see P020
P105	Sodium azide
	Sodium coumadin see P001
P106	Sodium cyanide
	Sodium fluoroacetate see P058
	SODIUM WARFARIN see P001
	SOLFARIN see P001
	SOLFOBLACK BB see P048
	SOLFOBLACK SB see P048
P107	Strontium sulfide
P108	Strychnine and salts
	SUBTEX see P020
	SYSTAM see P085
	TAG FUNGICIDE see P092
	TEKWAISA see P071
	TEMIC see P070
	TEMIK see P070
	TERM-I-TROL see P090
P109	Tetraethyldithiopyrophosphate
P110	Tetraethyl lead
P111	Tetraethylpyrophosphate
P112	Tetranitromethane
	Tetraphosphoric acid, hexaethyl ester see P062
	TETROSULFUR BLACK PB see P048
	TETROSULPHUR PBR see P048
P113	Thallic oxide
	Thallium peroxide see P113
P114	Thallium selenite
P115	Thallium (I) sulfate
	THIFOR see P092
	THIMUL see P092
	THIODAN see P050
	THIOFOR see P050
	THIOMUL see P050
	THIONEX see P050
	THIOPHENIT see P071
P116	Thiosemicarbazide
	Thiosulfan tionel see P050
P117	Thiuram
	THOMPSON'S WOOD FIX see P060
	TIOVEL see P050
P118	Trichloromethanethiol
	TWIN LIGHT RAT AWAY see P001
	USAF RH-8 see P068
	USAF EK-4860 see P002
P119	Vanadic acid, ammonium salt
P120	Vanadium pentoxide
	VOFATOX see P071
	WANADU see P120
	WARCOUMIN see P001
	WARFARIN SODIUM see P001
	WARFICIDE see P001
	WOFOTOX see P072
	YANOCK see P057
	YASOKNOCK see P058
	ZIARNIK see P092
P121	Zinc cyanide
P122	Zinc phosphide (R,T)
	ZOOCOUMARIN see P001

[1] The Agency included those trade names of which it was aware; an omission of a trade name does not imply that the omitted material is not hazardous. The material is hazardous if it is listed under its generic name.

(f) The commercial chemical products or manufacturing chemical intermediates, referred to in paragraphs (a), (b) and (d) of this section, are identified as toxic wastes (T) unless otherwise designated and are subject to the small quantity exclusion defined in § 261.5 (a) and (b). These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous Waste No.	Substance[1]
	AAF see U005
U001	Acetaldehyde
U002	Acetone (I)
U003	Acetonitrile (I,T)
U004	Acetophenone
U005	2-Acetylaminofiourene
U006	Acetyl chloride (C,T)
U007	Acrylamide
	Acetylene tetrachloride see U209
	Acetylene trichloride see U228
U008	Acrylic acid (I)
U009	Acrylonitrile
	AEROTHENE TT see U226
	3-Amino-5-(p-acetamidophenyl)-1H-1,2,4-triazole, hydrate see U011
U010	6-Amino-1,1a,2,8,8a,8b-hexahydro-8-(hydroxymethyl)8-methoxy-5-methylcarbamate azirino(2',3':3,4) pyrrolo(1,2-a) indole-4, 7-dione (ester)
U011	Amitrole
U012	Aniline (I)
U013	Asbestos
U014	Auramine
U015	Azaserine
U016	Benz[c]acridine
U017	Benzal chloride
U018	Benz[a]anthracene
U019	Benzene
U020	Benzenesulfonyl chloride (C,R)
U021	Benzidine
	1,2-Benzisothiazolin-3-one, 1,1-dioxide see U202
	Benzo[a]anthracene see U018
U022	Benzo[a]pyrene
U023	Benzotrichloride (C,R,T)
U024	Bis(2-chloroethoxy)methane
U025	Bis(2-chloroethyl) ether
U026	N,N-Bis(2-chloroethyl)-2-naphthylamine
U027	Bis(2-chloroisopropyl) ether
U028	Bis(2-ethylhexyl) phthalate
U029	Bromomethane
U030	4-Bromophenyl phenyl ether
U031	n-Butyl alcohol (I)
U032	Calcium chromate
	Carbolic acid see U188
	Carbon tetrachloride see U211
U033	Carbonyl fluoride
U034	Chloral
U035	Chlorambucil
U036	Chlordane
U037	Chlorobenzene
U038	Chlorobenzilate
U039	p-Chloro-m-cresol
U040	Chlorodibromomethane
U041	1-Chloro-2,3-epoxypropane
	CHLOROETHENE NU see U226
U042	Chloroethyl vinyl ether
U043	Chloroethene
U044	Chloroform (I,T)
U045	Chloromethane (I,T)
U046	Chloromethyl methyl ether
U047	2-Chloronaphthalene
U048	2-Chlorophenol
U049	4-Chloro-o-toluidine hydrochloride
U050	Chrysene
	C.I. 23060 see U073
U051	Cresote
U052	Cresols
U053	Crotonaldehyde
U054	Cresylic acid
U055	Cumene
	Cyanomethane see U003
U056	Cyclohexane (I)
U057	Cyclohexanone (I)
U058	Cyclophosphamide
U059	Daunomycin
U060	DDD
U061	DDT
U062	Diallate
U063	Dibenz[a,h]anthracene
	Dibenzo[a,h]anthracene see U063
U064	Dibenzo[a,i]pyrene
U065	Dibromochloromethane
U066	1,2-Dibromo-3-chloropropane
U067	1,2-Dibromoethane
U068	Dibromomethane
U069	Di-n-butyl phthalate
U070	1,2-Dichlorobenzene
U071	1,3-Dichlorobenzene
U072	1,4-Dichlorobenzene
U073	3,3'-Dichlorobenzidine
U074	1,4-Dichloro-2-butene
	3,3'-Dichloro-4,4'-diaminobiphenyl see U073
U075	Dichlorodifluoromethane
U076	1,1-Dichloroethane
U077	1,2-Dichloroethane
U078	1,1-Dichloroethylene
U079	1,2-trans-dichloroethylene
U080	Dichloromethane
	Dichloromethylbenzene see U017
U081	2,4-Dichlorophenol
U082	2,6-Dichlorophenol
U083	1,2-Dichloropropane
U084	1,3-Dichloropropene
U085	Diepoxybutane (I,T)
U086	1,2-Diethylhydrazine
U087	0,0-Diethyl-S-methyl ester of phosphorodithioic acid
U088	Diethyl phthalate
U089	Diethylstilbestrol
U090	Dihydrosafrole
U091	3,3'-Dimethoxybenzidine
U092	Dimethylamine (I)
U093	p-Dimethylaminoazobenzene
U094	7,12-Dimethylbenz[a]anthracene
U095	3,3'-Dimethylbenzidine
U096	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	Dimethylcarbamoyl chloride
U098	1,1-Dimethylhydrazine
U099	1,2-Dimethylhydrazine
U100	Dimethylnitrosoamine
U101	2,4-Dimethylphenol
U102	Dimethyl phthalate
U103	Dimethyl sulfate
U104	2,4-Dinitrophenol
U105	2,4-Dinitrotoluene
U106	2,6-Dinitrotoluene
U107	Di-n-octyl phthalate
U108	1,4-Dioxane
U109	1,2-Diphenylhydrazine
U110	Dipropylamine (I)
U111	Di-n-propylnitrosamine
	EBDC see U114
	1,4-Epoxybutane see U213
U112	Ethyl acetate (I)
U113	Ethyl acrylate (I)
U114	Ethylenebisdithiocarbamate
U115	Ethylene oxide (I,T)
U116	Ethylene thiourea
U117	Ethyl ether (I,T)
U118	Ethylmethacrylate
U119	Ethyl methanesulfonate
	Ethylnitrile see U003
	Firemaster T23P see U235
U120	Fluoranthene
U121	Fluorotrichloromethane
U122	Formaldehyde
U123	Formic acid (C,T)
U124	Furan (I)
U125	Furfural (I)
U126	Glycidylaldehyde
U127	Hexachlorobenzene
U128	Hexachlorobutadiene
U129	Hexachlorocyclohexane
U130	Hexachlorocyclopentadiene
U131	Hexachloroethane
U132	Hexachlorophene
U133	Hydrazine (R,T)
U134	Hydrofluoric acid (C,T)
U135	Hydrogen sulfide
	Hydroxybenzene see U188
U136	Hydroxydimethyl arsine oxide
	4,4'-(Imidocarbonyl)bis(N,N-dimethyl)aniline see U014
U137	Indeno(1,2,3-cd)pyrene
U138	Iodomethane
U139	Iron Dextran
U140	Isobutyl alcohol
U141	Isosafrole
U142	Kepone
U143	Lasiocarpine
U144	Lead acetate
U145	Lead phosphate
U146	Lead subacetate
U147	Maleic anhydride
U148	Maleic hydrazide
U149	Malononitrile
	MEK Peroxide see U160
U150	Melphalan
U151	Mercury
U152	Methacrylonitrile
U153	Methanethiol
U154	Methanol
U155	Methapyrilene
	Methyl alcohol see U154
U156	Methyl chlorocarbonate
	Methyl chloroform see U226
U157	3-Methylcholanthrene
	Methyl chloroformate see U156
U158	4,4'-Methylene-bis-(2-chloroaniline)
U159	Methyl ethyl ketone (MEK) (I,T)
U160	Methyl ethyl ketone peroxide (R)
	Methyl iodide see U138
U161	Methyl isobutyl ketone
U162	Methyl methacrylate (R,T)
U163	N-Methyl-N'-nitro-N-nitrosoguanidine
U164	Methylthiouracil
	Mitomycin C see U010
U165	Naphthalene
U166	1,4-Naphthoquinone
U167	1-Naphthylamine
U168	2-Naphthylamine
U169	Nitrobenzene (I,T)
	Nitrobenzol see U169
U170	4-Nitrophenol
U171	2-Nitropropane (I)
U172	N-Nitrosodi-n-butylamine
U173	N-Nitrosodiethanolamine
U174	N-Nitrosodiethylamine
U175	N-Nitrosodi-n-propylamine
U176	N-Nitroso-n-ethylurea
U177	N-Nitroso-n-methylurea
U178	N-Nitroso-n-methylurethane
U179	N-Nitrosopiperidine
U180	N-Nitrosopyrrolidine
U181	5-Nitro-o-toluidine
U182	Paraldehyde
	PCNB see U185
U183	Pentachlorobenzene
U184	Pentachloroethane
U185	Pentachloronitrobenzene
U186	1,3-Pentadiene (I)
	Perc see U210
	Perchlorethylene see U210
U187	Phenacetin
U188	Phenol
U189	Phosphorous sulfide (R)
U190	Phthalic anhydride
U191	2-Picoline
U192	Pronamide
U193	1,3-Propane sultone
U194	n-Propylamine (I)
U196	Pyridine
U197	Quinones
U200	Reserpine
U201	Resorcinol
U202	Saccharin
U203	Safrole
U204	Selenious acid
U205	Selenium sulfide (R,T)
	Silvex see U233
U206	Streptozotocin
	2,4,5-T see U232
U207	1,2,4,5-Tetrachlorobenzene
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethene
	Tetrachloroethylene see U210
U211	Tetrachloromethane
U212	2,3,4,6-Tetrachlorophenol
U213	Tetrahydrofuran (I)
U214	Thallium (I) acetate
U215	Thallium (I) carbonate
U216	Thallium (I) chloride
U217	Thallium (I) nitrate
U218	Thioacetamide
U219	Thiourea
U220	Toluene
U221	Toluenediamine
U222	o-Toluidine hydrochloride

Hazardous Waste No.	Substance[1]
U223	Toluene diisocyanate
U224	Toxaphene
	2,4,5-TP see U233
U225	Tribromomethane
U226	1,1,1-Trichloroethane
U227	1,1,2-Trichloroethane
U228	Trichloroethene
	Trichloroethylene see U228
U229	Trichlorofluoromethane
U230	2,4,5-Trichlorophenol
U231	2,4,6-Trichlorophenol
U232	2,4,5-Trichlorophenoxyacetic acid
U233	2,4,5-Trichlorophenoxypropionic acid alpha, alpha, alpha- Trichlorotoluene see U023
	TRI-CLENE see U228
U234	Trinitrobenzene (R,T)
U235	Tris(2,3-dibromopropyl) phosphate
U236	Trypan blue
U237	Uracil mustard
U238	Urethane
	Vinyl chloride see U043
	Vinylidene chloride see U078
U239	Xylene

[1] The Agency included those trade names of which it was aware; an omission of a trade name does not imply that it is not hazardous. The material is hazardous if it is listed under its generic name.

Appendix I—Representative Sampling Methods

The methods and equipment used for sampling waste materials will vary with the form and consistency of the waste materials to be sampled. Samples collected using the sampling protocols listed below, for sampling waste with properties similar to the indicated materials, will be considered by the Agency to be representative of the waste.

Extremely viscous liquid—ASTM Standard D140–70 Crushed or powdered material—ASTM Standard D346–75 Soil or rock-like material—ASTM Standard D420–69 Soil-like material—ASTM Standard D1452–65

Fly Ash-like material—ASTM Standard D2234–76 [ASTM Standards are available from ASTM, 1916 Race St., Philadelphia, PA 19103]

Containerized liquid wastes—"COLIWASA" described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," [1] U.S. Environmental Protection Agency, Office of Solid Waste, Washington, D.C. 20460. [Copies may be obtained from Solid Waste Information, U.S. Environmental Protection Agency, 26 W. St. Clair St., Cincinnati, Ohio 45268]

Liquid waste in pits, ponds, lagoons, and similar reservoirs.—"Pond Sampler" described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods." [1]

This manual also contains additional information on application of these protocols.

[1] These methods are also described in "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA 600/2–80–018, January 1980.

Appendix II— EP Toxicity Test Procedure

A. Extraction Procedure (EP)

1. A representative sample of the waste to be tested (minimum size 100 grams) should be obtained using the methods specified in Appendix I or any other methods capable of yielding a representative sample within the meaning of Part 260. [For detailed guidance on conducting the various aspects of the EP see "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," SW–846, U.S. Environmental Protection Agency Office of Solid Waste, Washington, D.C. 20460.[1]]

2. The sample should be separated into its component liquid and solid phases using the method described in "Separation Procedure" below. If the solid residue [2] obtained using this method totals less than 0.5% of the original weight of the waste, the residue can be discarded and the operator should treat the liquid phase as the extract and proceed immediately to Step 8.

3. The solid material obtained from the Separation Procedure should be evaluated for its particle size. If the solid material has a surface area per gram of material equal to, or greater than, 3.1 cm^2 or passes through a 9.5 mm (0.375 inch) standard sieve, the operator should proceed to Step 4. If the surface area is smaller or the particle size larger than specified above, the solid material should be prepared for extraction by crushing, cutting or grinding the material so that it passes through a 9.5 mm (0.375 inch) sieve or, if the material is in a single piece, by subjecting the material to the "Structural Integrity Procedure" described below.

4. The solid material obtained in Step 3 should be weighed and placed in an extractor with 16 times its weight of deionized water. Do not allow the material to dry prior to weighing. For purposes of this test, an acceptable extractor is one which will impart sufficient agitation to the mixture to not only prevent stratification of the sample and extraction fluid but also insure that all sample surfaces are continously brought into contact with well mixed extraction fluid.

5. After the solid material and deionized water are placed in the extractor, the operator should begin agitation and measure the pH of the solution in the extractor. If the pH is greater than 5.0, the pH of the solution should be decreased to 5.0 ± 0.2 by adding 0.5 N acetic acid. If the pH is equal to or less than 5.0, no acetic acid should be added. The pH of the solution should be monitored, as described below, during the course of the extraction and if the pH rises above 5.2, 0.5N acetic acid should be added to bring the pH down to 5.0 ± 0.2. However, in no event shall the aggregate amount of acid added to the solution exceed 4 ml of acid per gram of solid. The mixture should be agitated for 24 hours and maintained at 20°–40° C (68°–104° F) during this time. It is recommended that the operator monitor and adjust the pH during the course of the extraction with a device such as the Type 45–A pH Controller manufactured by Chemtrix, Inc., Hillsboro, Oregon 97123 or its equivalent, in conjunction with a metering pump and reservoir of 0.5N acetic acid. If such a system is not available, the following manual procedure shall be employed:

(a) A pH meter should be calibrated in accordance with the manufacturer's specifications.

(b) The pH of the solution should be checked and, if necessary, 0.5N acetic acid should be manually added to the extractor until the pH reaches 5.0 ± 0.2. The pH of the solution should be adjusted at 15, 30 and 60 minute intervals, moving to the next longer interval if the pH does not have to be adjusted more than 0.5N pH units.

(c) The adjustment procedure should be continued for at least 6 hours.

(d) If at the end of the 24-hour extraction period, the pH of the solution is not below 5.2 and the maximum amount of acid (4 ml per gram of solids) has not been added, the pH should be adjusted to 5.0 ± 0.2 and the extraction continued for an additional four hours, during which the pH should be adjusted at one hour intervals.

6. At the end of the 24 hour extraction period, deionized water should be added to the extractor in an amount determined by the following equation:

V= (20)[W)−16(W)−A
V= ml deionized water to be added
W= weight in grams of solid charged to extractor
A= ml of 0.5N acetic acid added during extraction

7. The material in the extractor should be separated into its component liquid and solid phases as described under "Separation Procedure."

8. The liquids resulting from Steps 2 and 7 should be combined. This

[1] Copies may be obtained from Solid Waste Information, U.S. Environmental Protection Agency, 26 W. St. Clair Street, Cincinnati, Ohio 45268.

[2] The percent solids is determined by drying the filter pad at 80° C until it reaches constant weight and then calculating the percent solids using the following equation:

$$\frac{\text{(weight of pad + solid) − (tare weight of pad)}}{\text{initial weight of sample}} \times 100 = \% \text{ solids}$$

combined liquid (or the waste itself if it has less than ½ percent solids, as noted in Step 2) is the extract and should be analyzed for the presence of any of the contaminants specified in Table I of § 261.24 using the Analytical Procedures designated below.

Separation Procedure

Equipment: A filter holder, designed for filtration media having a nominal pore size of 0.45 micrometers and capable of applying a 5.3 kg/cm² (75 psi) hydrostatic pressure to the solution being filtered shall be used. For mixtures containing nonabsorptive solids, where separation can be affected without imposing a 5.3 kg/cm² pressure differential, vacuum filters employing a 0.45 micrometers filter media can be used. (For further guidance on filtration equipment or procedures see "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.")

Procedure: [3]

(i) Following manufacturer's directions, the filter unit should be assembled with a filter bed consisting of a 0.45 micrometer filter membrane. For difficult or slow to filter mixtures a prefilter bed consisting of the following prefilters in increasing pore size (0.65 micrometer membrane, fine glass fiber prefilter, and coarse glass fiber prefilter) can be used.

(ii) The waste should be poured into the filtration unit.

(iii) The reservoir should be slowly pressurized until liquid begins to flow from the filtrate outlet at which point the pressure in the filter should be immediately lowered to 10–15 psig. Filtration should be continued until liquid flow ceases.

(iv) The pressure should be increased stepwise in 10 psi increments to 75 psig and filtration continued until flow ceases or the pressurizing gas begins to exit from the filtrate outlet.

(v) The filter unit should be depressurized, the solid material removed and weighed and then transferred to the extraction apparatus, or, in the case of final filtration prior to analysis, discarded. Do not allow the material retained on the filter pad to dry prior to weighing.

(vi) The liquid phase should be stored at 4°C for subsequent use in Step 8.

B. Structural Integrity Procedure

Equipment: A Structural Integrity Tester having a 3.18 cm (1.25 in.) diameter hammer weighing 0.33 kg (0.73 lbs.) and having a free fall of 15.24 cm (6 in.) shall be used. This device is available from Associated Design and Manufacturing Company, Alexandria, VA., 22314, as Part No. 125, or it may be fabricated to meet the specifications shown in Figure 1.

Procedure:

1. The sample holder should be filled with the material to be tested. If the sample of waste is a large monolithic block, a portion should be cut from the block having the dimensions of a 3.3 cm (1.3 in.) diameter x 7.1 cm (2.8 in.) cylinder. For a fixated waste, samples may be cast in the form of a 3.3 cm (1.3 in.) diameter x 7.1 cm (2.8 in.) cylinder for purposes of conducting this test. In such cases, the waste may be allowed to cure for 30 days prior to further testing.

2. The sample holder should be placed into the Structural Integrity Tester, then the hammer should be raised to its maximum height and dropped. This should be repeated fifteen times.

3. The material should be removed from the sample holder, weighed, and transferred to the extraction apparatus for extraction.

Analytical Procedures for Analyzing Extract Contaminants

The test methods for analyzing the extract are as follows:

(1) For arsenic, barium, cadmium, chromium, lead, mercury, selenium or silver: "Methods for Analysis of Water and Wastes," Environmental Monitoring and Support Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268 (EPA–600/4–79–020, March 1979),

(2) For Endrin; Lindane; Methoxychlor; Toxaphene; 2,4-D; 2,4,5-TP Silver: in "Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater," September 1978, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 42568,

as standardized in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods."

For all analyses, the method of standard addition shall be used for the quantification of species concentration. This method is described in "Test Methods for the Evaluation of Solid Waste." (It is also described in "Methods for Analysis of Water and Wastes.")

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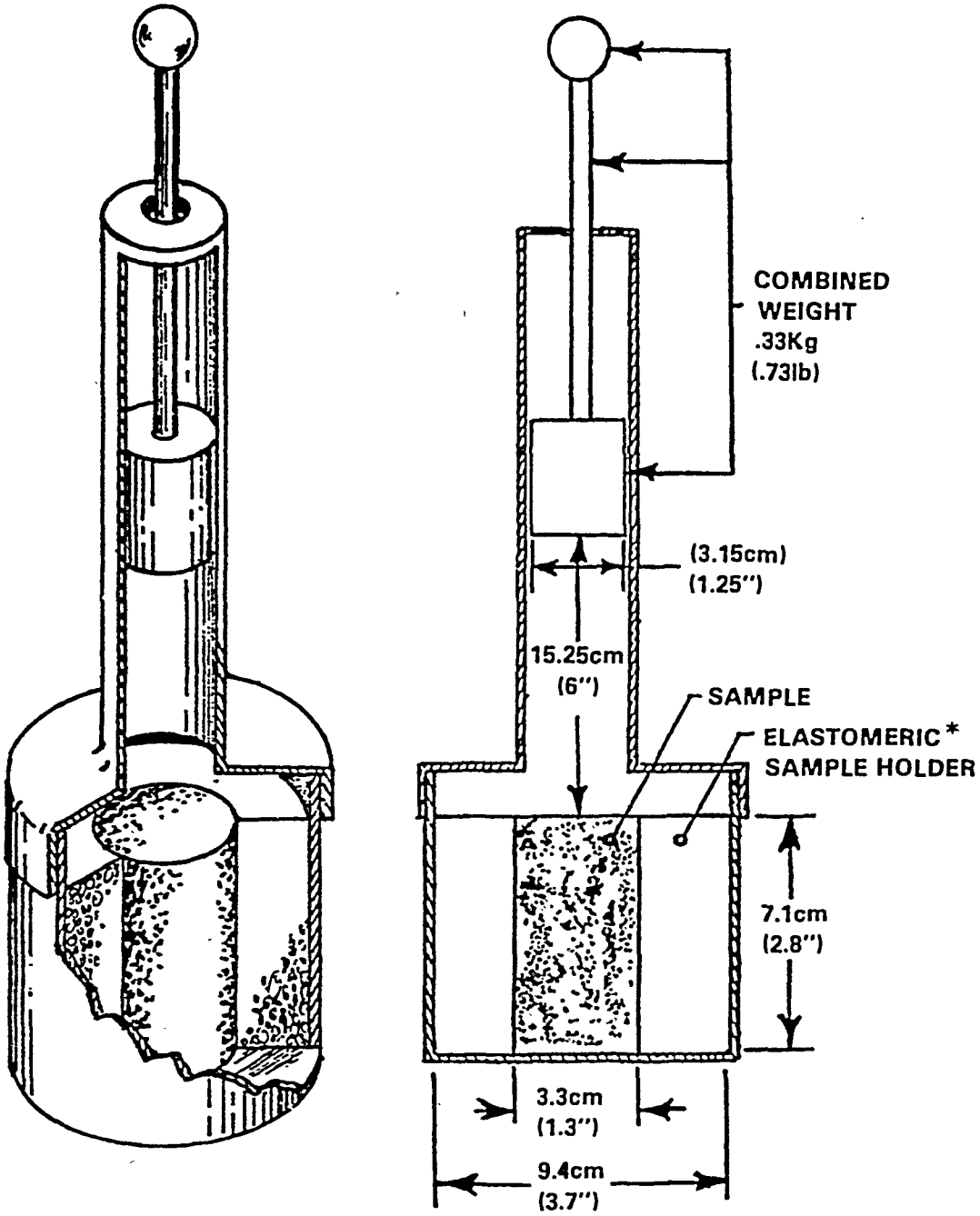
[3] This procedure is intended to result in separation of the "free" liquid portion of the waste from any solid matter having a particle size >0.45um. If the sample will not filter, various other separation techniques can be used to aid in the filtration. As described above, pressure filtration is employed to speed up the filtration process. This does not alter the nature of the separation. If liquid does not separate during filtration, the waste can be centrifuged. If separation occurs during centrifugation the liquid portion (centrifugate) is filtered through the 0.45um filter prior to becoming mixed with the liquid portion of the waste obtained from the initial filtration. Any material that will not pass through the filter after centrifugation is considered a solid and is extracted.



*ELASTOMERIC SAMPLE HOLDER FABRICATED OF MATERIAL FIRM ENOUGH TO SUPPORT THE SAMPLE

Figure 1

COMPACTION TESTER

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Appendix III—Chemical Analysis Test Methods

Tables 1, 2 and 3 specify the appropriate analytical procedures, described in "Test Methods for Evaluating Solid Waste" (SW–846), which should be used in determining whether the waste in question contains a given toxic constituent. Table 1 identifies the analytical class and the approved measurement techniques for each organic chemical listed in Appendix VII. Table 2 identifies the corresponding methods for the inorganic species. Table 3 identifies the specific sample preparation and measurement instrument introduction techniques which may be suitable for both the organic and inorganic species as well as the matrices of concern.

Prior to final selection of the analytical method the operator should consult the specific method descriptions in SW–846 for additional guidance on which of the approved methods should be employed for a specific waste analysis situation.

Table 1.—*Analytical Characteristics of Organic Chemicals*

Compound	Sample handling class/fraction	Non-GC methods	Measurement techniques		
			GC/MS	Conventional GC	Detector
Acetonitrile	Volatile		8.24	8.03	NSD
Acrolein	Volatile		8.24	8.03	NSD
Acrylamide	Volatile		8.24	8.01	FID
Acrylonitrile	Volatile		8.24	8.03	NSD
Benzene	Volatile		8.24	8.02	PID
Benz(a)anthracene	Extractable/BN	8.10 (HPLC)	8.25	8.10	FID
Benzo(a)pyrene	Extractable/BN	8.10 (HPLC)	8.25	8.10	FID
Benzotrichloride	Extractable/BN		8.25	8.12	ECD
Benzyl chloride	Volatile or Extractable/BN		8.24	8.01	HSD
			8.25	8.12	ECD
Benz(b)fluoanthene	Extractable/BN	8.10 (HPLC)	8.25	8.10	FID
Bis(2-chloroethoxymethane)	Volatile		8.24	8.01	HSD
Bis(2-chloroethyl)ether	Volatile		8.24	8.01	HSD
Bis(2-chloroisopropyl)ether	Volatile		8.24	8.01	HSD
Carbon disulfide	Volatile		8.24	8.01	HSD
Carbon tetrachloride	Volatile		8.24	8.01	HSD
Chlordane	Extractable/BN		8.25	8.08	HSD
Chlorinated dibenzodioxins	Extractable/BN		8.25	8.08	ECD
Chlorinated biphenyls	Extractable/BN		8.25	8.08	HSD
Chloroacetaldehyde	Volatile		8.24	8.01	HSD
Chlorobenzene	Volatile		8.24	8.01	HSD
				8.02	PID
Chloroform	Volatile		8.24	8.01	HSD
Chloromethane	Volatile		8.24	8.01	HSD
2-Chlorophenol	Extractable/BN		8.25	8.04	FID, ECD
Chrysene	Extractable/BN	8.10 (HPLC)	8.25	8.10	FID
Creosote	Extractable/BN		[1]8.25	8.10	ECD
Cresol(s)	Extractable/A		8.25	8.04	FID, ECD
Cresylic acid(s)	Extractable/A		8.25	8.04	FID, ECD
Dichlorobenzene(s)	Extractable/BN		8.25	8.01	HSD
				8.02	PID
				8.12	ECD
Dichloroethane(s)	Volatile		8.24	8.01	HSD
Dichloromethane	Volatile		8.24	8.01	HSD
Dichlorophenoxy-acetic acid	Extractable/A		8.25	8.40	HSD
Dichloropropanol	Extractable/BN		8.25	8.12	ECD
2,4-Dimethylphenol	Extractable/A		8.25	8.04	FID, ECD
Dinitrobenzene	Extractable/BN		8.25	8.09	FID, ECD
4,6-Dinotro-o-cresol	Extractable/A		8.25	8.04	FID, ECD
2,4-Dinitrotoluene	Extractable/BN		8.25	8.09	FID, ECD
Endrin	Extractable/P		8.25	8.08	HSD
Ethyl ether	Volatile		8.24	8.01	FID
				8.02	FID
Formaldehyde	Volatile		8.24	8.01	FID
Formic acid	Extractable/BN		8.25	8.06	FID
Heptachlor	Extractable/P		8.25	8.06	HSD
Hexachlorobenzene	Extractable/BN		8.25	8.12	ECD
Hexachlorobutadiene	Extractable/BN		8.25	8.12	ECD
Hexachloroethane	Extractable/BN		8.25	8.12	ECD
Hexachlorocyclopentadiene	Extractable/BN		8.25	8.12	ECD
Lindane	Extractable/P		8.25	8.08	HSD
Maleic anhydride	Extractable/BN		8.25	8.06	ECD, FID
Methanol	Volatile		8.24	8.01	FID
Methomyl	Extractable/BN	8.32 (HPLC)			
Methyl ethyl ketone	Volatile		8.25	8.01	FID
				8.02	FID
Methyl isobutyl ketone	Volatile		8.25	8.01	FID
				8.02	FID
Naphthalene	Extractable/BN		8.25	8.10	FID
Napthoquinone	Extractable/BN		8.25	8.06	ECD, FID
				8.09	FID
Nitrobenzene	Extractable/BN		8.25	8.09	ECD, FID
4-Nitrophenol	Extractable/A		8.24	8.04	ECD, FID
Paraldehyde (trimer of acetaldehyde).	Volatile		8.24	8.01	FID

Table 1.—*Analytical Characteristics of Organic Chemicals—Continued*

Compound	Sample handling class/fraction	Non-GC methods	Measurement techniques		
			GC/MS	Conventional GC	Conventional Detector
Pentachlorophenol	Extractable/A		8.25	8.04	ECD
Phenol	Extractable/A		8.25	8.04	ECD, FID
Phorate	Extractable/BN			8.22	FPD
Phosphorodithioic acid esters	Extractable/BN			8.06	ECD, FID
				8.09	ECD, FID
				8.22	FPD
Phthalic anhydride	Extractable/BN		8.25	8.06	ECD, FID
				8.09	ECD, FID
2-Picoline	Extractable/BN		8.25	8.06	ECD, FID
				8.09	ECD, FID
Pyridine	Extractable/BN		8.25	8.06	ECD, FID
				8.09	ECD, FID
Tetrachlorobenzene(s)	Extractable/BN		8.25	8.12	ECD
Tetrachloroethane(s)	Volatile		8.24	8.01	HSD
Tetrachloroethene	Volatile		8.24	8.01	HSD
Tetrachlorophenol	Extractable/A		8.24	8.04	ECD
Toluene	Volatile		8.24	8.02	PID
Toluenediamine	Extractable/BN		8.25		
Toluene diisocyanate(s)	Extractable/nonaqueous		8.25	8.06	FID
Toxaphene	Extractable/P		8.25	8.06	HSD
Trichloroethane	Volatile		8.24	8.01	HSD
Trichloroethene(s)	Volatile		8.24	8.01	HSD
Trichlorofluoromethane	Volatile		8.24	8.01	HSD
Trichlorophenol(s)	Extractable/A		8.25	8.04	HSD
2,4,5-TP (Silvex)	Extractable/A		8.25	8.40	HSD
Trichloropropane	Volatile		8.24	8.01	HSD
Vinyl chloride	Volatile		8.24	8.01	HSD
Vinylidene chloride	Volatile		8.24	8.01	HSD
Xylene	Volatile		8.24	8.02	PID

[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.

ECD = Electron capture detetor; FID = Flame ionization detector; FPD = Flame photometric detector; HSD = Halide specific detector; HPLC = High pressure liquid chromotography; NSD = Nitrogen-specific detector; PID = Photoionization detector.

Table 2—*Analytical Characteristics of Inorganic Species*

Species	Sample handling class	Measurement technique	Method number
Antimony	Digestion	Atomic absorbtion-furnace/flame	8.50
Arsenic	Hydride	Atomic absorbtion-flame	8.51
Barium	Digestion	Atomic absorbtion-furnace/flame	8.52
Cadmium	Digestion	Atomic absorbtion-furnace/flame	8.53
Chromium	Digestion	Atomic absorbtion-furnace/flame	8.54
Cyanides	Hydrolysis	Atomic absorbtion-spectroscopy	8.55
Lead	Digestion	Atomic absorbtion-furnace/flame	8.56
Mercury	Cold Vapor	Atomic absorbtion	8.57
Nickel	Digestion	Atomic absorbtion-furnace/flame	8.58
Selenium	Hydride digestion	Atomic absorbtion-furnace/flame	8.59
Silver	Digestion	Atomic absorbtion-furnace/flame	8.60

Table 3.—*Sample Prepartion/Sample Introduction Techniques*

Sample handling class	Physical characteristics of waste [1]		
	Fluid	Paste	Solid
Voltile	Purge and trap.	Purge and trap.	Headspace.
	Direct injection.	Headspace	
Semivolatile and nonvolatile.	Direct injection.	Shake out	Shake out. Soxhlet. Sonication.
	Shake out		
Inorganic	Direct injection.		
	Digestion	Digestion	Digestion.
	Hydride	Hydride	Hydride.

[1] For purposes of this Table, fluid refers to readily pourable liquids, which may or may not contain suspended particles. Paste-like materials, while fluid in the sense of flowability, can be thought of as being thixotropic or plastic in nature, e.g. paints. Solid materials are those wastes which can be handled without a container (i.e., can be piled up without appreciable sagging).

Procedure and Method Number(s)

Digestion—See appropriate procedure for element of interest.
Direct injection—8.80
Headspace—8.82
Hydride—See appropriate procedure for element of interest.
Purge & Trap—8.83
Shake out—8.84
Sonication—8.85
Soxhlet—8.86

Appendix VII.—*Basis for Listing Hazardous Wastes*

EPA hazardous waste No.	Hazardous constituents for which listed
F001	tetrachloroethylene, methylene chloride trichloroethylene, 1,1,1-trichloroethane chlorinated fluorocarbons, carbon tetrachloride
F002	tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, trichlorofluoromethane
F003	N.A.
F004	cresols and cresylic acid, nitrobenzene
F005	methanol, toluene, methyl ethyl ketone, methyl isobutyl ketone, carbon disulfide, isobutanol, pyridine
F006	cadmium, chromium, nickel, cyanide (complexed)
F007	cyanide (salts)
F008	cyanide (salts)
F009	cyanide (salts)
F010	cyanide (salts)
F011	cyanide (salts)
F012	cyanide (complexed)
F013	cyanide (complexed)
F014	cyanide (complexed)
F015	cyanide (salts)
F016	cyanide (complexed)
K001	benzene, benz(a)anthracene, benzo(a)pyrene, chrysene, 4-nitrophenol, toluene, naphthalene phenol, 2-chlorophenol, 2,4-dimethyl phenol, 2,4,6-trichlorophenol, pentachlorophenol, 4,6-dinitro-o-cresol, tetrachlorophenol
K002	chromium, lead
K003	chromium, lead
K004	chromium
K005	chromium, lead
K006	chromium
K007	cyanide (complexed), chromium
K008	chromium
K009	chloroform, formaldehyde, methylene chloride, methyl chloride, paraldehyde, formic acid
K010	chloroform, formaldehyde, methylene chloride, methyl chloride, paraldehyde, formic acid, chloroacetaldehyde
K011	acrylonitrile, acetonitrile, hydrocyanic acid
K012	acrylonitrile, acetonitrile, acrolein, acrylamide
K013	hydrocyanic acid, acrylonitrile, acetonitrile
K014	acetonitrile, acrylamide
K015	benzyl chloride, chlorobenzene, toluene, benzotrichloride
K016	hexachlorobenzene, hexachlorobutadiene, carbon tetrachloride, hexachloroethane, perchloroethylene
K017	epichlorohydrin, chloroethers [bis(chloromethyl) ether and bis (2-chloroethyl) ethers], trichloropropane, dichloropropanols
K018	1,2-dichloroethane, trichloroethylene, hexachlorobutadiene, hexachlorobenzene
K019	ethylene dichloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, tetrachloroethanes (1,1,2,2-tetrachloroethane and 1,1,1,2-tetrachloroethane), trichloroethylene, tetrachloroethylene, carbon tetrachloride, chloroform, vinyl chloride, vinylidene chloride

Appendix VII.—*Basis for Listing Hazardous Wastes*—Continued

EPA hazardous waste No.	Hazardous constituents for which listed
K020	ethylene dichloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, tetrachloroethanes (1,1,2,2-tetrachloroethane and 1,1,1,2-tetrachloroethane), trichloroethylene, tetrachloroethylene, carbon tetrachloride, chloroform, vinyl chloride, vinylidene chloride
K021	antimony, carbon tetrachloride, chloroform
K022	phenol, tars (polycyclic aromatic hydrocarbons)
K023	phthalic anahydride, maleic anhydride
K024	phthalic anhydride, polynuclear tar-like materials, naphthoquinone
K025	meta-dinitrobenzene, 2,4-dinitrotoluene
K026	paraldehyde, pyridines, 2-picoline
K027	toulene diisocyanate, toluene-2,4-diamine, tars (benzidimidazapone)
K028	1,1,1-trichloroethane, vinyl chloride
K029	1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, vinlyidene chloride, chloroform
K030	hexachlorobenzene, hexachlorobutadiene, hexachloroethane, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, ethylene dichloride
K031	arsenic
K032	hexachlorocyclopentadiene
K033	hexachlorocyclopentadiene
K034	hexachlorocyclopentadiene
K035	cresote, benz(a)anthracene, benz(b)fluoranthene, benzo(a)pyrene
K036	toulene, phosphorodithioic and phosphorothioic acid esters
K037	toulene, phosphorodithioic and phosphorothioic acid esters
K038	phorate, formaldehyde, phosphorodithioic and phosphorothioic acid esters
K039	phosphorodithioic and phosphorothioic acid esters
K040	phorate, formaldehyde, phosphorodithioic and phosphorothioic acid esters
K041	toxaphene
K042	hexachlorobenzene; ortho-dichlorobenzene
K043	2,4-dichlorophenol, 2,6-dichlorophenol, 2,4,6-trichlorophenol
K044	N.A.
K045	N.A.
K046	lead
K047	N.A.
K048	chromium, lead
K049	chromium, lead
K050	chromium
K051	chromium, lead
K052	lead
K053	chromium
K054	chromium
K055	chromium, lead
K056	chromium, lead
K057	chromium, lead
K058	chromium, lead
K059	N.A.
K060	cyanide, naphthalene, phenolic compounds, arsenic
K061	chromium, lead, cadmium
K062	chromium, lead
K063	chromium, lead
K064	lead, cadmium
K065	lead, cadmium
K066	lead, cadmium
K067	lead, cadmium
K068	lead, cadmium
K069	chromium, lead, cadmium

N.A.—Waste is hazardous because it meets either the ignitability, corrosivity or reactivity characteristic.

Appendix VIII—Hazardous Constituents

Acetaldehyde
(Acetato)phenylmercury
Acetonitrile
3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts
2-Acetylaminofluorene
Acetyl chloride
1-Acetyl-2-thiourea
Acrolein
Acrylamide
Acrylonitrile
Aflatoxins
Aldrin
Allyl alcohol
Aluminum phosphide
4-Aminobiphenyl
6-Amino-1,1a,2,8,8a,8b-hexahydro-8-(hydroxymethyl)-8a-methoxy-5-methylcarbamate azirino(2',3':3,4) pyrrolo(1,2-a)indole-4,7-dione (ester) (Mitomycin C)
5-(Aminomethyl)-3-isoxazolol
4-Aminopyridine
Amitrole
Antimony and compounds, N.O.S.[1]
Aramite
Arsenic and compounds, N.O.S.
Arsenic acid
Arsenic pentoxide
Arsenic trioxide
Auramine
Azaserine
Barium and compounds, N.O.S.
Barium cyanide
Benz[c]acridine
Benz[a]anthracene
Benzene
Benzenearsonic acid
Benzenethiol
Benzidine
Benzo[a]anthracene
Benzo[b]fluoranthene
Benzo[j]fluoranthene
Benzo[a]pyrene
Benzotrichloride
Benzyl chloride
Beryllium and compounds, N.O.S.
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl) ether
N,N-Bis(2-chloroethyl)-2-naphthylamine
Bis(2-chloroisopropyl) ether
Bis(chloromethyl) ether
Bis(2-ethylhexyl) phthalate
Bromoacetone
Bromomethane
4-Bromophenyl phenyl ether
Brucine
2-Butanone peroxide
Butyl benzyl phthalate
2-sec-Butyl-4,6-dinitrophenol (DNBP)
Cadmium and compounds, N.O.S.
Calcium chromate
Calcium cyanide
Carbon disulfide
Chlorambucil
Chlordane (alpha and gamma isomers)
Chlorinated benzenes, N.O.S.
Chlorinated ethane, N.O.S.
Chlorinated naphthalene, N.O.S.
Chlorinated phenol, N.O.S.
Chloroacetaldehyde
Chloroalkyl ethers
p-Chloroaniline
Chlorobenzene
Chlorobenzilate
1-(p-Chlorobenzoyl)-5-methoxy-2-methylindole-3-acetic acid
p-Chloro-m-cresol
1-Chloro-2,3-epoxybutane
2-Chloroethyl vinyl ether
Chloroform
Chloromethane
Chloromethyl methyl ether
2-Chloronaphthalene
2-Chlorophenol
1-(o-Chlorophenyl)thiourea
3-Chloropropionitrile
alpha-Chlorotoluene
Chlorotoluene, N.O.S.
Chromium and compounds, N.O.S.
Chrysene
Citrus red No. 2
Copper cyanide
Creosote
Crotonaldehyde
Cyanides (soluble salts and complexes), N.O.S.
Cyanogen
Cyanogen bromide
Cyanogen chloride
Cycasin
2-Cyclohexyl-4,6-dinitrophenol
Cyclophosphamide
Daunomycin
DDD
DDE
DDT
Diallate
Dibenz[a,h]acridine
Dibenz[a,j]acridine
Dibenz[a,h]anthracene(Dibenzo[a,h] anthracene)
7H-Dibenzo[c,g]carbazole
Dibenzo[a,e]pyrene
Dibenzo[a,h]pyrene
Dibenzo[a,i]pyrene
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
Dibromomethane
Di-n-butyl phthalate
Dichlorobenzene, N.O.S.
3,3'-Dichlorobenzidine
1,1-Dichloroethane
1,2-Dichloroethane
trans-1,2-Dichloroethane
Dichloroethylene, N.O.S.
1,1-Dichloroethylene
Dichloromethane
2,4-Dichlorophenol
2,6-Dichlorophenol
2,4-Dichlorophenoxyacetic acid (2,4-D)
Dichloropropane
Dichlorophenylarsine
1,2-Dichloropropane
Dichloropropanol, N.O.S.
Dichloropropene, N.O.S.
1,3-Dichloropropene
Dieldrin
Diepoxybutane
Diethylarsine
0,0-Diethyl-S-(2-ethylthio)ethyl ester of phosphorothioic acid
1,2-Diethylhydrazine
0,0-Diethyl-S-methylester phosphorodithioic acid
0,0-Diethylphosphoric acid, 0-p-nitrophenyl ester
Diethyl phthalate
0,0-Diethyl-0-(2-pyrazinyl)phosphorothioate
Diethylstilbestrol
Dihydrosafrole
3,4-Dihydroxy-alpha-(methylamino)-methyl benzyl alcohol
Di-isopropylfluorophosphate (DFP)
Dimethoate
3,3'-Dimethoxybenzidine
p-Dimethylaminoazobenzene
7,12-Dimethylbenz[a]anthracene
3,3'-Dimethylbenzidine
Dimethylcarbamoyl chloride

[1] The abbreviation N.O.S. signifies those members of the general class "not otherwise specified" by name in this listing.

1,1-Dimethylhydrazine
1,2-Dimethylhydrazine
3,3-Dimethyl-1-(methylthio)-2-butanone-0-((methylamino) carbonyl)oxime
Dimethylnitrosoamine
alpha,alpha-Dimethylphenethylamine
2,4-Dimethylphenol
Dimethyl phthalate
Dimethyl sulfate
Dinitrobenzene, N.O.S.
4,6-Dinitro-o-cresol and salts
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene Di-n-octyl phthalate
1,4-Dioxane
1,2-Diphenylhydrazine
Di-n-propylnitrosamine
Disulfoton
2,4-Dithiobiuret
Endosulfan
Endrin and metabolites
Epichlorohydrin
Ethyl cyanide
Ethylene diamine
Ethylenebisdithiocarbamate (EBDC)
Ethyleneimine
Ethylene oxide
Ethylenethiourea
Ethyl methanesulfonate
Fluoranthene
Fluorine
2-Fluoroacetamide
Fluoroacetic acid, sodium salt
Formaldehyde
Glycidylaldehyde
Halomethane, N.O.S.
Heptachlor
Heptachlor epoxide (alpha, beta, and gamma isomers)
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclohexane (all isomers)
Hexachlorocyclopentadiene
Hexachloroethane
1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo,endo-dimethanonaphthalene
Hexachlorophene
Hexachloropropene
Hexaethyl tetraphosphate
Hydrazine
Hydrocyanic acid
Hydrogen sulfide
Indeno(1,2,3-c,d)pyrene
Iodomethane
Isocyanic acid, methyl ester
Isosafrole
Kepone
Lasiocarpine
Lead and compounds, N.O.S.
Lead acetate
Lead phosphate
Lead subacetate
Maleic anhydride
Malononitrile
Melphalan
Mercury and compounds, N.O.S.
Methapyrilene
Methomyl
2-Methylaziridine
3-Methylcholanthrene
4,4'-Methylene-bis-(2-chloroaniline)
Methyl ethyl ketone (MEK)
Methyl hydrazine
2-Methyllactonitrile
Methyl methacrylate
Methyl methanesulfonate
2-Methyl-2-(methylthio)propionaldehyde-o-(methylcarbonyl) oxime
N-Methyl-N'-nitro-N-nitrosoguanidine
Methyl parathion
Methylthiouracil
Mustard gas
Naphthalene
1,4-Naphthoquinone
1-Naphthylamine
2-Naphthylamine
1-Naphthyl-2-thiourea
Nickel and compounds, N.O.S.
Nickel carbonyl
Nickel cyanide
Nicotine and salts
Nitric oxide
p-Nitroaniline
Nitrobenzene
Nitrogen dioxide
Nitrogen mustard and hydrochloride salt
Nitrogen mustard N-oxide and hydrochloride salt
Nitrogen peroxide
Nitrogen tetroxide
Nitroglycerine
4-Nitrophenol
4-Nitroquinoline-1-oxide
Nitrosamine, N.O.S.
N-Nitrosodi-N-butylamine
N-Nitrosodiethanolamine
N-Nitrosodiethylamine
N-Nitrosodimethylamine
N-Nitrosodiphenylamine
N-Nitrosodi-N-propylamine
N-Nitroso-N-ethylurea
N-Nitrosomethylethylamine
N-Nitroso-N-methylurea
N-Nitroso-N-methylurethane
N-Nitrosomethylvinylamine
N-Nitrosomorpholine
N-Nitrosonornicotine
N-Nitrosopiperidine
N-Nitrosopyrrolidine
N-Nitrososarcosine
5-Nitro-o-toluidine
Octamethylpyrophosphoramide
Oleyl alcohol condensed with 2 moles ethylene oxide
Osmium tetroxide
7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
Parathion
Pentachlorobenzene
Pentachloroethane
Pentachloronitrobenzene (PCNB)
Pentacholorophenol
Phenacetin
Phenol
Phenyl dichloroarsine
Phenylmercury acetate
N-Phenylthiourea
Phosgene
Phosphine
Phosphorothioic acid, O,O-dimethyl ester, O-ester with N,N-dimethyl benzene sulfonamide
Phthalic acid esters, N.O.S.
Phthalic anhydride
Polychlorinated biphenyl, N.O.S.
Potassium cyanide
Potassium silver cyanide
Pronamide
1,2-Propanediol
1,3-Propane sultone
Propionitrile
Propylthiouracil
2-Propyn-1-ol
Pryidine
Reserpine
Saccharin
Safrole
Selenious acid
Selenium and compounds, N.O.S.
Selenium sulfide
Selenourea
Silver and compounds, N.O.S.
Silver cyanide
Sodium cyanide
Streptozotocin
Strontium sulfide
Strychnine and salts
1,2,4,5-Tetrachlorobenzene
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
Tetrachloroethane, N.O.S.
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethene (Tetrachloroethylene)
Tetrachloromethane
2,3,4,6-Tetrachlorophenol
Tetraethyldithiopyrophosphate
Tetraethyl lead
Tetraethylpyrophosphate
Thallium and compounds, N.O.S.
Thallic oxide
Thallium (I) acetate
Thallium (I) carbonate
Thallium (I) chloride
Thallium (I) nitrate
Thallium selenite
Thallium (I) sulfate
Thioacetamide
Thlosemicarbazide
Thiourea
Thiuram
Toluene
Toluene diamine
o-Toluidine hydrochloride
Tolylene diisocyanate
Toxaphene
Tribromomethane
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene (Trichloroethylene)
Trichloromethanethiol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)
2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP) (Silvex)
Trichloropropane, N.O.S.
1,2,3-Trichloropropane
0,0,0-Triethyl phosphorothioate
Trinitrobenzene
Tris(1-azridinyl)phosphine sulfide
Tris(2,3-dibromopropyl) phosphate
Trypan blue
Uracil mustard
Urethane
Vanadic acid, ammonium salt
Vanadium pentoxide (dust)
Vinyl chloride
Vinylidene chloride
Zinc cyanide
Zinc phosphide

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Part IV

Environmental Protection Agency

Hazardous Waste Management System

Proposal To Modify 40 CFR Part 261—Hazardous Waste Lists

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 261

[FRL 1471-4]

Identification and Listing of Hazardous Wastes

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing to add eleven wastes to the interim final list of hazardous wastes which it is promulgating today under Section 3001 of the Resource Conservation and Recovery Act of 1976, as amended (RCRA). The effect of adding these wastes to the hazardous waste list will be to make them subject to the management standards issued by EPA under Sections 3002 through 3006 and 3010 of RCRA (Parts 262 through 265, 122 through 124 of this Chapter and 45 FR 12746).

DATES: EPA will accept public comments on the proposed listings until July 18, 1980. Any person may request a hearing on this proposal by filing a request with John P. Lehman, whose address appears below, by June 9, 1980. The request must contain the information prescribed in § 260.20(d) of this chapter.

ADDRESSES: Comments and requests for hearing should be addressed to John P. Lehman, Director, Hazardous and Industrial Waste Division, Office of Solid Waste [WH-565], U.S. Environmental Protection Agency, Washington, D.C. 20460. Communications should identify the regulatory docket number "Section 3001."

The public docket for this proposed rulemaking is located in Room 2711, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460 and is available for viewing from 9:00 a.m. to 4:00 p.m., Monday through Friday, excluding holidays.

FOR FURTHER INFORMATION CONTACT: Alan S. Corson, Office of Solid Waste (WH-565), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, (202) 755-9187.

SUPPLEMENTARY INFORMATION: Section 3001 of RCRA requires EPA to publish criteria for listing hazardous waste and to list particular hazardous wastes. In today's Federal Register EPA is promulgating interim final criteria for listing hazardous wastes (§ 261.11) along with an interim final list of hazardous wastes (Part 261, Subpart D). The Agency is now proposing to expand this list of hazardous wastes to add eleven wastes which EPA has determined meet its interim final listing criteria.

Included in this proposed supplemental listing are five wastes generated in the organic chemicals industry, four wastes from the manufacture of pesticides, one waste stream from the wood preserving industry and one waste stream from the non-ferrous metals industry. All eleven of these wastes were identified by the Agency in the course of developing the necessary technical data to support the interim final hazardous waste list promulgated today. These wastes and the hazards they pose to health or the environment are:

(1) *Distillation bottoms and heavy ends from the production of 1,1,1-trichloroethane.* These two wastes contain known carcinogens, many of which are soluble in water or are volatile. If the waste is improperly managed, the carcinogens may contaminate surface water, groundwater, or air.

(2) *Vacuum stripper discharge from chlordene chlorinator in the production of chlordane.* This waste contains dissolved or suspended highly toxic constituents which are soluble and may migrate through leaching from the waste if the waste is improperly managed.

(3) *Untreated wastewater from the production of 2,4-D.* This waste contains carcinogens and mutagens which are soluble in water. If the waste is improperly managed, these constituents can contaminate surface water or groundwater.

(4) *Wastewater from the production of methomyl.* This waste contains toxic compounds, a carcinogen and mutagenic substances. If this waste is improperly managed, these compounds could migrate from the waste and contaminate groundwater and surface water.

(5) *Distillation residues both light ends and bottoms from the production of phthalic anyhride from ortho-xylene.* These two wastes contain toxic compounds, a known carcinogen, and a suspected carcinogen. Some of these compounds are soluble in water, and, if the waste is improperly managed, these compounds can contaminate surface water and groundwater. If the residues are improperly incinerated, these compounds (or equally or more toxic degradation products) may be emitted into the air.

(6) *Wastewater from wood preserving processes that use creosote and/or pentachlorophenol.* This waste contains carcinogens, mutagens and toxic compounds, many of which are soluble in water or are volatile. If the waste is improperly managed, these compounds can contaminate surface water, groundwater, or air.

(7) *Untreated process wastewater from the production of toxaphene.* This waste contains toxaphene, a carcinogenic and extremely toxic compound. If the waste is improperly managed, this compound could migrate from the waste and contaminate groundwater and surface water.

(8) *Process wastewater from creosote production.* This waste contains a number of known carcinogens. If this waste is improperly managed, these compounds are capable of migrating and persisting in the environment and could contaminate surface water and groundwater.

(9) *Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.* This waste contains toxic heavy metals which, when solubilized, can contaminate surface water and groundwater if the waste is improperly managed.

When surface water, groundwater, or air is contaminated, human health or the environment can be adversely affected.

BACKGROUND DOCUMENT: Background documents have been prepared in support of this proposed rule. Copies are available for review in all EPA Regional office libraries, in the EPA headquarters (Public Information Reference Unit) Room 2404, Waterside Mall, 401 M Street, S.W., Washington, D.C. and in the docket located in Room 2711, Waterside Mall, 401 M Street, S.W., Washington, D.C.

ECONOMIC, ENVIRONMENTAL AND REGULATORY IMPACTS: In accordance with Executive Order 11821, as amended by Executive Order 11949, and OMB Circular A-107, EPA policy as stipulated in 39 FR 37419, October 21, 1974, and Executive Order 12044, analyses of the economic, environmental, and regulatory impacts were performed for the entirety of Subtitle C. EPA does not believe that amending Part 261 to add these additional wastes is a major action for the purposes of Executive Order 12044, in part because the wastes are generated by processes which produce other listed wastes and because the cost of managing those other listed wastes has already been accounted for in the final Regulatory Analysis which was prepared for the entirety of Subtitle C. However, EPA requests that any data commenters have on the generation rates of the wastes listed in the proposal, current management costs and practices for these wastes or on the cost or economic impacts of the proposed

regulations be sent to John P. Lehman at the address listed above.

Dated: May 2, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend Title 40 CFR, Part 261, by revising 40 CFR, Part 261, as follows:

§ 261.32 [Amended]

1. In § 261.32, add the following waste streams:

Industry	EPA hazardous waste No.*	Hazardous waste	Hazardous code
Wood preservation.		Wastewater from wood preserving processes that use creosote or pentachlorophenol.	(T).
Organic chemicals.		Distillation bottoms from the production of 1,1,1-trichloroethane.	(T).
		Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.	(T).
		Vacuum stripper discharge from chlordene chlorinator in the production of chlordane.	
		Distillation light ends from the production of phthalic anhydride from ortho-xylene.	(T).
		Distillation bottoms from the production of phthalic anhydride from ortho-xylene.	(T).
Pesticides.....		Untreated process wastewater from the production of toxaphene.	(T).
		Untreated wastewater from the production of 2,4-D.	(T).
		Wastewater from the production of methomyl.	(T).
		Process wastewater from creosote production.	(T).
Secondary lead.		Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting.	(T).

*The EPA Hazardous Waste Number will not be assigned until the listed waste is promulgated.

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