ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 148, 261, 264, 265, 268, 271, and 302

[SWH–FRL–6413–4]

RIN 2050–AD85

Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Chlorinated Aliphatics Production Wastes; Land Disposal Restrictions for Newly Identified Wastes; and CERCLA Hazardous Substance Designation and Reportable Quantities

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The EPA is proposing to list three of six wastes from the chlorinated aliphatics industry as hazardous wastes under the Resource Conservation and Recovery Act (RCRA), which directs EPA to determine whether certain wastes from the chlorinated aliphatics industry present a hazard to human health or the environment. The effect of listing these three wastes will be to subject them to stringent management and treatment standards under RCRA and to subject them to emergency notification requirements for releases of hazardous substances to the environment. EPA is proposing a contingent-management listing approach for one of these wastes, and as one of two options for another of these wastes, such that waste generators will have the option of their waste not being listed if it is sent to a specific type of management facility.

DATES: EPA will accept public comments on this proposed rule until November 23, 1999. Comments postmarked after this date will be marked ''late'' and may not be considered. Any person may request a public hearing on this proposal by filing a request by September 8, 1999.

ADDRESSES: If you wish to comment on this proposed rule, you must send an original and two copies of the comments referencing docket number F–1999–CALP–FFFFF to: RCRA Docket Information Center, Office of Solid Waste (5305G), U.S. Environmental Protection Agency Headquarters (EPA, HQ), 401 M Street, SW, Washington, D.C. 20460. Hand deliveries of comments should be made to the Arlington, VA, address listed in the fourth paragraph of **SUPPLEMENTARY INFORMATION**. You also may submit comments electronically by sending electronic mail through the Internet to: rcradocket@epamail.epa.gov. See the beginning of **SUPPLEMENTARY INFORMATION** for instructions on electronic submission.

You should not submit electronically any confidential business information (CBI). You must submit an original and two copies of CBI under separate cover to: RCRA CBI Document Control Officer, Office of Solid Waste (5305W), U.S. EPA, 401 M Street, SW, Washington, D.C. 20460. See the beginning of **SUPPLEMENTARY INFORMATION** for information on viewing public comments and supporting materials.

Address requests for a hearing to Mr. David Bussard at: Office of Solid Waste, Hazardous Waste Identification Division (5304W), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460, (703) 308–8880.

FOR FURTHER INFORMATION CONTACT: For general information, contact the RCRA Hotline at (800) 424–9346 or TDD (800) 553–7672 (hearing impaired). In the Washington, D.C., metropolitan area, call (703) 412–9810 or TDD (703) 412–3323. For information on specific aspects of the rule, contact Ross Elliott of the Office of Solid Waste (5304W), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460. [E-mail addresses and telephone numbers: elliott.ross@epamail.epa.gov, (703) 308–8748.]

SUPPLEMENTARY INFORMATION: You should identify comments in electronic format with the docket number F–1999–CALP–FFFFF. You must submit all electronic comments as an ASCII (text) file, avoiding the use of special characters and any form of encryption. If you do not submit comments electronically, EPA is asking prospective commenters to voluntarily submit one additional copy of their comments on labeled personal computer diskettes in ASCII (text) format or a word processing format that can be converted to ASCII (text). It is essential to specify on the disk label the word processing software and version/edition as well as the commenter's name. This will allow EPA to convert the comments into one of the word processing formats utilized by the Agency. Please use mailing envelopes designed to physically protect the submitted diskettes. EPA emphasizes that submission of comments on diskettes is not mandatory, nor will it result in any advantage or disadvantage to any commenter. Supporting documents in the docket for this Notice are also available in electronic format on the Internet. Follow these instructions to access these documents.

WWW: http://www.epa.gov/epaoswer/hazwaste/id

FTP: ftp.epa/gov

Login: anonymous

Password: your Internet address

Files are located in /pub/gopher/OSWRCRA.

EPA will keep the official record for this action in paper form. Accordingly, we will transfer all comments received electronically into paper form and place them in the official record, which will also include all comments submitted directly in writing. The official record is the paper record maintained at the address in **ADDRESSES** at the beginning of this document.

EPA responses to comments, whether the comments are written or electronic, will be in a notice in the **Federal Register** or in a response to comments document placed in the official record for this rulemaking. We will not immediately reply to commenters electronically other than to seek clarification of electronic comments that may be garbled in transmission or during conversion to paper form, as discussed above.

You may view public comments and supporting materials in the RCRA Information Center (RIC), located at Crystal Gateway I, First Floor, 1235 Jefferson Davis Highway, Arlington, VA. The RIC is open from 9 a.m. to 4 p.m., Monday through Friday, excluding federal holidays. To review docket materials, we recommend that you make an appointment by calling (703) 603–9230. You may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost $0.15/page. For information on accessing paper and/or electronic copies of the document, see the first paragraph of the **SUPPLEMENTARY INFORMATION** section.

Customer Service

How Can I Influence EPA's Thinking on This Proposed Rule?

In developing this proposal, we tried to address the concerns of all our stakeholders. Your comments will help us improve this rule. We invite you to provide different views on options we propose, new approaches we haven't considered, new data, how this rule may affect you, or other relevant information. We welcome your views on all aspects of this proposed rule, but we request comments in particular on the items indicated at the end of each section. Your comments will be most effective if you follow the suggestions below:

- Explain your views as clearly as possible and provide a summary of the reasoning you used to arrive at your

conclusions, as well as examples to illustrate your views, where possible.

- Provide solid technical and cost data to support your views.
- If you estimate potential costs, explain how you arrived at your estimate.
- Tell us which parts you support, as well as those with which you disagree.
- Offer specific alternatives.
- Reference your comments to specific sections of the proposal, such as the sections or page numbers of the preamble, or the regulatory citations.
- Remember that your comments must be submitted by the deadline in this notice.
- Include the name, date, and docket number with your comments.

Contents of This Proposed Rule

The contents of the preamble to this proposed rule are listed in the following outline:

I. Overview

A. Who Potentially Will Be Affected by This Proposed Rule?

Beginning January 1, 1999 all documents related to USEPA's regulatory, compliance and enforcement activities including rules, policies, interpretive guidance, and site-specific determinations with broad application, should properly identify the regulated entities, including descriptions that correspond to the applicable SIC codes or NAICS codes (source: 09 October 1998 USEPA memo from Peter D. Robertson, Acting Deputy Administrator of USEPA). Today's action, if finalized, could potentially affect those who handle the wastes that EPA is proposing to add to the Agency's list of hazardous wastes under the RCRA program. This action also may affect entities that may need to respond to releases of these wastes as CERCLA hazardous substances. These potentially-affected entities are described in the Economics Background Document placed in the docket in support of today's proposed rule; a summary is shown in the table below.

SUMMARY OF FACILITIES POTENTIALLY AFFECTED BY THE USEPA'S 1999 CHLORINATED ALIPHATICS MANUFACTURING WASTE LISTING PROPOSAL ACCORDING TO APPLICABLE SIC AND NAICS CODES

Item	Parent company SIC code	Industry sector name	Number of U.S. relevant CAHC mfg. facilities*	Parent company NAICS code equivalent**
1	1311	Mining: Crude petroleum and natural gas	3	211111
2	1400	Mining: Nonmetallic minerals, except fuels	2	212300

SUMMARY OF FACILITIES POTENTIALLY AFFECTED BY THE USEPA'S 1999 CHLORINATED ALIPHATICS MANUFACTURING WASTE LISTING PROPOSAL ACCORDING TO APPLICABLE SIC AND NAICS CODES—Continued

Item	Parent company SIC code	Industry sector name	Number of U.S. relevant CAHC mfg. facilities*	Parent company NAICS code equivalent**
3	2295	Manufacturing: Coated fabrics, not rubberized	1	31332
4	2800	Manufacturing: Chemicals & allied products	3	325000
5	2810	Manufacturing: Chemicals & allied products	1	325000
6	2812	Manufacturing: Alkalies & chlorine manufacture	1	325181
7	2821	Manufacturing: Plastics materials & resins	8	325211
8	2851	Manufacturing: Paints & allied products	1	32551
9	2869	Manufacturing: Industrial organic chemicals, nec	1	32511
10	2911	Manufacturing: Petroleum refining	1	32411
11	3600	Manufacturing: Electronic & other electric equipment	1	335000
		Total Applicable Facilities	23	

*The number of relevant facilities is based on the (a) type of CAHC products manufactured, (b) types of wastes generated, and (c) baseline waste management practices, in relation to the terms and conditions of the proposed listing options. However, all CAHC manufacturing facilities in each industrial sector code may not be affected by the proposed listing options.

**OSW–EMRAD derived the NAICS code equivalents above from the SIC-to-NAICS conversion tables provided by the US Department of Commerce, Bureau of the Census, at the following website: *http://www.census.gov/epcd/www/naicstab.htm.* There is no direct match in the SIC–NAICS conversion tables for SIC codes 1400, 2800, 2810, and 3600, so a generalized six-digit NAICS code is provided above for these four cases.

The list of potentially affected entities in the above table may not be exhaustive. Our aim is to provide a guide for readers regarding entities likely to be regulated by this action. This table lists those entities that EPA is aware potentially could be affected by this action. However, this action may affect other entities not listed in the table. To determine whether your facility is regulated by this action, you should examine 40 CFR 260 and 261 carefully in concert with the proposed rules amending RCRA that are found at the end of this **Federal Register** notice. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding section entitled FOR FURTHER INFORMATION CONTACT.

B. Why Does This Rule Read Differently From Other Listing Rules?

Today's proposed listing determination preamble and regulations are written in ''readable regulations'' format. The authors tried to use active rather than passive voice, plain language, a question-and-answer format, the pronouns ''we'' for EPA and ''you'' for the owner/generator, and other techniques to make the information in today's rule easier to read and understand. This new format is part of the Agency's efforts at regulatory reinvention, and it makes today's rule read differently from other listing rules. The Agency believes that this new format will increase readers' abilities to understand the regulations, which should then increase compliance, make enforcement easier, and foster better relationships between EPA and the regulated community.

C. What Are the Statutory Authorities for This Rule?

These regulations are being proposed under the authority of Sections 2002(a), 3001(b), 3001(e)(2) and 3007(a) of the Solid Waste Disposal Act, 42 U.S.C. 6912(a), 6921(b) and (e)(2), and 6927(a) as amended several times, most importantly by the Hazardous and Solid Waste Amendments of 1984 (HSWA). These statutes commonly are referred to as the Resource Conservation and Recovery Act (RCRA), and are codified at Volume 42 of the United States Code (U.S.C.), Sections 6901 to 6992(k) (42 U.S.C. 6901–6992(k)).

Section 102(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9602(a) is the authority under which the CERCLA aspects of this rule are being proposed.

II. Background

A. Schedule Suit

In 1989, the Environmental Defense Fund (EDF) sued the Environmental Protection Agency (EPA), in part for failing to meet the statutory deadlines of Section 3001(e)(2) of RCRA (EDF vs. Browner; Civ. No. 89–0598 D.D.C.). To resolve most of the issues in the case, EDF and EPA entered into a consent decree, which has been amended several times to revise dates. The consent decree sets out deadlines for promulgating certain RCRA rules and for completing certain studies and reports. Paragraph 1. m. of the consent decree obliges EPA to propose a hazardous waste listing determination for wastewaters and wastewater treatment sludges generated from the production of specified chlorinated aliphatic chemicals. The wastewater and wastewater treatment sludges subject to the consent decree are those from the production of chlorinated aliphatics for which other process wastes already have been designated as hazardous waste F024 in 40 CFR 261.31. According to the consent decree, EPA must propose listing determinations by July 30, 1999 and promulgate final listing determinations on or before September 30, 2000. Today EPA is proposing listing determinations for these wastes in accordance with the consent decree.

B. Existing Chlorinated Aliphatics Listings

Today's proposal does not affect the scope of the chlorinated aliphatics process wastes that already have been listed as hazardous in prior EPA rulemakings. These wastes include wastes designated as hazardous waste code F024 as well as a number of other chlorinated aliphatic wastes listed below in Table II–1. EPA is not soliciting comment on these existing hazardous waste listings and does not intend to respond to such comments, if received.

Likewise, EPA is not soliciting comments in today's rule on the applicability of the existing chlorinated aliphatics listings to the provisions of CERCLA. Wastes listed as hazardous

under RCRA are by definition hazardous substances under CERCLA, and are included in the list of hazardous substances in 40 CFR 302.4, along with their corresponding reportable quantities (''RQs''). Hazardous substance RQs are those quantities of the designated chemical or waste that trigger certain reporting requirements if released to the environment. The previously listed hazardous wastes from chlorinated aliphatics production and their corresponding RQs are listed below in Table II–1.

TABLE II–1.—LIST OF CURRENTLY-REGULATED CHLORINATED ALIPHATIC PROCESS WASTES AND CORRESPONDING REPORTABLE QUANTITIES AS CERCLA HAZARDOUS SUBSTANCES

Hazardous substance	RQ pounds (KG)
F024—Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor cleanout wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. [This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in 40 CFR 261.31 or 261.32.]	1 (0.454)
F025—Condensed light ends, spent filters and filter aids, and spent dessicant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	1 (0.454)
K016—Heavy ends or distillation residues from the production of carbon tetrachloride.	1 (0.454)
K018—Heavy ends from the fractionation column in ethyl chloride production.	1 (0.454)
K019—Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.	1 (0.454)
K020—Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.	1 (0.454)
K028—Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.	1 (0.454)
K029—Waste from the product steam stripper in the production of 1,1,1-trichloroethane.	1 (0.454)
K030—Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.	1 (0.454)
K095—Distillation bottoms from the production of 1,1,1-trichloroethane.	1 (0.454)
K096—Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.	1 (0.454)

III. Today's Action

A. Summary of Today's Action

1. Scope of the Listing Determination

Aliphatic hydrocarbons are compounds composed of the atoms of hydrogen and carbon, where the carbon atoms are linked by covalent bonds in an open-chain (straight and branched) structure, and those cyclic compounds that resemble the open-chain compounds. Aliphatics are distinguished from aromatic hydrocarbons, which are defined as benzene and compounds that resemble benzene in chemical behavior. For an aliphatic to be chlorinated, one or more hydrogen atoms have been chemically replaced with chlorine atoms. The chlorinated aliphatic chemicals, the wastes of which are described in the (existing) F024 listing description, and identified in the consent decree, are those produced by free-radical catalyzed processes with carbon chain lengths ranging from one to five.

EPA performed an initial review and investigation of the waste categories identified in the consent decree, as well as a review of chlorinated aliphatics production processes and the wastewaters and wastewater treatment sludges generated by these processes. The Agency decided, for the purpose of studying chlorinated aliphatic wastes, to divide the wastestreams into several distinct waste groupings. Waste groupings were defined to differentiate between unique residuals, as well as to differentiate between unique management practices (e.g., on-site land treatment) and/or particular constituents (e.g., mercury). The Agency segregated chlorinated aliphatics wastewaters into two groupings, with one group being wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. These wastewaters were evaluated as one group due to the unique nature of this production process, the fact that these wastewaters are treated in a dedicated wastewater treatment system, and the presence of mercury in the wastestream. All other chlorinated aliphatic wastewaters were included in a second group and evaluated collectively. The Agency found that many producers of chlorinated aliphatics manufacture several different chlorinated aliphatic products at a single facility and commingle the wastewaters generated by all processes prior to treatment in a single wastewater treatment system.

The Agency identified four waste groupings for wastewater treatment sludges generated by the chlorinated aliphatics industry. These waste groupings were defined based primarily upon the particular management practices used to manage the wastes, but also based on particular production processes. The Agency identified four waste groups for chlorinated aliphatics wastewater treatment sludges. These waste groups include sludges generated from the treatment of wastewaters from the production of:

- Ethylene dichloride and/or vinyl chloride monomer (EDC/VCM);
- Vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM-A);
- Methyl chloride; and
- allyl chloride.

The scope of today's notice does not include any other process residuals generated by the chlorinated aliphatics industry. In particular, the Agency is not re-evaluating previous listing determinations concerning wastes generated by chlorinated aliphatics production processes.

The Agency also points out that the consent decree specifies that this listing determination ''shall include wastewaters and wastewater treatment sludges generated from the production of chlorinated aliphatics specified in the F024 listing'' (a listing which is limited to wastes from chlorinated aliphatic production using the ''free radical catalyzed process'' but does not include wastewaters or wastewater treatment sludges). However, for today's proposed rule the Agency did not restrict its evaluation of wastewaters and wastewater treatment sludges to only those generated from chlorinated aliphatics manufacturers using the free radical catalyzed process. In the rulemaking for the F024 listing (which includes process wastes such as distillation residues, heavy ends, and tars, but not wastewaters and

wastewater treatment sludges) we found that there were distinct differences in the amount and type of chemical constituents present in these production wastes as a direct result of the production process used. For example, the free radical catalyzed reactions tended to produce unwanted organic compounds, as well as the desired chemical product, because this type of reaction is less specific (in terms of desired product) than other types of processes used. As a result, the chemical constituents that were the basis for listing F024 includes many organic compounds that are more prevalent in process wastes (again, tars, heavy ends, etc.) generated from the free radical catalyzed process.

However, in developing the information for today's proposed listing, EPA was concerned that limiting the scope of the investigation to free radical catalyzed processes might not be appropriate because of the different nature of wastewaters and wastewater treatment sludges as compared with the F024 process wastes. Wastewaters may be generated in different ways, including from scrubber waters, cooling waters, as well as reaction media, etc. Ultimately, our primary reason for not restricting our evaluation of wastewaters and wastewater treatment sludges to those generated by free radical catalyzed processes is that our preliminary analysis of these wastes indicated that the constituents of concern (i.e., dioxins, chloroform, arsenic) were not the same as the constituents of concern associated with the previously-listed F024 and F025 wastes. In those previous listing determinations (which did not include wastewaters or wastewater treatment sludges) the Agency was able to distinguish risk levels of concern based upon particular production processes.

In the case of today's proposed listing determination, we were not able to make such a distinction. The primary constituents of concern in the wastes we are proposing to list as hazardous in today's notice are dioxins, whereas dioxins were not a basis for listing the F024 and F025 wastes. Data currently available to the Agency does not support a conclusion that wastewaters and wastewater treatment sludges generated by free radical catalyzed processes have significantly different concentrations of dioxins than other types of production processes used to manufacture chlorinated aliphatics. However, EPA requests comment and data addressing the issue of whether one type of manufacturing process (e.g., free radical catalyzation) versus all other potential processes (e.g., ionic catalyzed processes) would result in different levels of dioxins in the resulting wastestream. The Agency will consider modifying the listing description proposed in today's rulemaking as appropriate to account for distinctions identified in information available to EPA at the time of the final rule.

2. Summary of the Proposed Listing Determinations

In today's notice, EPA is proposing to add three wastes generated by the chlorinated aliphatics industry to the list of hazardous wastes in 40 CFR 261.32. Below are the wastestreams EPA is proposing to list as hazardous with their corresponding proposed EPA Hazardous Waste Numbers.

K173 Wastewaters from the production of chlorinated aliphatic hydrocarbons, except for wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons that have carbon chain lengths ranging from one to, and including five, with varying amounts and positions of chlorine substitution.

K174 Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (EDC/VCM).

K175 Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.

EPA is proposing to list these wastes because these residuals meet the criteria set out in 40 CFR 261.11(a)(3) for listing a waste as hazardous. EPA assessed and considered these criteria for all six wastestreams through the use of risk assessments and risk modeling, as well as a consideration of other pertinent factors. Today's proposed listing determination follows the elements of the Agency's listing decision policy that was presented in the proposed listing for wastes generated by the dye and pigment industries published in the **Federal Register** on December 22, 1994 (see 59 *FR* 66073). This policy uses a ''weight-of-evidence'' approach in which calculated risk information is a key factor considered in making a listing determination.

Upon promulgation of these proposed listings, wastes meeting the listing descriptions will become hazardous wastes and need to be managed in accordance with RCRA subtitle C requirements. Residuals from the treatment, storage, or disposal of the wastewater treatment sludges proposed to be listed as hazardous also will be classified as hazardous wastes pursuant to the ''derived-from'' rule (40 CFR 261.3(c)(2)(i)).[1] Also, with certain limited exceptions, any mixture of a listed hazardous waste and a solid waste is itself a RCRA hazardous waste (40 CFR 261.3(a)(2)(iv), ''the mixture rule'').

In today's notice, the Agency is proposing an alternative approach to listing two of the wastes from chlorinated aliphatics processes as hazardous, rather than proposing to list these wastes in accordance with the Agency's traditional listing approach. The Agency is proposing a conditional listing approach for one waste, and as one of two alternative approaches for a second waste, because the Agency has evaluated the ways in which the wastes are likely to be managed and has determined that certain waste management activities would present significant risks but that others would be protective of human health and the environment. Under a contingent management approach, EPA is proposing to list particular wastes as hazardous only if the wastes are managed in a way other than the manner in which the Agency has determined is protective of human health and the environment. In implementing a conditional-listing approach, the Agency is proposing that wastes that fall outside the scope of the listing description (*e.g.*, are destined for the appropriate type of disposal) are non-hazardous when generated. However, if it turns out that the waste actually is not handled in accordance with the conditions of the listing at any point in its management, the generators or other handlers of the waste would be subject to various enforcement actions or, depending on the violations, the waste could become a hazardous waste and may even be considered hazardous from the point of generation. The Agency's proposed conditional-listing approach for wastes generated from chlorinated aliphatics processes is further discussed in section III.E of today's notice.

Today's action also proposes not to list as hazardous the following three wastes:

- Process wastewaters from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process,
- Wastewater treatment sludges from the production of methyl chloride, and

[1] As explained later in this notice, residuals generated from the management of wastewaters proposed to be listed as hazardous (i.e., wastewater treatment sludges) will not be subject to the derived-from rule due to the fact that EPA conducted separate investigations of these residuals and they are the subject of independent listing determinations.

• Wastewater treatment sludges from the production of allyl chloride.

3. Summary of the Remainder of this Preamble

Section III.B. describes the chlorinated aliphatics industry. Section III.C. describes how the information was gathered in support of today's proposed rule. Section III.D. is a description of the risk assessment performed for three of the wastes evaluated in today's rule, including chlorinated aliphatic wastewaters, EDC/VCM sludges, and methyl chloride sludges, and the results of these assessments. Section III.E provides the rationale for the proposed listing decisions for all six wastes analyzed in today's rule. Because full risk analyses were not necessary for VCM-A wastewaters, VCM-A wastewater treatment sludges, or allyl chloride sludges, we discuss our assessment of risks attributable to each of these wastes in the same sections where we describe our listing decisions for the wastes. Section IV contains the economic assessment of the industry and the estimated impact of today's proposed listing determinations. Section V describes the proposed land disposal restriction requirements for those wastes we propose to list as hazardous, along with determinations of whether there is adequate treatment and disposal capacity for these wastes. Sections VI (compliance dates), VII (state authority), VIII (designating CERCLA hazardous substances) and IX (administrative assessments) discuss other analyses required by statute and various executive orders.

B. Description of the Industry

In 1992, when EPA began gathering information about the U.S. chlorinated aliphatics industry, it consisted of 27 facilities owned by 20 corporations. However, as a result of information updates in 1997, we determined that two chlorinated aliphatics facilities had closed and two additional facilities manufacture de minimis quantities of chlorinated aliphatics, lowering the number of facilities affected by today's proposed rulemaking to 23 and corporations to 19.

Chlorinated aliphatics production facilities are located primarily in and around the petroleum/petrochemical industry which generally is located along the Gulf Coast. The majority of facility locations are fully integrated petrochemical processing facilities. A few facilities are co-located with other chemical manufacturing and/or petroleum refining facilities. These integrated facilities often manage wastes generated across different production processes within the same waste management systems. For example, these facilities often combine chlorinated aliphatic wastewaters with non-chlorinated aliphatics wastewaters prior to treatment. The combined wastewater treatment system generates a commingled sludge. In addition, there are facilities that manage chlorinated aliphatics wastewaters in separate or dedicated wastewater treatment systems. For the purpose of this listing determination, the Agency refers to these treatment systems, and resulting sludges, as ''dedicated'' systems and ''dedicated'' sludges.

Nearly 10 million metric tons of chlorinated aliphatics were produced in 1996. More than 85 percent of the chlorinated aliphatic products manufactured in 1996 was ethylene dichloride and vinyl chloride monomer (EDC/VCM) manufactured via the ''balanced process.'' This process involves the production of EDC as an intermediate product using direct chlorination and oxyhydrochlorination of ethylene, followed by cracking to produce VCM. Other chlorinated aliphatics production includes chlorinated methanes, methyl chloride, and a variety of other products.

C. Overview of EPA's Information Collection Activities

EPA's investigation of the wastes generated by the chlorinated aliphatics industry can be characterized in terms of two major information collection efforts: field investigations and survey evaluation. The Agency's field investigations included engineering site visits, ''familiarization sampling'' (sample collection and analysis to gain a preliminary understanding of the nature and concentration of potential constituents of concern), and ''record sampling'' (sample collection and analysis to provide data to use in assessing the potential risks posed by the wastes). The survey effort included the development, distribution, and assessment of an extensive industry-wide RCRA Section 3007 survey. Each of these efforts is summarized below.

1. Field Investigations and Sampling

EPA initiated its work activities with a series of engineering site visits. The primary purpose of the site visits was to gather information on chlorinated aliphatic manufacturing processes and the generation, management, and characterization of the consent decree wastes. In addition, the field teams identified potential record sampling locations. The Agency conducted site visits at 16 facilities prior to record sampling; site visit facilities were selected based on a goal of obtaining first hand information from a representative sampling of all chlorinated aliphatic manufacturers as well as all relevant manufacturing and waste management processes, including an investigation of dedicated wastewater treatment units.

Concurrently, the Agency initiated the analytical phase of this listing determination with the development of a Quality Assurance Project Plan (QAPjP) for sampling and analysis, followed by collection of 15 familiarization samples from three different manufacturing facilities (collected during the engineering site visits). The purpose of collecting familiarization samples is to assess the effectiveness of the analytical methods identified in the QAPjP for the analysis of the residuals of concern.

Upon successful completion of the familiarization sampling and analysis effort, the Agency initiated record sampling and analysis of the consent decree wastes. The Agency sampled wastewaters and wastewater treatment sludges from twelve facilities. During a four-month period beginning in April of 1997, the Agency collected 52 samples, excluding additional blanks and matrix spike/matrix spike duplicates(MS/MSD) collected for quality assurance purposes. Of these 52 samples, 41 were wastewater samples, and 11 were wastewater treatment sludge samples.

2. RCRA Section 3007 Survey

EPA developed an extensive questionnaire under the authority of Section 3007 of RCRA for distribution to the chlorinated aliphatics manufacturing industry. The purpose of the survey was to gather information about solid and hazardous waste generation and management practices in the U.S. chlorinated aliphatics manufacturing industry necessary to support the listing determination. The questionnaire covered topics such as chlorinated aliphatic product information, facility and unit process flow diagrams, process descriptions, residual generation and residual management profiles.

The Agency distributed the survey in November of 1992 to 57 facilities and/or corporations identified as potential chlorinated aliphatics manufacturers from the most recent information available at the time. Of the 57 surveys distributed, completed surveys were received from 27 facilities. These facilities represent 20 companies that reported that they had manufactured chlorinated aliphatics in 1991. The remaining facilities notified EPA that they had either stopped operations or

did not manufacture chlorinated aliphatic products.

We also conducted an exhaustive engineering review of the submitted surveys for accuracy and completeness. Data from the survey responses was then entered into a data base known as the Chlorinated Aliphatics Industry Studies Data Base (ISDB). We conducted quality assurance reviews of the ISDB to identify any inappropriate entries and missing data links. The exhaustive engineering review of each facility's response resulted in follow-up letters and/or telephone calls to facility representatives seeking clarifications, corrections, and additional data where needed. The responses to these requests for clarification, along with additional information gathered during engineering site visits and familiarization and record sampling activities were entered into the data base.

In 1996 we conducted a review of data collected previously, and re-contacted facility representatives to verify the status of chlorinated aliphatics manufacturing operations. In June of 1997, the Agency sent requests for updated data (for calendar year 1996) regarding consent decree wastes generated to each facility. We processed the data received from this request in the same manner as the original RCRA surveys, and entered the new information into the ISDB. Between 1993 and 1996, two chlorinated aliphatics manufacturers ceased operations, resulting in a universe of 23 chlorinated aliphatics manufacturing facilities owned and operated by 19 different companies. Each of the 23 current manufacturers of chlorinated aliphatics generate at least one wastestream identified in the consent decree. All 23 facilities generate at least one wastewater residual, while 14 facilities reported that they generate wastewater treatment sludges.

D. What Are the Risks Associated With Management of Wastewaters and Wastewater Treatment Sludges From the Production of Chlorinated Aliphatic Chemicals?

As discussed in Section III.A.2. of this preamble, EPA considers the Listing criteria set out in 40 CFR 261.11, as well as any other information relevant to the criteria, in making listing determinations. The criteria provided in 40 CFR 261.11 include eleven factors for determining ''substantial present or potential hazard to human health and the environment.'' Nine of these factors, as described generally below, are directly incorporated into EPA's completion of a risk assessment for the wastestreams of concern:

- Toxicity (§ 261.11(a)(3)(i)) is considered in developing the health benchmarks used in the risk assessment modeling.
- Constituent concentrations and waste quantities (§ § 261.11(a)(3)(ii) and 261.11(a)(3)(viii)) are used to define the initial conditions for the risk evaluation.
- Potential to migrate, persistence, degradation, and bioaccumulation of the hazardous constituents and any degradation products (261.11(a)(3)(iii), 261.11(a)(3)(iv), 261.11(a)(3)(v), and 261.11(a)(3)(vi)) are all considered in the design of the fate and transport models used to determine the concentrations of the contaminants to which individuals are exposed.

We consider two of the remaining factors, plausible mismanagement and other regulatory actions (§ § 261.11(a)(3)(vii) and 261.11(a)(3)(x)) in establishing the waste management scenario(s) modeled in the risk assessment.

EPA conducted analyses of the risks posed by wastewaters and wastewater treatment sludges from the production of chlorinated aliphatic chemicals to assist in the determination of whether the wastes meet the criteria for listing set forth in 40 CFR 261.11(a)(3). This section (III.D.) discusses the human health risk analyses and ecological risk screening analyses EPA conducted to support our proposed listing determinations for chlorinated aliphatics wastewaters (other than VCM-A wastewaters), EDC/VCM wastewater treatment sludges, and methyl chloride wastewater treatment sludges. We consider the risk analyses in developing our listing decisions for each of the wastestreams (described in Sections III.E.1.a. for chlorinated aliphatics wastewaters, III.E.2. for EDC/VCM sludges, and III.E.4. for methyl chloride sludges). The risk analyses we describe in this section (III.D.) are presented in detail in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination which is located in the docket for today's proposed rule.

Because full risk analyses were not necessary for VCM-A wastewaters, VCM-A sludges, or allyl chloride sludges, we discuss our assessment of risks attributable to each of these wastes in the same sections where we describe our listing decisions for each of the wastes, that is, Sections III.E.1.b., III.E.3, III.E.5, respectively.

1. What are the Risks for Potential Human Receptors?

a. What was EPA's Approach to Conducting the Human Health Risk Assessment?

EPA's human health risk analyses for chlorinated aliphatics wastewaters and EDC/VCM and methyl chloride sludges provide estimates of the incremental human health risks resulting from exposure to contaminants detected in these wastes. The incremental human health risks are expressed as estimates of excess lifetime cancer risk for individuals (''receptors'') who may be exposed to carcinogenic (cancer-causing) contaminants and hazard quotients (HQs) for those contaminants that produce noncancer health effects. Excess lifetime cancer risk is the incremental probability (chance) of an individual developing cancer over a lifetime as a result of exposure to a carcinogen. A hazard quotient is the ratio of an individual's chronic daily dose of a noncarcinogen to an acceptable daily dose for chronic exposures to the noncarcinogen.

EPA used two different methods of analysis to estimate risks. These methods are called ''deterministic risk analysis'' and ''probabilistic risk analysis.'' A deterministic risk analysis produces a point estimate of risk or hazard for each receptor based on using a single value for each parameter in the analysis. A probabilistic analysis calculates risk or hazard by allowing some of the parameters to have more than one value, consequently producing a distribution of risk or hazard for each receptor. A parameter is any one of a number of inputs or variables (such as waste volume or distance between the waste management unit and the receptor) required for the fate and transport and exposure models and equations that EPA uses to assess risk. (In some cases EPA treats multiple parameters as a single parameter for the purpose of conducting our analyses. We do this to prevent inadvertently combining parameters in our analyses in ways that are unrealistic. For example, EPA treats environmental setting [location] parameters such as climate, depth to groundwater, aquifer type as a single set of parameters. We believe that, for example, allowing the climate from one location to be paired with the depth to groundwater for another location could result in a scenario that would not occur in nature.)

EPA conducts both ''central tendency'' and ''high end'' deterministic risk assessments to attempt to quantify the cancer risk or non-cancer hazard for the ''average'' receptor in the population

(the central tendency risk) and the risk or hazard for individuals in small, but definable ''high end'' segments of the population (the high end risk). For central tendency deterministic risk analyses, we set all parameters at their central tendency values. For the chlorinated aliphatics risk assessments, the central tendency values generally are either mean (average) or 50th percentile (median) values.

We use high end deterministic risk analysis to predict the risks and hazards for those individuals exposed at the upper range of the distribution of exposures. EPA's Guidance For Risk Characterization (EPA 1995)[2] advises that ''conceptually, high end exposure means exposure above about the 90th percentile of the population distribution, but not higher than the individual in the population who has the highest exposure,'' and recommends that ''* * * the assessor should approach estimating high end by identifying the most sensitive variables and using high end values for a subset of these variables, leaving others at their central values.'' For the chlorinated aliphatics high end deterministic risk analyses, EPA set two parameters at their high end values (generally 90th percentile values), and set all other parameters at their central tendency values. We used a ''sensitivity analysis'' to identify the two parameters that we set at high end. A sensitivity analysis is an iterative procedure in which an analysis is performed by alternately setting different parameters at high end to identify the parameters that most influence the analysis' outcome. EPA compares the different results generated by the sensitivity analysis and selects the two high end parameters to which the analysis was ''most sensitive,'' that is, the two parameters that are expected to generate the greatest estimate of risk or hazard.

EPA used probabilistic risk assessment to support the results of the deterministic risk analyses and to allow EPA to quantify individual risk at selected percentiles of the risk distribution (for example, 50th percentile, 90th percentile, 95th percentile). EPA conducted probabilistic risk analyses for those combinations of receptor, contaminant, and pathway for which risk or hazard estimated using a deterministic analysis exceeded the following criteria: a cancer risk of 1×10^{-6} or a hazard quotient of 1. In a probabilistic analysis, each parameter may have more than one value. EPA develops ''probability density functions'' (PDFs), distributions that describe the full range of values that the various input parameters may have. Some of the parameters in the probabilistic analysis are set as constant values because (1) there are insufficient data to develop a PDF; (2) EPA made assumptions to simplify the analysis in cases where such simplifications would improve the efficiency of the analysis without significantly affecting the results; (3) site-specific constants are available; or (4) the analysis has not been shown to be sensitive to the value of the parameter, that is, even if the parameter varies, the resulting risk estimate does not vary significantly. The Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination describes the input parameters used in the probabilistic analysis. In the probabilistic analysis, risk is approximated through repetitive calculation of the fate and transport and exposure equations and models using input parameters randomly selected from the PDFs. The result of the probabilistic analysis is a distribution of the risks or hazards for each of the receptors.

The human health risk assessments that EPA conducted to support the chlorinated aliphatics listing determination included four primary tasks: (1) establishing that there are constituents in the wastes that are of concern to the Agency and that warrant analysis to determine their risk to human health; (2) establishing a scenario under which contaminants are released from a waste management unit and subsequently are transported in the environment to a human receptor; (3) estimating the concentrations of contaminants to which the receptor might be exposed; (4) quantifying the receptor's exposure to contaminants and the contaminants' toxicity to the receptor; and (5) describing the receptor's predicted risk. The following sections discuss how EPA completed each of these tasks for the risk assessments conducted to support the chlorinated aliphatics listing determination.

b. How Did EPA Determine Which Waste Constituents and Waste Volumes Would Be Evaluated in the Risk Assessments?

To support the chlorinated aliphatics listing determination, EPA collected and analyzed samples of wastewaters from the production of chlorinated aliphatic chemicals, wastewater treatment sludges from the production of EDC/VCM, and wastewater treatment sludges from the production of methyl chloride (see Section III.E of today's preamble, as well as the Background Document for Identification and Listing of Chlorinated Aliphatics Production Wastes, for further discussion of EPA's waste characterization efforts). We used the results of these waste analyses to establish the ''constituents of potential concern'' (COPCs) in the wastes. We derived waste volume information from data provided by facilities in their RCRA Section 3007 questionnaire responses.

EPA collected and analyzed 41 samples of wastewaters generated from the production of chlorinated aliphatic chemicals. EPA collected six of these samples at the influent (or ''headworks'') of wastewater treatment systems that manage only wastewaters derived from the production of chlorinated aliphatic chemicals. We call these samples ''dedicated'' chlorinated aliphatics wastewater samples,[3] and we chose to use these samples in our assessment of the risks and hazards attributable to the management of chlorinated aliphatic wastewaters. (The assessment of dedicated sample data allows us to evaluate without question what risks are attributable to the wastes of concern to the Agency.) Because we used analytical data for dedicated chlorinated aliphatics wastewater samples in our analysis, we also used dedicated chlorinated aliphatic wastewater volumes in our analysis. We identified eight wastewater volumes that represent the volumes of dedicated chlorinated aliphatics wastewaters discharged to the headworks of chlorinated aliphatics facility wastewater treatment systems.

EPA collected and analyzed seven samples of nonhazardous EDC/VCM sludge. (Some sludges generated by this industry already are designated as hazardous because they include material derived from wastes that EPA previously listed as hazardous waste.) Four were samples of sludges that were derived from wastewater treatment systems that manage only EDC/VCM process wastewaters. These samples are ''dedicated'' EDC/VCM sludge samples. Three were samples of sludges that result from the treatment of EDC/VCM process wastewaters combined with wastewaters from non-EDC/VCM processes and sources. EPA chose to use only the dedicated EDC/VCM sample data in our analysis. Because we used

[2] EPA. 1995. Guidance for Risk Characterization. U.S. Environmental Protection Agency Science Policy Council. February.

[3] ''Dedicated'' chlorinated aliphatic wastewaters are those that are comprised only of chlorinated aliphatics process wastewaters, that is, wastewaters generated from the production of the chlorinated aliphatic chemicals of concern to this listing determination.

analytical data for dedicated EDC/VCM sludge samples in our analysis, we also used ''dedicated'' EDC/VCM sludge volumes. EPA divided the volume of wastewater attributable to EDC/VCM processes by the total volume of wastewater influent, and applied the resultant ratio to the total sludge volumes to obtain the volume of wastewater treatment sludge attributable to EDC/VCM processes (that is, the ''dedicated '' EDC/VCM sludge volume).

The methyl chloride sludge, generated by only one facility, results from treatment of the combined wastewaters from the facility's methyl chloride production process and other facility processes and sources. The facility reports that approximately 18 percent of the wastewater that generates the sludge is from the methyl chloride process. The remainder of the wastewater is from other processes. Because the sludge, as generated, is not dedicated, and there is no means to obtain a dedicated sample of the methyl chloride sludge, we conducted our risk assessment using the sample data for the nondedicated methyl chloride sludge sample, and, comparably, the nondedicated (total) methyl chloride sludge volume.

Using the results of the analysis of the waste samples, EPA developed a list of ''chemicals of potential concern'' (COPCs) for the chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges. The COPCs are the constituents which were the subject of EPA's risk assessment. EPA developed the COPC lists by taking the complete list of detected constituents in the wastes and eliminating constituents from the list that occurred at concentrations clearly below levels of concern, based on screening analyses developed to maximize risk estimates. For chlorinated aliphatics wastewaters and EDC/VCM sludges, EPA also eliminated constituents when a constituent was detected in only one of the samples and the concentration of the constituent in the one sample was qualified with the ''J'' qualifier, indicating that the constituent was detected below the quantitation limit and the reported value was estimated. Specifically, the laboratory detected 69 constituents in chlorinated aliphatics wastewater samples of which we eliminated 28; 53 constituents in EDC/VCM sludges of which we eliminated 16; and 19 constituents in methyl chloride sludges of which we eliminated 11.

Six polychlorinated dibenzodioxin (''dioxin'') congeners and ten polychlorinated dibenzofuran (''furan'') congeners were among the constituents detected in samples of the chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges and evaluated in the risk assessment. EPA classifies the furan congeners and certain polychlorinated biphenyl (PCB) congeners as ''dioxin-like compounds'' because of their structural similarity to the dioxins (EPA 1994a [4]). In today's preamble we use the term ''dioxins'' to represent both the dioxin and furan congeners. Our use of the term ''dioxins'' does not refer to dioxin-like PCBs because we did not analyze for PCBs in our waste samples from the chlorinated aliphatics industry since we do not expect PCBs to be constituents of the chlorinated aliphatics wastes that are the subject of today's listing determination.

c. What Exposure Scenarios Did EPA Evaluate?

Prior to conducting the risk assessments, EPA had to establish that there is a plausible scenario under which a receptor might be exposed to contaminants in the wastewaters and sludges. Establishing this scenario required that EPA determine:

- How the waste is managed or is likely to be managed;
- How contaminants could be released from the waste management unit;
- How contaminants could be transported in the environment to a point of contact with a receptor; and
- How a receptor could be exposed to the contaminants.

One respondent to EPA's § 3007 questionnaire reported that they discharge a portion of their nonhazardous chlorinated aliphatics wastewaters to nonhazardous underground injection wells. Section III.E.1.a.i. discusses EPA's evaluation of the underground injection waste management scenario. Twenty-three respondents reported that they manage their nonhazardous or exempt chlorinated aliphatics wastewaters in tanks. Because management of wastewaters in tanks is the dominant wastewater management practice in the chlorinated aliphatics industry, EPA chose to evaluate tanks in our risk assessment for chlorinated aliphatics wastewaters. For reasons discussed in III.E.1.a.i., EPA chose to evaluate risks attributable to management of chlorinated aliphatics wastewaters in uncovered aerated biological treatment tanks.

One respondent to EPA's § 3007 questionnaire reported that they manage their EDC/VCM wastewater treatment sludges in an onsite land treatment unit. All other respondents reported that nonhazardous EDC/VCM sludges are managed in landfills. Eight facilities send EDC/VCM sludges to offsite nonhazardous waste landfills, two facilities manage EDC/VCM sludge in onsite nonhazardous industrial waste landfills, and one facility manages their nonhazardous EDC/VCM sludge in an onsite hazardous waste landfill (see section III.E.2.a. in today's preamble for a description of current methods for managing EDC/VCM sludges). For this assessment, EPA evaluated the risks associated with management of EDC/VCM sludges in unlined municipal landfills and in a land treatment unit. Because the only facility that generates methyl chloride sludges manages them in an onsite nonhazardous industrial waste landfill, EPA evaluated this management scenario in our risk assessment for methyl chloride sludges. The Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination provides a complete discussion of the parameters that define the characteristics of the waste management units.

EPA determined that releases from all of the waste management units (tank, land treatment unit, and landfill) could occur through release of vapor emissions to the air. In addition, for the land treatment unit and the landfill, EPA determined that releases could occur through leaching of the waste into the subsurface. We assumed that the chlorinated aliphatics industry's tanks retain sufficient structural integrity to prevent wastewater releases to the subsurface (and therefore to groundwater), and that overflow and spill controls prevent wastewater releases to the ground surface. For the land treatment unit, releases also could occur through release of particulate emissions to the air and runoff and erosion of waste from the unit. EPA assumed that wastewater would entrain any particulate matter such that particulates would not be released from the tanks. EPA did not evaluate particulate emissions from the landfills because the moisture content of the sludges (41 to 74 percent moisture) would prevent generation and release of particulates to the air in the time between placement of the waste in the landfill and application of daily cover or a new day's waste addition. EPA also assumed that runon/runoff controls would prevent releases from the landfills due to erosion and runoff.

EPA also evaluated the mechanisms and pathways by which contaminants

[4] EPA. 1994a. Estimating Exposure to Dioxin-Like Compounds, Volume I: Executive Summary. Review Draft. EPA/600/6–88/005Ca. Office of Research and Development. June.

might be transported to the points where receptors are exposed. The mechanisms and pathways we evaluated are as follows:

- Eroded waste can be transported by runoff and deposited onto the soil and into surface water bodies.
- Leachate can migrate through the unsaturated [5] zone to the saturated [6] zone, where contaminants are transported in groundwater to drinking water wells and to points of discharge to surface water bodies.
- Vapor emissions can remain dispersed in the air, or can be deposited through wet and dry deposition. Specifically, EPA models:
- The concentration of vapor phase contaminants in air,
- The diffusion of vapor phase contaminants into plants,
- The diffusion of vapor phase contaminants into surface water,
- Wet deposition of vapors onto soils and surface water (for example, due to wash-out [scavenging] by precipitation).
- Dry deposition of vapors onto soils (for example, due to density).
- Although we do not evaluate wet and dry deposition of vapors onto plants, we do assume that wet and dry deposition of vapors onto soils increase the contaminant concentrations in the soil and result in additional uptake of contaminants into plants via soil-to-plant uptake.
- Particulate emissions can remain dispersed in the air or be deposited through wet deposition (in precipitation) or dry deposition (particle settling). We assume that particulates may be deposited onto soil and surface water through both wet and dry deposition, and onto plants through dry deposition.

Human receptors indirectly may come into contact with vapors that diffuse into vegetation, particulates that are deposited on vegetation, or contaminants that are taken up by vegetation from the soil through exposure to contaminated home-grown fruits and vegetables, as well as exposure to contaminated beef and dairy products derived from cattle which have ingested contaminated forage, silage, grain, and surface soil. Receptors that ingest fish also indirectly may come into contact with contaminants in air-borne vapors and particulates (through vapor diffusion into surface water, vapor deposition onto surface water, and particulate deposition onto surface water), contaminated groundwater (through groundwater discharge into surface water), and runoff and eroded soil that enter surface water.

EPA determined that the following receptors reasonably represent the types of individuals that could be exposed to contaminants in chlorinated aliphatics wastes, and were the receptors evaluated in our risk analyses:

- an adult resident
- the child of a resident
- a home gardener
- a farmer
- the child of a farmer
- a fisher

The following sections describe briefly EPA's primary assumptions regarding the characteristics and activities of each of the receptor types, and the routes by which each receptor is exposed.

Adult Resident and Child of Resident—We assume that an adult and child reside near the waste management unit. The residential receptors inhale vapors and particulate matter that are dispersed in the ambient air. EPA assumes that household water is supplied to the residential receptors by a domestic groundwater well that is located near their home. The adult resident and child of the resident drink water that comes from the well. We assume that the adult resident inhales vapors that are emitted from the water that they use in their house (for example, during showering), and that the adult resident's skin also is exposed to groundwater when he/she bathes. The residential receptors do not ingest foods that are grown in the vicinity of their home, however they do incidentally ingest surface soil from their yard.

Home Gardener—We assume that the residential receptor may have a home garden. The home gardener grows fruit, exposed vegetables (vegetables with edible parts that are exposed at land surface), and root vegetables. Approximately 23 percent of the exposed vegetables, 11 percent of the root vegetables, and 12 percent of the fruits eaten by the gardener are grown in his/her garden (EPA 1997a, Table 13–71) [7]. The gardener's other characteristics and activities are the same as those of the adult resident.

Fisher—We assume that the residential receptor may be a recreational angler. Approximately 32 percent of the fish eaten by the fisher are from a stream located near the waste management unit (EPA 1997a, Table 13–71). The fisher's other characteristics and activities are the same as those of the adult resident.

Adult Farmer and Child of Farmer—We assume that a farmer raises fruits, exposed vegetables, root vegetables, beef cattle, and dairy cattle in an agricultural field located near the waste management unit. Approximately 42 percent of the exposed vegetables, 17 percent of the root vegetables, 33 percent of the fruits, 49 percent of the beef, and 25 percent of the dairy products eaten by the farmer and the child of the farmer are grown/raised on the farmer's agricultural field (EPA 1997a, Table 13–71). We assume that the farmer incidentally ingests soil from the agricultural field, and that the child of the farmer incidentally ingests soil from his/her yard. The farmer's and child's exposure to groundwater via ingestion, inhalation, and dermal contact are the same as that for the adult resident and child of the resident.

EPA establishes the locations of receptors relative to waste management units based on information obtained from national surveys. Exposure to groundwater occurs through the use of water from drinking water wells, and exposure via nongroundwater pathways occurs through runoff/erosion and releases to air. Therefore, ''distance to receptor'' for groundwater exposure pathways actually is the distance to the drinking water well that the receptor is using (the ''receptor well''). ''Distance to receptor'' for nongroundwater pathways is the distance to the residence where the receptor is inhaling air or contacting soil, the distance to the garden where the receptor is growing fruits and vegetables, or the distance to the field where the receptor is growing crops or raising livestock. Consequently, EPA uses different databases to establish ''distance to receptor,'' depending on whether we are evaluating a groundwater or a nongroundwater pathway.

For analysis of the nongroundwater pathway (air pathways and erosion/runoff) risks in the deterministic analysis we assume that the receptors live either 75 meters (m) (high end) or 300 m (central tendency) from the waste management unit. The distance of 250 feet (ft) (approximately 75 m) is based on the actual measured distance to the nearest resident for the worst-case facility evaluated in the risk assessment conducted to support the ''Hazardous Waste Treatment, Storage, and Disposal Facilities—Organic Air Emissions Standards for Process Vents and Equipment Leaks Final Rule'' (55 FR

[5] The unsaturated (vadose) zone is a subsurface zone in which the pore spaces contain both water and air.

[6] The saturated zone is a subsurface zone in which all pore spaces are full of water.

[7] EPA. 1997a. Exposure Factors Handbook, Volumes I, II, and III. Office of Research and Development, Washington, D.C., EPA/600/P–95/002Fa, b, c. August 1997; www.epa.gov/ordntrnt/ord/webpubs/exposure/index.html.

25454), and was used as distance to the nearest resident for that rulemaking. In the same risk assessment, EPA identified the receptor distance of 1000 ft (approximately 300 m) as the median distance in a random sample of distances to the nearest residence. For the probabilistic analysis, we assume the receptors live either 50, 75, 100, 200, 300, 500, or 1000 m from the waste management unit. For air pathway analyses, we always assume that the receptors (including cattle) are located along the centerline of the area most greatly impacted by air releases from the waste management units. However, at distances of a few hundred meters from the waste management unit, the air concentrations within about a 100 meter lateral distance do not vary appreciably.

For deterministic analyses we assume that a receptor well is located 102 m (high end) or 430 m (central tendency) from the waste management unit, and that the receptor well is located on centerline of the contaminant plume (high end) or halfway between the centerline and the edge of the contaminant plume (central tendency). The 102 m distances is the 10th percentile value in the distribution of distances derived from EPA's 1988 survey of Solid Waste (Municipal) Landfill Facilities (DPRA 1993[8]). The 430 m value is the 50th percentile value in that same distribution. For the Monte Carlo analysis, the distance from the waste management unit to the receptor well is based on the complete distribution of distances to receptor well reported by the survey respondents, and ranges from 0.02 m (the location of the closest reported well was 0 m) to 1604 m (the maximum distance for which EPA requested receptor well information was 1 mile). For the Monte Carlo analysis we assume that the receptor well is located anywhere within the contaminant plume.

The *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination* provides a complete discussion of the values of additional parameters that define the characteristics of each receptor, such as the amounts of contaminated food and water they ingest, their inhalation rates, and how long they live near the waste management unit.

[8] DPRA. 1993. Parameter Values for Developing Nationwide Regulations with the EPA's Composite Model for Landfills (EPACML). EPA Contract Number 68–WO–0029. July.

d. How Did EPA Predict What Contaminant Concentrations Are at the Points Where Receptors Are Exposed?

EPA conducts contaminant fate and transport modeling and indirect exposure modeling to determine what the concentrations of contaminants will be in the media (for example, groundwater, air, soil, food items) that the receptor comes into contact with. These concentrations are called ''exposure point concentrations'' (that is, they are the contaminant concentrations at the point where the receptor is exposed to the contaminants). There are a number of computer-based models and sets of equations that EPA uses to predict exposure point concentrations. In the following sections we briefly discuss these models and equations and their application in the risk analyses.

i. Partitioning Model

For the landfill and the land treatment unit, EPA uses a series of ''partitioning'' equations to determine how much contaminant mass is retained in the waste management unit and how much is released into the environment. These equations are based upon equations presented in a series of articles by Jury et al. (Jury et al. 1983, 1984, and 1990[9]). EPA used the partitioning equations to estimate the mass of a contaminant that will be lost from the land treatment unit due to volatilization into the air, contaminant leaching into the subsurface, runoff from the land treatment unit, and degradation. For the landfill scenarios, EPA used the partitioning equations to determine how much of the contaminant mass would be lost due to volatilization into the air; EPA assumed that the remainder of the mass would be available to leach into the subsurface. We assumed that volatilization losses could occur prior to the landfill being covered with daily cover or daily waste addition, through the daily cover or daily waste addition, and through the cap that is placed on the landfill after closure. For the landfill, we used toxicity characteristic leaching procedure (TCLP) analytical results (rather than the partitioning equations) as the predictor of leachate concentration. The TCLP is an analytical procedure that ''leaches'' a waste sample in a way that mimics the leaching of waste in a municipal landfill. Thus, TCLP results are a proxy for the concentrations of contaminants that would be generated in leachate if the waste were placed in a municipal landfill.

[9] Jury, W.A., W.F. Spencer, and W. J. Farmer. 1983. Behavior assessment model for trace organics in soil: i. model description. J. Environ. Qual. 12(4):558–564.

Jury, W.A., W. J. Farmer, and W.F. Spencer. 1984. Behavior assessment model for trace organics in soil: ii. chemical classification and parameter sensitivity. *J. Environ. Qual.* 13(4):567–572.

Jury, W.A., D. Russo, G. Streile, and H.E. Abd. 1990. Evaluation of volatilization by organic chemicals residing below the soil surface. *Water Resources Research.* 26(1):13–20.

ii. Tank Emissions Model

EPA modeled emissions from aerated biological wastewater treatment tanks using the CHEMDAT8 model (EPA 1994b[10]). We used the emissions estimates in conjunction with the air dispersion modeling results (see Section D.1.d.iii) to estimate constituent-specific air concentrations and deposition rates. CHEMDAT8 accounts for most of the competing removal pathways that might limit air emissions, including adsorption, biodegradation, and hydrolysis. Chemicals that sorb to solids or decompose due to either biodegradation or hydrolysis have lower potential for emission to the air. CHEMDAT8 is considered to provide reasonable to slightly high estimates of air emissions.

CHEMDAT8 requires that the user specify parameters relating to tank characteristics, waste characteristics, contaminant physical and chemical properties, and location-specific meteorological conditions (for example, windspeed and temperature). The tank characterization data required by the model include both tank physical parameters (for example, tank dimensions) and tank operating parameters (for example, the number of aerators in the tank). In the absence of site-specific data, we developed tank dimensions based on facility-reported wastewater generation rates, an assumed wastewater depth in the tank of 15 feet, and a retention time in the tank of two days. We selected operating parameters that we believe represent typical operating conditions of an aerated tank. The Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination provides a complete list of the parameters used in the CHEMDAT8 model.

iii. Air Dispersion and Deposition Model

We used EPA's Industrial Source Complex Short Term model (version 3;

[10] EPA. 1994b. CHEMDAT8 User's Guide, EPA–453/C–94–080B. Office of Air Quality Planning and Standards, US Environmental Protection Agency, Research Triangle Park, NC, November. This model is publicly available from EPA's Web page at http://www.epa.gov/ttn/chief/software.html.

ISCST3 [11]) to estimate the dispersion and deposition of vapors emitted from the wastewater treatment tank, the municipal landfill, the onsite industrial landfill, and the land treatment unit. EPA also used ISCST3 to estimate the dispersion and deposition of particulate emissions from the land treatment unit. For the land treatment unit, EPA used equations documented in EPA's ''Compilation of Air Pollutant Emission Factors (AP–42)'' (EPA 1985) [12] to estimate particulate emissions resulting from wind erosion and tilling activities. Vapor emissions from the landfill and the land treatment unit were estimated using the partitioning models discussed in Section III.D.1.d.i. Vapor emissions from the wastewater treatment tank were estimated using the CHEMDAT8 model discussed in Section III.D.1.d.ii. ISCST3 was used to estimate the air concentration of vapors, wet deposition of vapors, the air concentration of particulates, wet deposition of particulates, and dry deposition of particulates. We calculate dry deposition of vapors using the air concentration of vapors and a contaminant deposition velocity.

iv. Overland Transport Model

The Universal Soil Loss Equation (USLE) is an erosion model originally designed to estimate long-term average soil erosion losses to a nearby surface water body from an agricultural field having uniform slope, soil type, vegetative cover, and erosion-control practices. We used a modified form of the USLE to estimate the mass of soil lost per year per unit area from the land treatment unit and deposited directly onto the adjacent receptor site (agricultural field, residential lot, home garden) and into a nearby stream.

Because the basic USLE equation estimates only soil erosion to surface water bodies, EPA assumes the receptor location is located between the land treatment unit and the surface water body. The area including the land treatment unit, the receptor site, and the intervening area is considered for the purposes of the analysis to be an independent, discrete drainage subbasin that is at steady-state. We estimate the soil erosion load from the subbasin to the surface water body using a distance-based sediment delivery ratio, and consider that the sediment not reaching the surface water body is deposited evenly over the area of the subbasin. Using mass balance equations, EPA estimates contaminant contributions to the surface water body and the receptor soil. ''Mass balance equations'' are equations that honor the law of conservation of mass, that is, the mass of a contaminant that is present at the beginning of the analysis (for example, the mass of a contaminant in a waste placed in a waste management unit) is equal to the mass of the contaminant present at the end of the analysis. Even though at the end of the analysis the contaminant mass may be partitioned into a number of environmental ''compartments'' (for example, the waste management unit, the soil, and the surface water body), there is in total no more or no less mass than was present at the start of the analysis.

Contaminated particles are transported from the land treatment unit to receptor sites via air deposition as well as runoff/erosion. We applied mass balance for each area of interest (for example, buffer area between source and receptor site, receptor site, or surrounding area). Consequently, the respective air deposition value for each area of interest is included in the evaluation of the mass balance. We considered that the air deposition over the entire subbasin area is uniform and equal to the air deposition modeled for the receptor site.

v. Groundwater Model

We used EPA's Composite Model for Leachate Migration with Transformation Products (EPACMTP; EPA 1996a, 1996b, 1996c, 1997 [13]) to model the subsurface fate and transport of contaminants that leach from the waste management units (the land treatment unit or the landfill) and migrate to a residential drinking water well or discharge from groundwater to surface water.

Precipitation that migrates through the waste management unit generates leachate, which infiltrates the bottom of the waste management unit and migrates into the unsaturated zone. The contaminants dissolved in the leachate subsequently are transported in the aqueous phase through the unsaturated zone to the underlying saturated zone and then downgradient to a receptor (drinking water) well or surface water body located at a specified distance from the boundary of the waste management unit. EPACMTP accounts for the following processes affecting contaminant fate and transport: advection, hydrodynamic dispersion, equilibrium linear or nonlinear sorption by the soil and aquifer solids (both in the unsaturated and saturated zones), and contaminant hydrolysis. In the event that the hydrolysis daughter products are toxic and their chemical properties are known, the model also accounts for the formation and subsequent fate and transport of the daughter products.

The landfill analysis employed two simplifying assumptions. First, we assumed that contaminant leaching from the landfill does not occur until after the landfill closes (that is, after 30 years). EPA made this assumption because of complexities associated with linking the output of the landfill partitioning equations (discussed in Section III.D.1.d.i.) and the groundwater model, EPACMTP. Second, we assumed that there are no contaminant losses due to mechanisms other than leaching after the landfill has been closed (that is, after 30 years). This effectively over-estimates the total mass of volatile contaminants that would leach to groundwater because it does not allow contaminant loss due to volatilization from the landfill to deplete the total contaminant mass available for leaching from the landfill in the years after closure. EPA determined that if volatile constituents caused significant risk via the groundwater pathway, we would have to re-evaluate our methodology for conducting the landfill analysis. This situation did not occur.

vi. Surface Water Model

EPA assumed that fish are exposed to waste constituents in surface water. Specifically, we assumed that fish are exposed to contaminants dissolved in the water column, contaminants sorbed to suspended solids in the water

[11] EPA. 1995. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models (Draft) (Revised). Volume I. EPA–454/B–95–003a. Office of Air Quality Planning and Standards, Emissions, Monitoring and Analysis Division, Research Triangle Park, NC. The ISCST3 model and meteorological preprocessor, PCRAMMET, and related user's guides can be accessed and downloaded through the Internet from the Support Center for Regulatory Air Models (SCRAM) web page (http://www.epa.gov/scram001). The SCRAM is part of EPA's Office of Air Quality Planning and Standards (OAQPS) Technology Transfer Network (TTN).

[12] EPA. 1985. Compilation of Air Pollutant Emission Factors, AP–42, Fifth Edition, Volume I: Stationary Point and Area Sources. Office of Air Quality Planning and Standards, Emissions Inventory Group, Research Triangle Park, NC. AP–42 can be downloaded through the Internet at http://www.epa.gov/ttn/chief/ap42.html.

[13] EPA. 1996a. EPA's Composite Model for Leachate Migration with Transformation Products (EPACMTP) Background Document. Office of Solid Waste, Washington, DC.

EPA. 1996b. EPA's Composite Model for Leachate Migration with Transformation Products (EPACMTP) Background Document for the Finite Source Methodology. Office of Solid Waste, Washington, DC.

EPA. 1996c. EPA's Composite Model for Leachate Migration with Transformation Products (EPACMTP) Background Document for Metals. Office of Solid Waste, Washington, DC.

EPA. 1997. EPA's Composite Model for Leachate Migration with Transformation Products (EPACMTP) User's Guide. Office of Solid Waste, Washington, DC.

column, and contaminants associated with the bed sediment in the surface water body. The method used to estimate how management of chlorinated aliphatics wastewaters and wastewater treatment sludges impacts surface water is based on the methodology presented in Addendum to Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions (EPA 1993)[14]. The model accounts for six ways in which contaminants may enter the surface water body: (1) contaminants may be sorbed to eroded soils that enter the surface water body, (2) contaminants may be dissolved in runoff that enters the surface water body, (3) contaminants may be bound to airborne particles that are deposited on the surface water body, (4) vapor phase contaminants in air may be deposited on the surface water body in precipitation (that is, wet deposition of vapor phase contaminants), (5) vapor phase contaminants in air may enter the surface water body through direct diffusion from the air, and (6) contaminants in groundwater may discharge into the surface water body. The model also accounts for processes that remove contaminants from the surface water body. These include: (1) volatilization of contaminants that are dissolved in surface water and (2) burial of contaminants in the sediment at the bottom of the surface water body. The model assumes that the impact to the water body is uniform, which is more realistic for smaller surface water bodies than for larger ones. The model estimates the concentrations of contaminants in the water column and bed sediment. We used the water column or bed sediment concentrations and bioconcentration factors (BCFs), bioaccumulation factors (BAFs), or biota-sediment accumulation factors (BSAFs) to estimate contaminant concentrations in fish tissue.

vii. Indirect Exposure Equations

EPA uses a series of ''indirect exposure equations'' to quantify the concentrations of contaminants that pass indirectly from contaminated environmental media to the receptor. For example, contaminants that are transported in air may be deposited on plants or onto the soil where they may accumulate in forage, grain, silage or soil that is consumed by beef cattle and dairy cattle. Individuals may then ingest contaminated beef and dairy products. Similarly, contaminants may be transported in groundwater to domestic groundwater wells where the groundwater is extracted and used for showering. The water vapor generated in the shower may be inhaled by the receptor. The indirect exposure equations allow EPA to calculate exposure point concentrations for these pathways and routes of exposure. The indirect exposure equations used by EPA to conduct the chlorinated aliphatic wastewater, EDC/VCM sludge, and methyl chloride sludge risk assessments are presented in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination.

e. How Did EPA Quantify Contaminant Exposure and Toxicity?

Exposure is the condition that occurs when a contaminant comes into contact with the outer boundary of the body, such as the skin, mouth and nostrils. Once EPA establishes the concentrations of contaminants at the points of exposure, EPA can estimate the magnitude of each receptor's exposure, or the contaminant dose. Dose is the amount of the contaminant that crosses the outer boundary of the body and is available for absorption at internal exchange boundaries (lungs, gut, skin; EPA 1992[15]). For example, for exposure to a carcinogen through ingestion of contaminated drinking water, dose is a function of the concentration of the contaminant in drinking water (the exposure point concentration), as well as certain ''exposure factors,'' such as how much drinking water the receptor consumes each day (the intake rate), the number of years the receptor is exposed to contaminated drinking water (the exposure duration), how often the receptor is exposed to contaminated drinking water (the exposure frequency), the body weight of the receptor, and the period of time over which the dose is averaged.

EPA's primary source of exposure factors is the *''Exposure Factors Handbook''* published by EPA in August 1997 (EPA 1997a[16]). For probabilistic risk analyses, EPA used the distributions of exposure factor values provided in the Exposure Factors Handbook to develop PDFs for exposure factors. The one situation where EPA does not develop an expression of dose is the case where we use Reference Concentrations (RfCs)[17] to estimate noncancer hazard for the inhalation exposure route. In this situation, EPA calculates noncancer hazard from concentration of the contaminant in air and the RfC, without considering exposure factors (inhalation rate, body weight) other than those inherent in the RfC.

We express the toxicity of contaminants as health benchmarks. Health benchmarks include cancer slope factors (CSFs, EPA's measure of cancer potency)[18] for oral exposure carcinogenic contaminants; reference doses (RfDs, EPA's acceptable contaminant dose via ingestion)[19] for oral exposure to noncarcinogenic contaminants; inhalation CSFs for inhalation exposure to carcinogenic contaminants; and RfCs for inhalation exposure to noncarcinogenic contaminants. EPA derived inhalation CSFs from Unit Risk Factors (URFs) for inhalation exposure to carcinogens. EPA uses Toxicity Equivalency Factors (TEFs) to express the toxicity of specific dioxin congeners in terms of the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8–TCDD) (see Section III. D.1.g.ii. for an explanation of TEFs). Health benchmark values are available from a number of sources. For the chlorinated aliphatics wastewater, EDC/VCM sludge, and methyl chloride sludge risk assessments, EPA established an order of preference for the sources of health benchmarks. The order of preference is as follows (from most preferred to least preferred): (1) the Integrated Risk Information System (IRIS) online database of verified health benchmarks (http://www.epa.gov/iris/subst/index.html)[20]; (2) the Health Effects Assessment Summary Tables (HEAST;

[14] EPA. 1993. Addendum to Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions. EPA/600/AP–93003. Office of Health and Environmental Assessment, Washington, DC.

[15] 57 FR 22888. Final Guidelines for Exposure Assessment. U.S. Environmental Protection Agency, May 29, 1992.

[16] EPA. 1997a. *Exposure Factors Handbook, Volumes I, II, and III.* Office of Research and Development, Washington, D.C., EPA/600/P–95/002Fa, b, c. August 1997, www.epa.gov/ordntrnt/ord/webpubs/exposure/index.html.

[17] Very simply, an RfC is EPA's acceptable concentration in air for a contaminant that causes non-cancer health effects. An RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious noncancer effects during a lifetime.

[18] A cancer slope factor is the slope of the dose-response curve in the low-dose region. When low-dose linearity cannot be assumed, the slope factor is the slope of the straight line from 0 dose (and 0 excess risk) to the dose at 1% excess risk. An upper bound on this slope is usually used instead of the slope itself. The units of the slope factor usually are expressed as 1/(mg/kg-day).

[19] An RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

[20] EPA. 1998. Integrated Risk Information System. Online database. (IRIS) Office of Research and Development (ORD). Cincinnati, OH.

EPA 1997b)[21]; (3) EPA's National Center for Environmental Assessment (NCEA) provisional values, and (3) benchmarks developed by the California Environmental Protection Agency (CALEPA)[22]. The specific health benchmarks used in the analysis are presented in Appendix C of the Background Document for the Chlorinated Aliphatics Risk Assessment.

f. What Are the Risks From Exposure to Chlorinated Aliphatics Wastewaters, and EDC/VCM and Methyl Chloride Sludges?

The following sections discuss EPA's estimates of individual and population risk for chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges.

i. What Are the Individual Risks?

EPA combined estimates of dose and estimates of toxicity (the health benchmarks) to calculate individual incremental lifetime carcinogenic risk estimates and hazard quotients for the potential contaminants of concern in chlorinated aliphatic wastewaters, EDC/VCM sludge, and methyl chloride sludge. Complete results of these calculations are provided in the *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination*. EPA typically considers a decision to list a waste when carcinogenic risks are $1x10^{-5}$ or greater or when the noncancer HQ is 1 or greater. None of the contaminants generated noncancer hazards with an HQ greater than 1, nor did the sum of the contaminant HQs exceed 1. In summing carcinogenic risk estimates and noncancer hazard quotients, EPA does not sum those risks or hazards that could not occur within the lifetime of an individual. For example, if estimated risks due to nongroundwater pathways occur during the operating or post-closure life of the unit (that is, due to releases to air and runoff/erosion) and risk via the groundwater pathways are not projected to occur for hundreds, or even thousands, of years due to long times required for contaminant migration, then these two pathway risks would not be added together.

The following sections present separately our deterministic and probabilistic estimates of individual risk for:

- Wastewaters from the production of chlorinated aliphatic chemicals,
- Wastewater treatment sludges from the production of EDC/VCM, and
- Wastewater treatment sludges from the production of methyl chloride.

Chlorinated Aliphatic Wastewaters

Table III–1 summarizes the significant (greater than $1x10^{-5}$ risk estimates for chlorinated aliphatic wastewaters managed in onsite aerated biological wastewater treatment tanks. The highest deterministic risk estimate, $2x10^{-5}$, occurs for the farmer. The risk is attributable to the farmer's ingestion of dioxins, which in Table III–1 are expressed as the 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ). The farmer's high end deterministic risk falls slightly below the 90th percentile probabilistic risk estimate (the 80th percentile risk estimate is $1x10^{-5}$). Table III–2 summarizes our deterministic estimates of risk due to the direct inhalation of chloroform. The high end chloroform risks are $3x10^{-6}$ for the farmer and $2x10^{-6}$ for all other receptors. The chloroform deterministic risk estimates for the adult receptors are roughly equal to the 97.5th percentile probabilistic risk estimates. Although the chloroform risks are not greater than $1x10^{-5}$, they are additive to the risks that EPA estimated for dioxins because they would occur within the same timeframe.

BILLING CODE 6560–50–P

[21] EPA. 1997b. Health Effects Assessment Summary Tables: Annual Update. (HEAST) Office of Emergency and Remedial Response. Washington, D.C. July.

[22] California Environmental Protection Agency (CalEPA). 1997. *Air Toxics Hot Spots Program Risk Assessment Guidelines: Technical Support Document for Determining Cancer Potency Factors.* Draft for Public Comment. Office of Environmental Health Hazard Assessment, Berkeley, CA, www.oehha.org/ra__guidance/.

Table III-1. Summary of Excess Lifetime Dioxin Cancer Risk (expressed as 2,3,7,8-TCDD TEQ) Attributable to Management of Chlorinated Aliphatic Wastewaters in an Aerated Biological Treatment Tank

Table III-1A. Deterministic Risk Results

Receptor	HE	CT	High End Parameters
Farmer	2E-05	4E-07	Exposure Duration and Contaminant Concentration
Child of Farmer	7E-06	3E-07	Contaminant Concentration and Waste Quantity
Home Gardener	2E-08	1E-09	Exposure Duration and Contaminant Concentration
Adult Resident/Fisher	2E-09	1E-11	Contaminant Concentration and Meteorological Location
Child of Resident	7E-09	4E-11	

HE = High End; CT = Central Tendency

Table III-1B. Probabilistic Risk Results

Receptor	Percentile				
	50th	90th	95th	97.5th	100th
Farmer	2E-07	5E-05	1E-04	3E-04	2E-02
Child of Farmer					
Age 1-5	2E-07	4E-05	1E-04	2E-04	8E-03
Age 6-11	2E-07	4E-05	1E-04	2E-04	9E-03
Age 12-18	2E-07	4E-05	1E-04	2E-04	1E-02

Table III-2. Summary of Excess Lifetime Chloroform Cancer Risk Attributable to Management of Chlorinated Aliphatic Wastewaters in an Aerated Biological Treatment Tank

Table III-2-A: Deterministic Results

Receptor	HE	CT	High End Parameters
Farmer	3E-06	8E-08	Exposure Duration and Distance To Receptor
Child of Farmer / Child Resident	2E-06	8E-08	Contaminant concentration and Distance to Receptor
Home Gardener/Fisher/Adult Resident	2E-06	8E-08	

Table III-2B. Probabilistic Results

Receptor	Percentile				
	50th	90th	95th	97.5th	100th
Farmer	3E-08	6E-07	1E-06	2E-06	6E-05
Adult Resident/Home Gardener/Fisher	2E-08	5E-07	1E-06	2E-06	5E-05
Child Resident					
Age 1-5	3E-08	6E-07	1E-06	2E-06	6E-05
Age 6-11	3E-08	6E-07	1E-06	2E-06	5E-05
Age 12-18	2E-08	4E-07	8E-07	1E-06	4E-05
Child of Farmer					
Age 1-5	6E-08	1E-06	2E-06	4E-06	6E-05
Age 6-11	4E-08	8E-07	2E-06	3E-06	5E-05
Age 12-18	3E-08	6E-07	1E-06	2E-06	4E-05

EDC/VCM Sludges

Tables III–3 and III–4 summarize the significant (greater than $1x10^{-5}$) risk estimates for EDC/VCM wastewater treatment sludges managed in an onsite land treatment unit. In all cases, we estimated that the highest risk occurs for the farmer. Table III–3 presents dioxin (expressed as 2,3,7,8–TCDD TEQ) risk estimates for the land treatment unit nongroundwater pathways. The high end deterministic risk estimate for the farmer is $2x10^{-4}$, which also corresponds to the 95th percentile probabilistic risk estimate. Table III–4 presents arsenic risk estimates for the land treatment unit groundwater pathways. The high end deterministic risk estimate for the farmer is $1x10^{-5}$, which falls between the 97.5th percentile probabilistic risk estimate ($6x10^{-6}$) and the 100th percentile probabilistic risk estimate ($5x10^{-5}$). EPA estimates that the groundwater pathway risks in Table III–4 would occur approximately 1500 years in the future, whereas the dioxin nongroundwater pathway risks in Table III–3 would occur during the assumed operating life of land treatment unit.

Table III–5 summarizes the significant risk estimates for EDC/VCM sludges managed in an offsite municipal landfill. The risk estimates presented in Table III–5 are arsenic groundwater pathway risks. The high end deterministic risk estimate for the farmer is $3x10^{-5}$, which falls between the 97.5th percentile ($1x10^{-5}$) and 100th percentile ($3x10^{-4}$) probabilistic risk estimates. We estimate that the arsenic risks attributable to the landfill (presented in Table III–5) would occur thousands of years in the future.

Table III-3. Summary of Excess Lifetime Dioxin (expressed as 2,3,7,8-TCDD TEQ) Cancer Risk Attributable to Management of EDC/VCM Sludge in An Onsite Land Treatment Unit

Table III-3A. Deterministic Risk Results

Receptor	HE	CT	High End Parameters
Farmer	2E-04	4E-06	Exposure Duration and Contaminant Concentration
Child of Farmer	8E-05	3E-06	Contaminant Concentration and Beef Intake
Home Gardener	2E-06	6E-08	Exposure Duration and Contaminant Concentration
Fisher	2E-05	6E-07	
Adult Resident	2E-06	5E-08	
Child of Resident	5E-06	1E-07	Contaminant Concentration and Soil Intake

HE = High End; CT = Central Tendency

Table III-3B. Probabilistic Risk Results

Receptor	Percentile				
	50th	90th	95th	97.5th	100th
Farmer	7E-06	1E-04	2E-04	4E-04	2E-03
Home Gardener	5E-08	2E-06	2E-06	4E-06	2E-05
Resident	3E-08	1E-06	2E-06	2E-06	7E-06
Fisher	2E-07	3E-06	8E-06	2E-05	4E-04
Child of Resident					
Age 1-5	1E-07	2E-06	4E-06	6E-06	1E-04
Age 6-11	5E-08	1E-06	2E-06	2E-06	6E-06
Age 12-18	3E-08	8E-07	1E-06	1E-06	4E-06
Child of Farmer					
Age 1-5	9E-06	1E-04	2E-04	3E-04	1E-03
Age 6-11	7E-06	9E-05	2E-04	2E-04	1E-03
Age 12-18	5E-06	7E-05	1E-04	2E-04	1E-03

Table III-4. Summary of Excess Lifetime Arsenic Cancer Risk Attributable to Management of EDC/VCM Sludge in An Onsite Land Treatment Unit

Table III-4A. Deterministic Risk Results

Receptor	HE	CT	High End Parameters
Farmer	1E-05	8E-07	Leachate concentration and Exposure Duration
Child of Farmer/Child of Resident	3E-06	6E-07	
Adult Resident/Gardener/Fisher	6E-06	7E-07	

HE = High End; CT = Central Tendency

Time for Peak concentration to reach receptor is approximately 1500 years

Table III-4B. Probabilistic Risk Results

Receptor	Percentile				
	50th	90th	95th	97.5th	100th
Farmer	9E-08	2E-06	4E-06	6E-06	5E-05
Adult Resident/Gardener/Fisher	7E-08	1E-06	3E-06	5E-06	3E-05
Child Resident					
Age 1-5	6E-08	1E-06	2E-06	4E-06	5E-05
Age 6-11	5E-08	1E-06	2E-06	3E-06	4E-05
Age 12-18	4E-08	9E-07	2E-06	3E-06	4E-05
Farm Child					
Age 1-5	1E-07	2E-06	4E-06	6E-06	4E-05
Age 6-11	8E-08	2E-06	3E-06	4E-06	2E-05
Age 12-18	6E-08	1E-06	2E-06	4E-06	2E-05

Table III-4. Summary of Excess Lifetime Arsenic Cancer Risk Attributable to Management of EDC/VCM Sludge in An Onsite Land Treatment Unit

Table III-4A. Deterministic Risk Results

Receptor	HE	CT	High End Parameters
Farmer	1E-05	8E-07	Leachate concentration and Exposure Duration
Child of Farmer/Child of Resident	3E-06	6E-07	
Adult Resident/Gardener/Fisher	6E-06	7E-07	

HE = High End; CT = Central Tendency

Time for Peak concentration to reach receptor is approximately 1500 years

Table III-4B. Probabilistic Risk Results

Receptor	Percentile				
	50th	90th	95th	97.5th	100th
Farmer	9E-08	2E-06	4E-06	6E-06	5E-05
Adult Resident/Gardener/Fisher	7E-08	1E-06	3E-06	5E-06	3E-05
Child Resident					
Age 1-5	6E-08	1E-06	2E-06	4E-06	5E-05
Age 6-11	5E-08	1E-06	2E-06	3E-06	4E-05
Age 12-18	4E-08	9E-07	2E-06	3E-06	4E-05
Farm Child					
Age 1-5	1E-07	2E-06	4E-06	6E-06	4E-05
Age 6-11	8E-08	2E-06	3E-06	4E-06	2E-05
Age 12-18	6E-08	1E-06	2E-06	4E-06	2E-05

BILLING CODE 6560-50-C

Methyl Chloride Sludges

EPA conducted a deterministic analysis to estimate nongroundwater (air) pathway risks associated with management of methyl chloride sludges in an onsite landfill. All nongroundwater pathway carcinogenic risks were less than 1×10^{-8}, and all noncancer HQs were less than 0.0001.

For groundwater pathways, EPA performed a screening analysis that maximizes estimates of risk or hazard to human receptors. EPA calculated the carcinogenic risk for an adult who ingests (drinks) 1.4 liters of leachate from the landfill for 350 days per year for 58 years. EPA also calculated the noncancer hazard for a child who ingests 1.4 liters of leachate from the landfill for 350 days per year for 9 years. None of the noncancer HQs was greater than 1. Arsenic was the only carcinogen with risk in excess of 1×10^{-5}. Specifically, an adult's risk due to ingesting leachate from methyl chloride sludges for 58 years was 5×10^{-5} due to arsenic. EPA discusses our evaluation of this risk in Section III.E.4.b.

ii. What are the Population Risks?

EPA expects that the population risks resulting from management of chlorinated aliphatics wastewaters in tanks and EDC/VCM sludges in onsite land treatment units and landfills are not significant. With regard to groundwater pathway risks, EPA believes that the number of domestic drinking water wells (thus the population) potentially affected by groundwater contaminated with arsenic originating from the landfill and the land treatment unit would be very small. Furthermore, we estimate that the arsenic concentrations predicted in receptor (drinking water) wells will result in risks only slightly above 1×10^{-5} for that very small number of people.

For nongroundwater pathways, EPA performed a screening evaluation of population risk for the waste management scenario and pathway that resulted in the greatest individual risk estimate of any pathway evaluated in the chlorinated aliphatics risk assessment. Specifically, EPA evaluated risk associated with ingestion of beef and dairy products contaminated with dioxins derived from the onsite EDC/VCM land treatment unit. As presented previously, under the land treatment unit scenario the farmer's total individual excess lifetime cancer risk from ingestion of beef and dairy was 2×10^{-4} for high end exposures and 3×10^{-6} for central tendency exposures. Although the individual risk estimates for the farmer exposed to dioxins from EDC/VCM sludge managed in a land treatment unit are an order of magnitude greater than those for the farmer exposed to dioxins from chlorinated aliphatics wastewaters managed in tanks, is possible that population risks resulting from releases from chlorinated aliphatics wastewaters would exceed those resulting from releases from EDC/VCM sludges. This might occur because there is only one land treatment unit that is used to manage EDC/VCM sludge, and we expect that there may be many aerated biological wastewater treatment tanks used to manage chlorinated aliphatics wastewaters. Nevertheless, EPA believes that it is reasonable to assume that the population risks for the land treatment unit likely would be greater than those for the wastewater tanks because there would need to be at least 10 wastewater treatment tanks with surrounding cattle populations similar to that of the land treatment unit to produce a population risk estimate equivalent to that of the land treatment unit.

Results of the population risk analysis for the land treatment unit indicate that 2×10^{-4} excess cancer cases would be expected annually in a population of 1,410 individuals ingesting beef produced from cattle raised within 2 kilometers of the land treatment unit over a 40-year operational life for the land treatment unit (dairy cattle are not raised in the county where the land treatment unit is located, thus we did not evaluate ingestion of dairy products in the population risk analysis). The average individual risk to the population consuming beef from within the 2-kilometer radius is 2×10^{-7}. We calculated the population potentially affected by a release from the land treatment unit (1,410 individuals) from the total estimated quantity of contaminated beef and average beef ingestion rates (that is, we calculated how many people would be required to consume all of the contaminated beef assuming typical rates of beef ingestion). It is possible that the contaminated beef would be distributed more widely throughout the population, such that the total number of people ingesting the contaminated beef would be greater than 1,410. However, the population risk estimate would not change because population risk is a function of the number of people who are exposed (that is, consume contaminated beef) and each person's individual risk (which is a function of the amount of contaminated beef a person consumes). Consequently, as the number of people who are exposed increases, the individual risk must decrease proportionally because there is only a finite amount of contaminated beef, and the overall population risk remains the same. The Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination provides a description of the procedure used to estimate population risks.

EPA did not estimate population risks for the other receptors for whom we calculated individual risk estimates (residents, children, gardeners, and fishers). Because the high end risk for the land treatment unit scenario was driven by the ingestion of beef and dairy products, the population risks for non-farmer receptors are expected to be considerably lower than 2×10^{-4}.

Although the population risks attributable to the management of chlorinated aliphatics wastes are expected to be very small, EPA does not believe it is appropriate to allow contamination from waste management activities to cause substantial risk to nearby residents simply because there are few individuals in the immediate vicinity of the waste management units. 40 CFR 261.11 clearly states that wastes are to be listed if they are ''capable of posing a substantial present or potential hazard.'' It does not state that a large number of people must be affected. However, population risk may be a factor that the Agency could consider under 40 CFR 261.11(a)(3)(xi) (''other factors as may be appropriate'').

EPA's Guidance for Risk Characterization (EPA 1995) states that when small populations are exposed, population risk estimates may be very small, however, ''in such situations, individual risk estimates will usually be a more meaningful parameter for decision-makers.'' Consequently, EPA's decision to list wastes has been based primarily on the concern over risks to those individual's who are significantly exposed, even if there are relatively few such individuals. EPA, however, requests comment on whether it would be appropriate to give weight to population risk in deciding whether to list these chlorinated aliphatic wastes as hazardous. EPA further invites comment on the effect of this approach on the Agency's goals with respect to environmental justice in rural areas.

g. What Is the Toxicity of COCs Identified by EPA?

The two contaminants for which EPA calculated significant risks are dioxins (expressed as the 2,3,7,8-TCDD TEQ) and arsenic. The following sections discuss the ways that these contaminants affect human health.

i. Arsenic

Arsenic is a naturally occurring element in the earth's crust that usually exists as an inorganic or organic compound, rather than in a free state. Arsenic that exists in compounds with elements such as oxygen, chlorine, and sulfur is referred to as inorganic arsenic; arsenic combined with carbon is referred to as organic arsenic. Organic forms of arsenic are less toxic than inorganic forms.

There is clear evidence that chronic exposure to inorganic arsenic in humans increases the risk of cancer, and EPA classifies inorganic arsenic as a Group A—Known Human Carcinogen. Studies report that inhalation of arsenic results in an increased risk of lung cancer. In addition, ingestion of arsenic has been associated with an increased risk of nonmelanoma skin cancer and bladder, liver, kidney, and lung cancer. No information is available on the risk of cancer in humans from dermal exposure to arsenic (EPA 1998).

ii. Dioxins

2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) belongs to the class of compounds, chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans, that are referred to as dioxins. EPA issued a draft *Health Assessment Document for 2,3,7,8-TCDD and Related Compounds* in 1994. This document is a three-volume series consisting of a complete reassessment of the toxic effects of 2,3,7,8-TCDD (EPA 1994a, b [23]). The document was reviewed by EPA's Science Advisory Board (SAB) but has not yet been issued in final form.

EPA has classified 2,3,7,8-TCDD as a Group B2—Probable Human Carcinogen (EPA 1997b). An increase in lung cancer risks was observed among Japanese males exposed to 2,3,7,8-TCDD as a result of an oil poisoning accident. Human studies have also found an association between 2,3,7,8-TCDD and soft-tissue sarcomas, lymphomas, and stomach carcinomas, although for malignant lymphomas, the increase in risk is not consistent. The increase in risk is of borderline significance for highly exposed groups and is less among groups exposed to lower levels of 2,3,7,8-TCDD (EPA 1994b). In animal tests, TCDD is one of the most potent carcinogens ever evaluated.

Although EPA has not developed an RfD or an RfC for 2,3,7,8-TCDD, noncarcinogenic health effects have been reported for 2,3,7,8-TCDD. The major noncarcinogenic effect from exposure to 2,3,7,8-TCDD is chloracne, a severe acne-like condition that develops within months of first exposure to high levels of 2,3,7,8-TCDD. For many individuals, the condition disappears after discontinuation of exposure, for others it may remain for years. There are limited human data to suggest the doses at which chloracne is likely to occur (EPA 1994a, b). Epidemiological studies report conflicting evidence on the immunotoxicity of 2,3,7,8-TCDD in humans. Some studies suggest evidence of immunotoxicity, such as alterations in lymphocyte populations, cell surface markers, or lymphocyte proliferative response (ATSDR 1997c [24]). However, studies have not reported changes in the immune system directly related to 2,3,7,8-TCDD exposure (EPA 1994a, b). An association has been reported between levels of male reproductive hormones and 2,3,7,8-TCDD exposure. Decreased testosterone levels were detected in several human studies, and animal data are available to support these findings. Other effects noted in human studies include an association between 2,3,7,8-TCDD exposure and the following:

- An increased risk of diabetes and an elevated prevalence of abnormal fasting serum glucose levels
- The induction of cytochrome P–450 1A1, an enzyme involved in biotransformation reactions
- Elevation of gamma glutamyl transferase, a liver enzyme
- A possible increased risk of endometriosis, a disease of the female reproductive system (EPA 1994a, b).

Animal studies report reproductive and developmental effects from exposure to 2,3,7,8-TCDD. These studies suggest that altered development may be among the most sensitive endpoints of 2,3,7,8-TCDD exposure. Developmental toxicity has been reported to occur in several animal species at lower levels than male and female reproductive toxicity effects. 2,3,7,8-TCDD appears to affect a large number of critical developmental effects at specific developmental stages. These changes can lead to increases in fetal mortality, disruption of organ system structure, and irreversible impairment of organ function. Developmental toxicity from 2,3,7,8-TCDD has been seen in fish, birds, and mammals (EPA 1994a, b).

EPA assigned 17 dioxin and furan congeners individual toxicity equivalency factors (TEFs). TEFs are estimates of the toxicity of dioxin-like compounds relative to the toxicity of TCDD, which is assigned a TEF of 1.0. We used the TEFs identified as the I-TEFs (International-TEFs) to conduct the chlorinated aliphatics risk assessment because, until very recently, this is the TEF scheme EPA scientists have recommended and used for the last 10 years (EPA 1989) [25] [26]. Documentation supporting the use of the TEFs has been placed in the rulemaking record.

The I-TEFs are presented in Table III–6. The I-TEFs are based on a limited data base of *in vivo* and *in vitro* toxicity testing (EPA 1989). The World Health Organization (WHO) recently reviewed the I-TEFs (Van den Berg et al. 1998) [27], and determined that three of the I-TEFs, those for 1,2,3,7,8-PeCDD (pentachlorodibenzo-p-dioxin), OCDD (octachlorodibenzo-p-dioxin), and OCDF (octachlorodibenzofuran), required modification (Table III–6). EPA is in the process of adopting these modifications, and consequently reviewed the impact that the revised (WHO-) TEFs would have on the results of the chlorinated aliphatics risk assessment. 1,2,3,7,8-PeCDD was not detected in dedicated chlorinated aliphatic wastewaters, dedicated EDC/VCM sludges, or methyl chloride sludges. Consequently, the difference in the I-TEF and the WHO-TEF for 1,2,3,7,8-PeCDD has no impact on the results of the risk analyses presented in this section. Because of the TEF differences for OCDD and OCDF, however, the decision to use either the I-TEFs or the WHO-TEFs potentially may result in large differences in the calculated TCDD TEQ concentrations for a given chlorinated aliphatics waste sample. Nevertheless, because OCDD and OCDF contribute very little to the actual risk attributable to dioxin compounds, the decision to use either

[23] EPA. 1994a. *Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds. Volume II.* (Draft). Office of Research and Development, Washington, D.C., www.epa.gov/ord/health.

EPA. 1994b. *Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds. Volume III. (Draft).* Office of Research and Development, Washington, D.C., www.epa.gov/ord/health.

[24] ATSDR (Agency for Toxic Substances and Disease Registry). 1997c. *Toxicological Profile for 2,3,7,8-Tetrachlorodibenzo-p-dioxin.* U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA.

[25] EPA. 1989. Interim Procedures for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-Dioxins and Furans (CDDs and CDFs) and 1989 Update. EPA/625/3–89/016. Risk Assessment Forum. March.

[26] Proposed Rule, ''Addition of Dioxin and Dioxin-Like Compounds; Modification of Polychlorinated Biphenyls (PCBs) Listing; Toxic Chemical Release Reporting; Community Right-to-Know,'' 62 FR 24887, (May 7, 1997).

[27] Van den Berg, et al. 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. Environmental Health Perspectives, v.106, n.12, pp. 775–792. December.

the I-TEFs or the WHO-TEFs has negligible impact to the overall risk results. The *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination* provides separate risk results for each of the dioxin congeners detected in the wastewaters and sludges evaluated.

TABLE III–6. TOXICITY EQUIVALENCY FACTORS (TEFS) FOR DIOXIN COMPOUNDS

Compound	I-TEF	WHO-TEF
2,3,7,8-TCDD	1	same
1,2,3,4,5,7,8,9-OCDD	0.001	0.0001
1,2,3,7,8,9-HxCDD	0.1	same
1,2,3,4,6,7,8-HpCDD	0.01	same
1,2,3,4,6,7,8,9-OCDF	0.001	0.0001
1,2,3,4,7,8-HxCDD, ...	0.1	same
1,2,3,7,8-PeCDD, ...	0.5	1
2,3,7,8-TCDF	0.1	same
1,2,3,4,7,8,9-HpCDF	0.01	same
2,3,4,7,8-PeCDF	0.5	same
1,2,3,7,8-PeCDF	0.05	same
1,2,3,6,7,8-HxCDF	0.1	same
1,2,3,6,7,8-HxCDD	0.1	same
2,3,4,6,7,8-HxCDF	0.1	same
1,2,3,4,6,7,8-HpCDF	0.01	same
1,2,3,4,7,8-HxCDF	0.1	same
1,2,3,7,8,9-HxCDF	0.1	same

h. What Is the Uncertainty in the Human Health Risk Results?

EPA typically classifies the major areas of uncertainty in risk assessments as parameter uncertainty, scenario uncertainty, and model uncertainty. This section identifies the primary sources of each of these types of uncertainty in the chlorinated aliphatics risk assessment, and qualitatively describes how each may influence the results of the risk assessment.

Many of the parameters that we used to quantify contaminant fate and transport and contaminant exposure and dose either were not measured or could not be measured precisely and/or accurately. Some of the most important and sensitive parameters in our analyses include those that describe waste composition; waste management practices; site characteristics (for example, hydrogeological, topographical, meteorological, and soils data); the physiologic and behavioral exposure characteristics of the receptors; the physical, chemical, and biochemical properties of the contaminants; and toxicological effects. We believe that the primary sources of parameter uncertainty include the following:

- The risk analyses were based on a limited set of waste sample data. It is possible that these data do not represent the true distribution of contaminant concentrations in the waste categories evaluated, resulting in either an overestimation or underestimation of the actual risk to receptors.
- EPA obtained little site-specific information regarding waste management units for the chlorinated aliphatics industry, necessitating that we make a number of assumptions regarding waste management in off-site landfills, the land treatment unit, and wastewater tanks. Many of the facilities reported using offsite nonhazardous landfills to dispose of EDC/VCM sludges. We assumed that these landfills are municipal landfills, and modeled typical municipal landfills based on available data. Our major assumptions about the municipal landfills that have the effect of decreasing our risk estimates are that the landfills have daily covers and run-on/run-off controls. Our major assumptions about the municipal landfills that have the effect of increasing our risk estimates are that the landfills are not lined and have no leachate collection systems. For the land treatment unit, we assumed that no run-on/run-off controls were present to mitigate risk. We assumed that the industry's wastewater treatment tanks are uncovered (which increases our risk estimates), are aerated (which increases our risk estimates), employ biological treatment techniques (which decreases our risk estimates), have structural integrity (which decreases our risk estimates), and have spill and overflow controls (which decreases our risk estimates).
- We typically used regional databases to obtain the parameter values necessary to model contaminant fate and transport. Because the data that we used are not specific to the facilities at which the actual wastes are managed, the data represent our best estimates of actual site conditions. Use of these databases in lieu of site-specific data may result in either overestimates or underestimates of risk.
- Sources of uncertainty in toxicological benchmarks include one or more of the following: extrapolation from laboratory animal data to humans, variability of response within the human population, extrapolation of responses at high experimental doses under controlled conditions to low doses under highly variable environmental conditions, and adequacy of the database (number of studies available, toxic endpoints evaluated, exposure routes evaluated, sample sizes, length of study, etc.). Toxicological benchmarks are designed to be conservative (that is, overestimate risk) because of the uncertainties and challenges associated with condensing toxicity data into a single quantitative expression. Therefore, use of the current toxicological benchmarks most likely overestimated risk for the pathways evaluated.
- EPA estimated the risk of developing cancer from the estimated lifetime average daily dose and the slope of the dose-response curve. A cancer slope factor is derived from either human or animal data and is taken as the upper bound on the slope of the dose-response curve in the low-dose region, generally assumed to be linear, expressed as a lifetime excess cancer risk per unit exposure. However, individuals exposed to carcinogens in the first few years of life may be at increased risk of developing cancer. For this reason, EPA recognizes that significant uncertainties and unknowns exist regarding the estimation of lifetime cancer risks in children. We also note that the analysis of cancer risks in children has not been externally peer reviewed.

We expect that the various sources of parameter uncertainty in our risk assessment counterbalance each other, such that parameter uncertainty will not result in a significant overall increase or decrease in risk.

Scenario uncertainty results from the assumptions we make regarding how receptors become exposed to contaminants. This uncertainty occurs because of the difficulty and general impracticality of making actual measurements of a receptor's exposure. Exposure modeling relies heavily on default assumptions regarding population activity patterns, mobility, dietary habits, body weights, and other factors. Because the risk estimates presented in today's notice are for hypothetical chronic exposures and are designed to provide a realistic range of potential receptor exposure scenarios, we develop predictions of long-term average exposures for each receptor. Although it is possible to study various populations to determine their exposure parameters (for example, age-specific soil ingestion rates or intake rates for food) or to assess past exposures (epidemiological studies) or current exposures, risk assessment is about prediction. Therefore, long-term exposure monitoring in this context is infeasible. The double-high end deterministic approach coupled with the probabilistic approach is designed to provide reasonable estimates of potential long-term exposures for various receptors. The *Exposure Factors Handbook* provides the current state-of-the-science regarding exposure modeling and assumptions and was used in the risk assessment. To the extent that actual exposure scenarios vary from the assumptions we used, risks could be underestimated or overestimated. Although there could be individuals living near a waste disposal site who have higher exposures than those presented, it is more likely that actual exposures for most of these individuals would fall within the predicted range, and, moreover, would be similar to those predicted for the central tendency or 50th percentile.

Models and their mathematical expressions are simplifications of reality that are used to approximate real-world conditions and processes, and their

relationships. Models do not include all parameters or equations necessary to express reality because of the inherent complexity of the natural environment, and the lack of sufficient data to describe the natural environment. Consequently, models are based on numerous assumptions and simplifications, and reflect an incomplete understanding of natural processes. We selected the models used in this risk assessment, described in Section III.D.1.d, based on science, policy, and professional judgment. We selected the wastewater emissions model, the air dispersion and deposition models, the indirect exposure equations, and the groundwater model because they provide the information needed for this analysis and because we generally consider them to be state-of-the-science. Even though the models used in the risk analysis are used widely and have been accepted for numerous applications, they each retain significant sources of uncertainty that as a whole could result in either an overestimation or underestimation of risk.

One of the sources of uncertainty is our assumption that vapor emissions of dioxins from chlorinated aliphatics wastewaters and wastewater treatment sludges do not appreciably sorb to particulate matter in the ambient air in approximately 1.2 minutes, the average the time required for emissions from the waste management units to reach a receptor located 300 meters away (our central tendency distance to receptor). Sorption of dioxins onto particles in air would remove dioxins from the vapor phase, thereby reducing the vapor-phase diffusion of dioxins into plants. As a result, our calculated dioxin concentrations in plants, and in animals consuming plants (particularly grasses), are higher than they would be if we assumed that some fraction of the vapor phase dioxin irreversibly partitions onto particles in the ambient air. However, given the uncertainties regarding rates of dioxin partitioning, magnitude of partitioning, and other factors potentially influencing dioxin sorption onto particles (such as temperature, humidity, and particle size, type and density), we believe our assumption that dioxins remain as vapors during their transport from the waste management unit source to the receptor location is appropriate. Because we understand that our assumption results in increased risk estimates, we are soliciting public comment on this issue. We also charged peer reviewers with providing comment on the issue during the peer review process, discussed in Section III.D.3., below.

2. What Are the Potential Risks to Ecological Receptors?

EPA conducted an ecological risk screening analysis for the tank scenario for chlorinated aliphatics wastewaters, the land treatment unit and landfill waste management scenarios for EDC/VCM sludges, and for the landfill waste management scenario for methyl chloride sludges. The purpose of this analysis was to identify whether there is potential for adverse ecological effects resulting from the management of chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges. The screening analysis compares the modeled media concentrations to protective media concentrations in the form of a hazard quotient. When the hazard quotient exceeds 1, there is potential for adverse effects. If the hazard quotient is less than 1, we do not expect adverse effects for a particular ecological receptor. The amount by which the hazard quotient exceeds 1 suggests the potential for adverse ecological effects; however, the screening results do not demonstrate actual ecological effects, nor do they indicate whether those effects will have significant implications for ecosystems and their components.

For the screening analysis, EPA applied a methodology designed to evaluate the potential for adverse ecological effects for selected receptors in generalized terrestrial and freshwater aquatic systems. The ecological risk screening analysis focused on a limited set of constituents of concern that were modeled for the human health risk analysis. For the selected ecological receptors, we developed protective contaminant concentrations in soil, sediment, and surface water that are based on conservative assumptions regarding exposure pathways and dietary preferences. The analysis included the following steps: (1) we developed chemical stressor concentration limits (CSCLs)[28]; (2) we compared the CSCLs to exposure point concentrations and calculated hazard quotients; and (3) we characterized key uncertainties and their impact on hazard quotients. We describe the results of this process in detail in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination.

Based on the results of the analysis, we do not anticipate significant risk for the ecological receptors evaluated under either the high end or central tendency chlorinated aliphatic wastewater tank, EDC/VCM landfill, or methyl chloride landfill scenarios. However, there is indication of potential significant risk to ecological receptors under both the high end and central tendency EDC/VCM land treatment unit scenarios. These results support our conclusions for the human health risk analyses for EDC/VCM and methyl chloride sludges, that is, that there are risks posed by the management of EDC/VCM sludges in land treatment units, but not by the management of EDC/VCM sludges or methyl chloride sludges in landfills. Although we did not explicitly consider risks to threatened or endangered species, the CSCLs are protective media concentrations based on Agency-wide standards (e.g., Ambient Water Quality Criteria) and no observed adverse effects levels. The protective nature of the CSCLs implies some degree of protection for species already considered to be under stress. The ecological risk screening results are described in detail in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination.

3. Did EPA Conduct a Peer Review of the Risk Assessment?

The Agency has submitted the risk assessment to three independent experts for peer review. Their comments have been received and are in the docket for today's proposed rule. Due to the time constraints for proposal of this rule, the Agency has not yet reviewed and addressed those comments. Both the peer review comments and the public comments will be addressed in the final rulemaking.

E. Waste-Specific Listing Determination Rationales

This section presents the rationale for today's proposed listing determinations for each of the identified categories of wastewaters and wastewater treatment sludges from the chlorinated aliphatic industry. EPA considered the listing criteria set out in 40 CFR 261.11, as incorporated into the risk assessments presented in Section III.D. above, as well as any other information relevant to the criteria, in making each of the listing determinations presented in this section. The criteria provided in 40 CFR 261.11 include eleven factors for determining ''substantial present or potential hazard to human health and the environment.'' As previously discussed at the beginning of Section III.D., nine of these factors relate to the risk assessments (constituent toxicity, concentration, waste quantity, migration potential, persistence, degradation

[28] Chemical stressor concentration limits are the containment concentrations in environmental media that are presumed to cause *de minimis* effects to ecological receptors.

potential, bioaccumulation potential, plausible mismanagement, and other regulatory actions). Damage incidents (261.11(a)(3)(ix)) are investigated, and those that can be attributed to the wastes being evaluated are identified and considered in our evaluation.

The following sections presents the rationale for each of the proposed listing determinations for wastes generated by the chlorinated aliphatics industry. Our rationale includes the results of our consideration of each of the factors listed above, the results of our risk assessment and other factors as may be appropriate.

1. Chlorinated Aliphatics Wastewaters

a. Wastewaters From the Production of Chlorinated Aliphatics

As explained previously in Section III.A.1., the Agency segregated wastewaters from the chlorinated aliphatics industry into two waste groupings. Based upon current waste management practices, we grouped all chlorinated aliphatic wastewaters, except for those wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, into a single waste category for the listing determination investigation. We decided to study these wastewaters collectively because most chlorinated aliphatic manufacturers commingle wastewaters generated by individual processes prior to treating the wastewaters in a common wastewater treatment system.[29] In addition, many process wastewaters generated from the production of chlorinated aliphatic hydrocarbons contain similar constituents of concern.

EPA is proposing to list as hazardous process wastewaters generated from the production of chlorinated aliphatic hydrocarbons (other than those wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, discussed later in Section III.E.1.b of this preamble). The wastewaters meet the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous and are capable of posing a substantial present or potential hazard to human health or the environment when mismanaged. As already described in the risk assessment results in Section III.D.1.f. of this preamble, we identified risks of concern associated with air releases of dioxins from wastewater treatment systems. The results of our risk analysis, which explicitly considers the factors listed in 40 CFR 261.11(a)(3)(i)–(x), shows potential risks of concern for the farmer and child of farmer receptors, where the contaminants of concern are dioxins. The risk assessment results were presented previously in Table III–1 of Section III. D.1.f.

i. What Information Led EPA To Propose To List as Hazardous Process Wastewaters From the Production of Chlorinated Aliphatic Hydrocarbons?

Responses to the 1996 RCRA Section 3007 chlorinated aliphatic industry survey indicated that approximately 11.5 million metric tons of chlorinated aliphatic wastewaters are generated annually. Survey responses and other publicly-available information also indicate that virtually all chlorinated aliphatic manufacturers treat these wastewaters in on-site, tank-based wastewater treatment systems prior to direct discharge of these wastewaters in accordance with facility-specific NPDES permits. Other wastewater management practices identified include discharge off-site to either publicly-or privately-owned treatment works (POTW, PrOTW), and storage and treatment in tanks prior to disposal in on-site underground injection wells. None of the facilities that responded to the questionnaire indicated that chlorinated aliphatic wastewaters currently are managed in surface impoundments.

The Agency evaluated air pathway (vapor emissions) risks associated with the management of chlorinated aliphatics in wastewater treatment tanks. Our analysis of air emissions from the treatment of wastewaters was limited to an evaluation of air emissions from tank-based systems because the results of the RCRA Section 3007 survey showed that the chlorinated aliphatics industry manages wastewaters exclusively in tanks. Surface impoundments currently are not being used by this industry for the treatment of wastewaters, and based upon a review of industry trends, we anticipate that this industry will not use surface impoundments in the future. First, all of our data indicate that surface impoundments are no longer used by the chlorinated aliphatics manufacturers. In the 1992 RCRA 3007 survey responses, 5 facilities indicated they were using surface impoundments in the treatment of wastewater. In the 1997 RCRA 3007 survey update, only two facilities indicated they were using surface impoundments. We contacted the five facilities to confirm whether or not surface impoundments were being used, and learned that all of the impoundments had closed. Second, we do not believe it is likely that established tank-based wastewater treatment systems would be abandoned for surface impoundments-based systems, given that chlorinated aliphatic manufacturers have made the decision to convert to tank-based systems outside of regulations and after having considered other variables (*e.g.*, liability concerns) and weighing all risks and benefits of tank-based systems. Further, impoundment-based systems are land intensive and land is valuable, particularly in industrial areas. Once a facility has reclaimed land previously used for surface impoundments, the facility is likely to then use that land for higher value operations. Therefore, we did not view surface impoundments as a plausible management for wastewaters within this industry.

Given that wastewaters are managed in aerated biological treatment tanks, the emissions pathway of most concern is air emissions. Although such tanks often are open and may facilitate air releases, wastewater treatment tanks do restrict or eliminate the possibility of releases to groundwater via leaching. Tanks used to store and treat wastewaters generally are equipped with overflow and spill controls and are managed in compliance with structural integrity requirements that restrict the physical migration of wastes from the unit into the surrounding soil. However, given that a majority of the tanks used to treat chlorinated aliphatic wastewaters are designed to allow for aeration of the wastewater, these units may not completely control releases due to vapor emissions. Therefore, EPA determined that contaminant transport via air releases from tank-based systems was the most logical source of potential risk from managing these wastewaters.

EPA collected 41 samples of chlorinated aliphatic wastewaters generated at 15 facilities. From the samples and analytical results we selected data for our risk analysis that represent wastewaters at the point where they are commingled prior to treatment. Since it is common for wastewaters to be combined prior to treatment in on-site wastewater treatment facilities, these commingled wastewaters are most representative of the wastewaters that actually are managed in tanks. Further, because the RCRA Section 3007 survey responses indicated that some facilities may commingle chlorinated aliphatic process wastewater with non-chlorinated aliphatic (e.g., petroleum refinery) process wastewater prior to treatment, we conducted our risk assessment using only waste characterization and volume data

[29] See Appendix D to Listing Background Document for the Chlorinated Aliphatic Listing Determination.

representing ''dedicated'' wastewaters. We used data from these facilities to ensure that the results of our risk assessment would reflect only risks associated with the management of chlorinated aliphatic wastewaters.

We also centered our analysis on an evaluation of chlorinated aliphatic wastewaters not currently defined as hazardous waste, and that are managed in aerated, uncovered biological treatment tanks. While not every facility currently uses biological treatment, this was the predominant practice observed during facility site visits and indicated in the RCRA Section 3007 survey. The risk analysis assumed that biological treatment occurs in aerated, uncovered tanks, because these conditions are typical for biological treatment in tanks and were confirmed to be occurring at some chlorinated aliphatic facilities treating non-hazardous, dedicated chlorinated aliphatic wastewaters. Also, because aeration increases air emissions, this scenario is expected to result in the highest risk estimates (compared with non-aerated and/or covered tanks). Based upon survey response information and follow up inquiries with facility personnel, biological treatment in uncovered, aerated tanks was considered to be a plausible management scenario for wastewaters in the chlorinated aliphatics industry.

The risks associated with vapor emissions of dioxin, as presented previously in Table III-1 in Section III.D.1.f., are significant for two receptors, the farmer and the farmer's child, and for one exposure route, the consumption of beef and dairy products. The high-end cancer risk for the farmer is 2E–05 and the central tendency risk is 4E–07. As explained previously, this risk is attributed to a local farmer's ingestion of dioxin due to his consumption of fruits, vegetables, beef and dairy products, all of which are grown or raised in an agricultural field located near a wastewater treatment unit used to treat chlorinated aliphatic wastewaters, as well as the farmer's incidental ingestion of soil from the agricultural field (see Section III.D.1.c). The high-end cancer risk for the farmer's child is 7E–06 and the central tendency risk is 3E–07. EPA also ran a Monte Carlo risk assessment on the air releases from these tanks. Probabilistic risk assessment results showed a risk of 1E–4 at the 95th percentile for the farmer, and for the child of farmer. This confirms the reasonableness of the deterministic analysis and the fact that regulation would be necessary to reduce the risk from the tank emissions to protect the farmers. At the 50th percentile, the probabilistic risk was 2E–7 for the farmer and the child of farmer.

As described in Section III.D.1.f. of this preamble, the high-end parameters used in the risk assessment for dioxin emissions from wastewater treatment tanks were waste concentration and exposure duration. These results are based upon a concentration of dioxin in wastewaters associated with the highest concentration of dioxin we found for the wastewater samples used in the analysis. Further discussion of the assumptions and parameters used in the risk assessment is provided in Section III.D. of this preamble and in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination that is in the docket for today's proposed rule.

Our analyses also showed marginal risks of concern for the farmer, child of farmer, home gardener, adult and child resident, and fisher, from direct inhalation of chloroform. The high-end cancer risk for the farmer from direct inhalation of chloroform is 3E–06. In addition, the high end cancer risk to the child of farmer, child resident, adult resident, home gardener, and the fisher from direct inhalation of chloroform is 2E–06. The central tendency risk from chloroform inhalation for the farmer, child of farmer, child resident, home gardener, fisher and adult resident is 8E–08.

EPA is confident that the constituents of most concern, dioxins and chloroform, were identified. In addition, we are confident that the assumptions and parameter values used in our risk modeling reflect ''high-end'' or ''reasonable worse case'' circumstances. Risks are unlikely to be significantly higher than shown by our modeling results. In Section III.D.1.h. of today's preamble, we describe in more detail sources of potential uncertainty in the risk results that may result in under- or over-estimations of risk.

Based on an analysis of the risks associated with current management practices, EPA is proposing to list wastewaters from the production of chlorinated aliphatic hydrocarbons as hazardous waste (EPA Hazardous Waste Number K173.) EPA's proposal to list this waste is consistent with the guidance the Agency has used for determining that a waste is hazardous (see 59 FR 66077), i.e., the risks associated with management of wastewaters in aerated biological treatment tanks due to vapor emissions of dioxins are above the 1E–5 listing benchmark. This guidance also provides that EPA can consider additional factors in cases where risk assessment results indicate a risk level of between 1E–4 and 1E–6, as is the case here. These additional factors include: certainty of waste characterization; certainty in risk assessment methodology; coverage by other regulatory programs; waste volume; evidence of co-occurrence of hazardous constituents; damage cases showing actual impact to human health or the environment; and presence of toxicants of unknown or unquantifiable risk.

With regard to certainty of waste characterization, as explained in Section III.D., the Agency collected and analyzed 41 samples of wastewaters generated from the production of chlorinated aliphatic chemicals, six of which were collected at the influent (''headworks'') of the wastewater treatment system. Given that we used these six ''dedicated'' samples in our risk assessment, we are certain that our analysis evaluated without question the risks attributable to the wastewaters of concern.

With respect to certainty in risk assessment methodology, we note that there is discussion of uncertainty in the risk assessment methodology in section III.D.1.h. of today's preamble. As mentioned in that section, we selected the models we used because we generally consider them to be state-of-the-science, and because they are used widely and have been accepted for numerous applications. However, as mentioned, they each retain significant sources of uncertainty that as a whole could result in either an overestimation or underestimation of risk. Should the Agency determine, based upon public comment or as a result of the peer review of the risk assessment methodology, that the wastewater risk assessment has overestimated the risks such that a decision to list this residual is not warranted, the Agency may ultimately decide against listing this waste.

We considered coverage by other regulatory programs in making our proposed listing determination for chlorinated aliphatic wastewaters. In fact, as discussed further below, our decision to propose to list these wastewaters and to propose technical standards to address air emissions from treatment tanks managing these wastewaters, is directly related to the fact that current regulatory programs do not appear to adequately address the type of air releases from these units that showed risk in our analysis.

Waste volume is part of our risk level calculations. As explained in section III.D., risk is projected based on the volume of waste managed under each modeled waste management scenario.

We note that there is a significant volume of chlorinated aliphatic wastewater generated annually (11.5 million metric tons). Our risk assessment methodology also accounts for the co-occurrence of hazardous constituents in any particular waste. Section III.D.1.b. discusses the number of potential constituents of potential concern identified in each wastestream. A more detailed discussion of the constituents of potential concern detected in each wastestream analyzed is provided in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination for this rule, which is available in the docket for today's rule.

With regard to the remaining factor in § 261.11(a)(3), no actual damage incidents have been observed (§ 261.11(a)(3)(ix)). However, the risk levels indicated, large waste volumes, certainty of waste characterization and risk assessment, coverage by other regulatory programs, and accounting for co-occurrence of constituents in the waste, outweigh the lack of observed damages. This is because the potential risks associated with this wastestream would be long term. Such risks are very difficult to directly attribute to any particular cause and can result even in the absence of observable releases. Our failure to observe damages incidents does not mean they have not occurred or that risks are not being imposed upon surrounding populations. RCRA is designed to be a prospectively-protective statute and the Agency need not wait for actual damages to be observed.

As discussed previously, the risk assessment addresses nine of the listing criteria in 40 CFR 261.11. EPA believes the risks resulting from our analysis represent plausible management of these wastes (§ 261.11(a)(3)(vii)) using reasonable assumptions for treatment of wastewaters in tanks. In addition, the risk analysis was developed using actual analytical data. However, the Agency still recognizes that sources of uncertainty could be contributing to an overestimation of risk. The Agency points out that risk modeling results show risks at significant levels only in cases where sensitive input parameters are assumed to represent high-end circumstances.

Finally, the Agency did not model wastewaters that are already defined as hazardous wastes (i.e., wastes mixed with or derived-from other existing listed wastes, or exhibiting a characteristic of hazardous waste), because we assume these wastes are already, and will continue to be, properly handled as hazardous. On-site injection of wastewaters to a permitted UIC well also was not modeled. Although information obtained from the RCRA Section 3007 questionnaire and other publicly available information indicate that some chlorinated aliphatic manufacturing facilities manage wastewaters via underground injection, the majority of these wastewaters currently are managed as hazardous wastes and injected into Class I permitted hazardous waste UIC wells in accordance with approved no-migration petitions. Only one facility manages chlorinated aliphatic wastewaters as non-hazardous waste and injects the wastewaters in a permitted UIC well.

Although we have proposed to list this wastestream, we recognize that our estimates of the risks associated with this wastestream are within the range in which the Agency has stated it may consider other factors in deciding whether to list a waste. EPA invites comment as to whether there are other factors EPA should consider that would further support a final decision to list this waste or that would support a conclusion that EPA should not list this waste. EPA has, for example, asked for comment earlier in section D.1.f.ii. regarding whether to consider population risk.

ii. What is the Scope of Today's Proposed Listing Determination for Chlorinated Aliphatic Wastewaters?

The scope of today's proposed listing includes all wastewaters generated by chlorinated aliphatic production processes, except for wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A process). These wastewaters were evaluated separately (see section III.E.1.b.). The listing description for chlorinated aliphatic wastewaters is as follows:

> K173 Wastewaters from the production of chlorinated aliphatic hydrocarbons, except wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.

iii. What Is the Proposed Regulatory Status of Sludges Derived From the Treatment of Wastewaters Covered by the Proposed Listing Determination?

The Agency is proposing to amend the current RCRA regulations so that wastewater treatment sludges generated from the treatment of wastewaters proposed to be listed as hazardous waste K173 will not be classified as hazardous waste as a result of the ''derived-from'' rule (40 CFR 261.3(c)(2)(i)). The proposed amendment to the derived from rule will exempt sludges derived from the processing or management of proposed K173, as long as the wastes would not otherwise be defined as hazardous waste, absent the proposed K173 listing. As presented elsewhere in today's proposed rule, EPA has studied wastewater treatment sludges from the chlorinated aliphatics industry and made independent hazardous waste listing determinations for several categories of sludges. These independent evaluations of the potential risks associated with wastewater treatment sludges derived from today's proposed K173 wastewaters supercede any presumed risk imparted by application of the derived-from rule in this instance. These risk evaluations logically should take precedent over the application of the derived-from rule, which presumes risk absent any information on toxicity of the treatment residual. The Agency points out, however, that sludges and other residuals generated as a result of managing chlorinated aliphatic wastewaters that carry waste codes other than K173, and residuals that otherwise are listed hazardous wastes (or exhibit a characteristic of hazardous waste) remain hazardous wastes.

EPA is today proposing to add a new paragraph (E) to the derived-from regulations at 40 CFR 261.3(c)(2)(ii) to make clear that wastewater treatment sludges derived-from treating K173 wastewaters will not be hazardous waste via the derived-from rule.

iv. What Comments Is EPA Specifically Requesting on the Proposed Listing of Chlorinated Aliphatic Wastewaters?

The Agency requests comments on the proposed listing of wastewaters from the production of chlorinated aliphatic hydrocarbons, specifically, how would specific areas of potential uncertainty justify a decision to list or not list these wastewaters as hazardous.

v. How Does the Agency Propose To Address the Risks Associated With Chlorinated Aliphatic Wastewaters Affected by the Proposed Listing?

Owners and operators of wastewater treatment units, as defined in 40 CFR 260.10, are not required to obtain a RCRA permit or comply with the management standards of 40 CFR Parts 264 (permitted facilities) and 265 (interim status facilities) when managing hazardous wastes in such

units (40 CFR 264.1(g)(6) and 265.1(c)(10)). Section 260.10 defines a wastewater treatment unit as a device which (1) is a part of a wastewater treatment facility that is subject to regulation under § 402 or § 307(b) of the Clean Water Act; (2) receives and treats or stores an influent wastewater that is a hazardous waste, generates and accumulates a wastewater treatment sludge that is a hazardous waste, or treats or stores a wastewater treatment sludge that is a hazardous waste; and (3) meets the definition of a tank or tank system.

The results of the Agency's risk assessment for chlorinated aliphatic wastewaters shows significant risks due to air emissions of dioxins from uncovered and aerated biological treatment tanks. The Agency's proposed listing determination for these wastewaters alone will not address the risk pathway of concern, due to the regulatory exemption for wastewater treatment units. To address the risks associated with the management of proposed K173 chlorinated aliphatic wastewaters, the Agency is proposing to require that wastewater treatment units used to treat chlorinated aliphatic wastewaters comply with specific requirements in 40 CFR Parts 264 and 265, subpart CC (Air Emission Standards for Tanks, Surface Impoundments, and Containers). The Agency's objective is to require air emission controls for wastewater treatment tanks managing these wastewaters to prevent the release of dioxin vapor emissions to the environment. These proposed requirements would be enforceable requirements of RCRA subtitle C.

By this limited proposal to change the exemption for wastewater treatment tanks that are used to treat chlorinated aliphatic wastewaters, which is based only on a risk assessment of certain kinds of tanks used to treat these specific wastewaters, EPA is not reopening any other aspect of the wastewater treatment unit exemption.

What Type of Requirements is EPA Proposing To Prevent Air Releases From These Tanks?

EPA considered simply requiring that the tanks be ''covered'' to prevent air releases of dioxins from K173 wastewaters. However, it became apparent that such a simplified approach might not provide adequate guidance to the regulated community on how to ensure they are complying with this type of performance standard. The Agency determined that the existing requirements for controlling air emissions from hazardous waste tanks, in subpart CC of 40 CFR Parts 264 and 265, could be used with some modifications to meet the goal of controlling air emissions from tanks managing proposed K173 wastewaters.

Currently, the 40 CFR 264/265 subpart CC requirements address volatile organic (VO) emissions from hazardous waste managed in tanks, surface impoundments, and containers. Therefore, many of the provisions in subpart CC (*e.g.*, the VO concentration threshold of 500 parts per million by weight for determining applicability of the Subpart CC requirements) are not appropriate for dioxin emissions. However, other provisions (namely, the technical standards for covering tanks and controlling emissions in Sections 264.1084 and 265.1085) are appropriate for controlling air emissions from wastewater treatment tanks managing K173 wastewaters. Therefore, EPA is proposing to amend the subpart CC requirements (described in more detail below) so that specific technical standards already in subpart CC for tank emissions apply to tanks managing K173 wastewaters. (The Agency notes that the standards being proposed today, if finalized, will apply irrespective of the VOC content of the wastewater.) We also recognize that dioxin levels vary among generators, and thus are proposing a trigger level for dioxins below which compliance with subpart CC is not required. This is because our analytical data indicate that there is a range of dioxin levels in the chlorinated aliphatic wastewaters.[30] In particular, two samples contained TCDD TEQ levels that were four orders of magnitude lower than both the maximum and average TCDD TEQ concentrations.

How Did EPA Develop the 2,3,7,8-TCDD TEQ Limit for Wastewaters?

EPA's first step in establishing a concentration limit for dioxins was to determine whether we should set the limit as a 2,3,7,8-TCDD TEQ (TCDD TEQ) concentration, or as a set of individual limits for each of the specific dioxin congeners. We decided to set the limit as a 2,3,7,8 TCDD TEQ concentration. In making this decision, we considered the analytical results from the six dedicated chlorinated aliphatics headworks wastewater samples collected during the record sampling effort (see Section III.D.1.b.). We determined that wastewaters from the production of chlorinated aliphatic chemicals do not carry a distinct congener ''fingerprint,'' that is, certain congeners are not consistently more prevalent in samples of chlorinated aliphatics wastewaters than other congeners. Because the congener composition of chlorinated aliphatic wastewaters is not consistent or distinct, setting limits on a congener-specific basis likely would be overly-restrictive for some facilities. Specifically, the limit set for a given congener would need to be protective in cases where a number of different congeners contribute to the wastewater's dioxin toxicity or risk (thereby requiring that lower limits be set for each congener to ensure that the combined emissions of each congener would not generate unacceptable risk). Such limits might be overly restrictive for those wastewaters with a dioxin composition that is dominated by a much smaller number of congeners. Moreover, setting the dioxin limit as a TCDD TEQ is consistent with the approach we have taken with other regulations, such as the Water Quality Guidance for the Great Lakes System, 40 CFR Part 132, Appendix F.

After considering options for setting the TCDD TEQ limit, we chose to base the TCDD TEQ limit on the lowest TCDD TEQ concentration measured in a dedicated wastewater sample for which a high end deterministic risk estimate is 1×10^{-5}. This concentration is 0.6 ng/L, calculated using the TEFs developed by the World Health Organization, and corresponding to the TCDD TEQ concentration for EPA's sample no. PL–02. (The TCDD TEQ concentration based on the I–TEFs is 0.7 ng/L. See section III.D.1.g.ii. for an explanation of the TEFs). The high end deterministic risk estimate was based on the evaluation of a farmer scenario (see section III.D.1.f.) in which the exposure duration of the farmer was set at its high end value, 48.3 years. For the purpose of establishing the TCDD TEQ limit, we did not set any additional values at high end. We used the ''single high end'' approach to account for sources of uncertainty in the risk analysis and our understanding that not all of the underlying assumptions of the analysis may be relevant to any one chlorinated aliphatics facility. For example, not all facilities may operate the type of aerated biological treatment tank that was modeled, grazing of cattle may not occur in the vicinity of all facilities on the centerline of the contaminant plume (the farmer's risk primarily is due to the ingestion of contaminated beef and dairy products). For reference, the adult resident's ''single high end'' risk is 1×10^{-9} when the wastewater concentration

[30] See Appendix B of ''Listing Background Document for the Chlorinated Aliphatics Listing Determination.''

is 0.6 ng/L (based on meteorological location as a high end parameter).

The 1×10^{-5} risk result for the farmer is based on predicted long-term average exposures assuming a wastewater TCDD TEQ concentration of 0.6 ng/L, as well as certain other environmental and exposure factors. This means that over the long term, the receptor is protected at the 1×10^{-5} level when, on average, the TCDD TEQ concentration in the wastewater is 0.6 ng/L. That is, it is implicit in the analysis that even if there are excursions of the wastewater TCDD TEQ concentration above 0.6 ng/L, an individual is still protected at the 1×10^{-5} risk level if on average the wastewater TCDD TEQ concentration is 0.6 ng/L. Today EPA is proposing to set the TCDD TEQ limit for wastewaters at 1 ng/L. Setting the limit at 1 ng/L accounts for the fact that we believe facilities who comply with the requirement that the TCDD TEQ concentrations of their wastewaters not exceed 1 ng/L will on average maintain wastewater TCDD TEQ concentrations of approximately 0.6 ng/L or below. EPA is proposing that wastewater treatment tanks managing proposed K173 wastewaters, where the TCDD TEQ concentration in the wastewater is greater than or equal to 1 ng/L, comply with specific air emission control regulations, as described in more detail below.

It is important to note that the 1 ng/L trigger level described here for implementing the proposed tank cover requirement is not a concentration below which the wastewater does not meet the K173 listing. This proposed listing follows what can be described as the traditional approach EPA has taken for hazardous waste listings (i.e., if a particular facility's waste meets the listing description, it is listed regardless of the concentration of constituents or waste management practice employed). While we are proposing to list wastewaters following this traditional approach, today's rule does establish a concentration level for wastewaters that reflect the Agency's concern for dioxin managed in tanks within this industry. We seek comment on the alternative of using this level as criteria for the listing itself. The Agency could finalize a concentration based listing based on the 1 ng/L trigger level instead of the traditional listing proposed today. The Agency also seeks comment on whether this concentration-based listing approach should be implemented in the same manner as is described in this notice (i.e., where the 1 ng/L concentration is a trigger for requiring tank covers), or alternatively, whether it would be more appropriate to apply the implementation approaches described in the July 23, 1999 rulemaking for the dyes and pigments industry (placed in the docket for today's rulemaking for convenience).

How Will These Air Emission Controls Be Implemented?

As described below, we are proposing that generators of K173 who manage these wastes in tanks comply with certain air emission control requirements, including covering their tanks, unless the results of testing the wastewater influent to the tank indicate that the dioxin concentrations are below the 1 ng/L trigger level. Our proposed approach consists of the following elements:

- Each wastewater treatment tank managing K173 that is not compliant with 40 CFR sections 264.1084/265.1085 of subpart CC must be assessed to determine whether dioxin levels in the influent to the tank exceed the trigger level.
- For the purposes of this listing, the headworks of the wastewater treatment system is assumed to be at a location directly after steam stripping. If a facility does not utilize steam stripping, the wastewater treatment system headworks is assumed to be the first tank in which wastewaters are combined, accumulated or treated after leaving the chlorinated aliphatics production process.
- Tanks that are fully compliant with sections 264.1084/265.1085 of 40 CFR subpart CC would not be subject to waste analysis, record keeping and notification requirements proposed in today's rule to be added to 40 CFR 265.1080(f)(1)–(5), described below.
- Once the facility has established that TCDD TEQ levels do not exceed the trigger level for a specific tank, the facility can assume that the TCDD TEQ levels for all downstream tanks also are below the trigger level.
- The facility must develop a waste analysis plan prior to sampling and analysis to ensure that the measurements are sufficiently sensitive, accurate and precise to demonstrate compliance, as described further below. We suggest that the waste analysis plan be developed in accordance with Agency guidance.[31]
- The initial assessment must be conducted by the effective date of the rule. If the trigger level is exceeded, compliance with the applicable sections of 40 CFR 264/265 subpart CC must be accomplished within one year of the effective date. Alternatively, the facility may implement process changes to reduce the TCDD TEQ level below the trigger level, and repeat the initial assessment to demonstrate that levels are now below the trigger level, within the same one year time frame.
- If it is determined that the TCDD TEQ concentration measured during the initial assessment is below the trigger level, re-assessment would be required (1) as a result of any process changes that would impact dioxin wastewater levels, and (2) annually.
- If the trigger level is not exceeded, the facility must submit a one-time notification and certification.
- The facility must maintain records on site.

Sampling and Analysis

In designing the sampling program, the facility must consider any expected fluctuations in concentrations over time. The sample design should be described in the waste analysis plan, which must be retained in the facility's files. The sample design must be adequate to determine that the level of TCDD TEQ in the wastewater is above or below the 1 ng/L at a 95 percent upper confidence limit around the mean. This approach is being used in the comparable fuels final rule (June 19, 1998; 63 FR 33782). See also Guidance for Data Quality Assessment—Practical Methods for Data Analysis, EPA QA/G–9, January 1998, EPA/600/R–96/084. Under this approach, EPA is not specifying a specific number of samples, because the number of samples required to demonstrate that the wastewater dioxin concentration is below 1 ng/L at the 95 percent upper confidence limit depends on how close the actual concentration is to the regulatory limit and on the variability of the waste. EPA is proposing that the samples used to demonstrate compliance be grab samples collected within a time period that will accurately account for potential variability in the wastestream, including potential variabilities associated with batch and continuous processes. If properly stored, the holding time for unprocessed aqueous samples of dioxins/furans (which can be found in the Sample Collection, Handling and Preservation section of Method 8290) allows for multiple samples to be collected and be available should additional analysis be required to achieve the data quality objective of determining compliance with the 1 ng/L limit at a 95% upper confidence limit around the mean.

EPA also is proposing an alternative sample design criteria. The alternative approach is to set a maximum

[31] Chapter Nine of ''Test Methods for Evaluating Solid Waste, Physical/Chemical Methods'' (SW–846) addresses the development and implementation of a scientifically credible sampling plan. Chapter One of SW–846 describes the basic elements to be included in a Quality Assurance Project Plan (QAPP), as well as information describing basic quality assurance (QA) and quality control (QC) procedures. Chapter Two of SW–846 aids the analyst in choosing the appropriate methods for samples, based upon sample matrix and the analytes to be determined. Other appropriate sources may also be used, including those issued by recognized national voluntary standards setting organizations, *e.g.*, ASTM, etc., http://www.epa.gov/ncepihom/Catalog/EPASW–846.3.4A.html

quantitation value as an alternative to the use of the 95% upper confidence limit around the mean. Under this approach, the Agency is proposing that the analytical quantitation limits should be sufficient to calculate a meaningful TCDD TEQ for comparison to the 1 ng/L trigger level. Our experience with this matrix is that quantitation at or below 0.05 ng/L should be routinely achievable, therefore we are proposing that the selected analytical method achieve a precision of at least 30 percent relative standard deviation at a calibration level of 0.05 ng/L and a recovery of greater than or equal to 70 percent [32] (we note that if isotope-dilution methods are used, recovery is not an issue, since this method is self-correcting for recovery.) Under this approach, EPA is specifying that a minimum of four grab samples be collected within a 24-hour time period. The Agency notes that although we are considering setting a lower calibration standard for the measurement method as an alternative to the 95 percent upper confidence limit around the mean standard, the regulatory language included with today's proposal reflects only the preferred option.

Generators may not use process knowledge to determine whether or not the 1 ng/L TCDD TEQ trigger level has been exceeded for the first tanks in the wastewater treatment system where constituent concentrations are likely to be highest. However, once the facility has established that the trigger level is not exceeded in the influent to a given tank, the facility may use process knowledge to determine that dioxin levels in wastewaters managed in subsequent downstream tanks also will not exceed the trigger level.

We are proposing that the generator maintain documentation of the: (1) detailed standard operating procedures (SOPs) for the sampling and analysis protocols that were employed; (2) sensitivity and bias of the measurement process; (3) precision of the analytical results for each batch of waste tested; and (4) analytical results.

It is the responsibility of the generator to ensure that the sampling and analysis is unbiased, precise, and representative of the tank influent. To show that a tank is not subject to the specific Subpart CC requirements applicable to K173 wastewaters, a generator must demonstrate that: (1) the maximum TCDD TEQ in the tank influent does not exceed the 1 ng/L trigger level; and (2) the analysis could have detected the presence of the CDD/CDF congeners at or below the trigger level.

We are not requiring the use of SW–846 methods to comply with these requirements. We are proposing to allow the use of alternative methods to those included in SW–846, so long as the selected methods meet the following performance based criteria.

The Agency will consider the analysis adequate to demonstrate that the trigger level of 1 ng/L is not exceeded if an analysis in which TCDD (as a surrogate for all of the CDD/CDF congeners) spiked at the trigger level indicates that the analyte is present at that level within analytical method performance limits (*e.g.*, sensitivity, bias and precision). To determine the performance limits for a method, EPA recommends following the quality control (QC) guidance provided in Chapters One and Two of SW–846, and the additional QC guidance provided in Method 8290.

vi. What Comments Is EPA Specifically Requesting on the Proposed Approach for Controlling Dioxin Air Emissions?

The Agency requests comment on the proposal to add air emission control requirements for tanks used to manage chlorinated aliphatic wastewaters. In addition, the Agency requests comment on whether the technical standards in 264.1084/265.1085 will address the risks associated with vapor emissions from these units. EPA requests comment on the proposed 1 ng/L TCDD TEQ concentration limit in wastewater that triggers application of the air emission control requirements, and on the testing and recordkeeping requirements for implementing this standard. Specifically, EPA is requesting comment on comparing the regulatory limit to a sample mean at the 95% upper confidence limit, versus a maximum sample value with the sensitivity (as demonstrated by the lower calibration standard), precision, and recovery (unless using the isotope-dilution method) described in today's proposal.

In addition, we request comment on whether or not there are other types of standards and/or other factors the Agency should consider in setting standards for wastewater treatment units used to manage chlorinated aliphatic wastewaters. The Agency is not reconsidering or requesting comment on the wastewater treatment unit exemption and does not intend to respond to any comments submitted regarding the exemption.

b. How Is EPA Proposing to Regulate VCM–A Wastewaters?

EPA is proposing not to list as hazardous wastewaters generated from the production of VCM using mercuric chloride catalyst in an acetylene-based process. This wastestream already is defined as hazardous waste due to the fact that it exhibits the toxicity characteristic.

i. What Information Led EPA To Propose Not to List as Hazardous Wastewaters From the VCM–A Process?

EPA knows of only one facility in the United States that operates an acetylene-based VCM production process, which uses mercuric chloride catalysts in the production of VCM. The management of spent mercuric chloride catalyst used in the VCM–A production process results in the generation of a wastewater containing mercuric chloride, as well as vinyl chloride. The wastewater treatment system is operated in a batch process fashion in tanks, and is designed to convert the mercuric chloride present in the process wastewaters to an much less soluble mercuric sulfide. The mercuric sulfide is precipitated during the treatment process, dewatered, and collected for off-site disposal. The remaining wastewaters are discharged directly under an NPDES permit. Due to the fact that this wastewater is managed in a single, dedicated wastewater treatment system associated with a unique production process, and the presence of mercury in relatively high concentrations (which is not found in other chlorinated aliphatic wastewaters), the Agency decided to consider this wastestream separately in our investigation of the wastes generated by the chlorinated aliphatic hydrocarbons manufacturing industry.

According to the RCRA Section 3007 survey response, the facility generates and discharges approximately 22,200 metric tons (5.86 million gallons) of wastewater from the VCM–A process each year. The identified constituents of concern in this wastestream include mercury and vinyl chloride. In addition, dioxins are present in these wastewaters. EPA analyzed one sample of this wastewater in 1996 in support of this listing determination. The analytical results showed the wastewaters contained 8.60 mg/L mercury, and 0.680 mg/L vinyl chloride. The analytical results for the split sample taken by the facility were 6.78 mg/L mercury, and 1.38 mg/L vinyl chloride. The results exceed the toxicity

[32] Recent recovery is from an EPA Memorandum from Barnes Johnson, Director of the Economics, Methods, and Risk Assessment Division, to James Berlow, Director of the Hazardous Waste Minimization and Management Division, regarding the Office of Solid Waste's (OSW) standing policy on the Appropriate Selection and Performance of Analytical Methods for Waste Matrices Considered to be ''Difficult-to-Analyze,'' January 31, 1996.

characteristic regulatory levels of 0.2 mg/L for mercury and 0.2 mg/L for vinyl chloride. Dioxins also were detected in the VCM–A wastewaters, however, the concentration was several orders of magnitude lower than levels found in other wastewaters generated from other chlorinated aliphatic manufacturing processes (i.e., 0.0022 ng/L TEQ/TCDD).

Based upon EPA's one record sample, this wastestream already is identified as a hazardous waste due to the fact that the waste exhibits the toxicity characteristic (TC). The constituents of significant concern in the VCM–A wastewaters (i.e., mercury and vinyl chloride) already are regulated under the TC, therefore, the TC adequately defines this wastestream as hazardous. Further, the facility's dedicated wastewater treatment system was designed and optimized expressly for the removal of mercury from mercuric chloride catalysts to comply with the Clean Water Act. In addition, given the fact that EPA's record sample was over 40 times above the TC limit for mercury, it is highly probable that these wasetwaters routinely contain levels of mercury which cause this wastestream to be defined as characteristically hazardous waste. As mentioned previously, the criteria in 40 CFR 261.11 (a)(3) for evaluating whether or not a solid waste is a hazardous waste provide that EPA should consider how the waste (and potential risk) is affected by other regulatory programs (i.e., 261.11(a)(3)(x)). In the case of the VCM–A wastewaters, EPA notes that our decision to propose not to list this wastewater as hazardous is based in large part on the fact that the waste already is defined as a hazardous waste because it exhibits the toxicity characteristic. We have, accordingly, determined that there is no regulatory benefit in listing this wastewater as hazardous, particularly when considering that the volume of wastewater generated by the single facility using the acetylene-based VCM production process is relatively small (22,200 metric tons annually) compared to the volumes of wastewaters generated in other chlorinated aliphatic wastewater treatment systems (11.5 million metric tons annually).

In addition, any risks associated with the management and disposal (i.e., direct discharge) of the wastewaters are addressed by other environmental regulations. With respect to the discharge of the wastewater, the facility treats and discharges the wastewater in compliance with the conditions of a NPDES permit. Regarding any air emissions of vinyl chloride from these wastewaters, vinyl chloride is a hazardous air pollutant, therefore the facility is subject to the National Emissions Standards for Hazardous Air Pollutants (NESHAP) requirements specific to vinyl chloride emissions (40 CFR Section 61.65), as well as the Hazardous Organic NESHAP for the synthetic and organic chemical manufacturing industry sector (40 CFR Part 63, subpart G) (59 FR 19468, April 22, 1994). For these reasons, the Agency is proposing not to list VCM–A wastewaters as hazardous waste.

Sludges generated by the wastewater treatment process are disposed of in an off-site hazardous waste (subtitle C) landfill. EPA conducted a separate investigation of these sludges. The results of this investigation and our listing determination for the VCM–A wastewater treatment sludges are summarized in section III.E.3. further below.

2. EDC/VCM Wastewater Treatment Sludges

a. How Is EPA Proposing To Regulate EDC/VCM Wastewater Treatment Sludges?

EPA is proposing to list as hazardous sludges generated from treating wastewaters associated with the manufacture of ethylene dichloride (EDC) and vinyl chloride monomer (VCM). This wastestream meets the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous and is capable of posing a substantial present or potential hazard to human health or the environment when managed in land treatment units. The Agency identified risks of concern associated with one management practice, on-site land treatment. In our risk assessment of these wastes, the exposed individuals of concern were the farmer, child of farmer, and the fisher receptors. The contaminants of concern are dioxin and arsenic.

As discussed in section III.D.1 above, our analyses identified health risks from the land treatment of the EDC/VCM wastewater treatment sludges due to airborne releases and subsequent deposition and food chain contamination from dioxin. Surface erosion due to runoff also contributes to risk from dioxin. Marginal risks from arsenic were identified for the land treatment unit groundwater ingestion exposure pathway. We also modeled a landfill management scenario; our risk assessment showed no significant risk from dioxin, and only marginal risk from arsenic associated with the groundwater pathway.

b. What Information Led EPA To Propose To List as Hazardous EDC/VCM Wastewater Treatment Sludges?

The results of the RCRA Section 3007 chlorinated aliphatic industry survey show that approximately 104,606 metric tons of wastewater treatment sludge is generated from the treatment of wastewaters at chlorinated aliphatic plants that manufacture VCM and/or EDC. One facility accounts for 74 percent of the total volume of wastewater treatment sludge generated.[33] Of the total volume of wastewater treatment sludges generated at plants manufacturing EDC/VCM and identified through the survey, 6,757 metric tons (6 percent) currently are already defined as hazardous waste.

EDC/VCM wastewater treatment sludges are generated at 12 facilities. The Agency notes that these sludges are not always generated from treating wastewaters produced exclusively from EDC and/or VCM manufacturing processes. Rather, sludges are sometimes generated in wastewater treatment systems that treat wastewaters from manufacturing processes producing a variety of chlorinated aliphatic and non-chlorinated aliphatic products. Wastewaters from multiple processes are combined prior to wastewater treatment. The Agency points out that the listing determination proposed today for EDC/VCM wastewater treatment sludges affects the total quantity of the sludges generated by a wastewater treatment system that accepts influent from any process manufacturing EDC and/or VCM. EPA has made this clear by including sludges from commingled EDC/VCM wastewater and other wastewater within the scope of the listing, although EPA believes this would have been the correct interpretation of the listing even absent the clarifying language.

The management scenarios selected for risk assessment were chosen based upon the waste management practices known to be practiced by the chlorinated aliphatic industry for non-hazardous sludges. Based on survey results, these practices are:

- On-site land treatment (one facility),
- On-site disposal in a non-hazardous landfill (two facilities),
- On-site co-disposal in a hazardous waste landfill (one facility), and
- Off-site disposal in a subtitle D landfill (7 facilities).

As explained earlier, EPA modeled risks from two management scenarios,

[33] Only one (1) percent of the wastewaters at this facility are generated from the manufacturing of EDC/VCM.

an off-site non-hazardous municipal landfill, and a land treatment unit. The management practices of most concern (landfills and land treatment) were assessed for this waste. Other non-hazardous waste management practices currently are not used by industry and would not serve as an appropriate basis for listing the waste as hazardous. In the case of the management practices employed by this industry, we are confident that the risk estimates from modeling an off-site non-hazardous waste landfill scenario also are representative of the potential risks associated with the management of EDC/VCM wastewater treatment sludges in on-site landfills. This is because information provided in facility responses to the RCRA Section 3007 questionnaire indicate that EDC/VCM wastewater treatment sludges are co-disposed with other industrial non-hazardous wastes in on-site landfills, therefore these units can be treated as off-site landfills (that receive a variety of wastestreams) rather than as monofills (that receive only one type of waste) with regard to the risk modeling approach employed.

Land treatment. The Agency's risk assessment of EDC/VCM wastewater treatment sludge showed risks of concern for the land treatment management scenario. The contaminant of greatest concern is dioxin. The exposure routes of concern are airborne releases and surface erosion from runoff which result in contamination of food products from nearby agricultural operations. The sludges present a hazard due to the fact that land treatment units are not covered and due to the potential absence of runoff controls. Land treatment results in a high-end cancer risk for the farmer of 2E–4 and a central tendency risk of 4E–6. EPA also performed a Monte Carlo analysis, and the results showed a risk for the farmer of 1E–4 at the 90th percentile, and 7E–6 at the 50th percentile. The high-end deterministic risk falls within the risk range for which there is a presumption for listing the waste as hazardous, consistent with guidance the Agency has used for determining that a waste is hazardous (see 59 FR at 66077), *i.e.*, the risks associated with management of EDC/VCM sludge in a land treatment unit are 1E–4 or higher, and well above the 1E–5 listing benchmark. The probabilistic results confirm that the high-end deterministic risk (2E–4) is above the 90th percentile result (1E–4). The 1992 guidance (memorandum from the then Deputy Administrator F. Henry Habicht ''Guidance on Risk Characterization for Risk Managers and Risk Assessors'') states that ''[t]he 'high end' of the risk distribution [generally the area of concern for risk managers] is conceptually above the 90th percentile of the actual (either measured or estimated) distribution. This conceptual range is not meant to precisely define the limits of this descriptor, but should be used by the assessor as a target range for characterizing 'high-end risk'.'' Therefore, a high-end estimate that falls within the range (above the 90th percentile but still realistically on the distribution) is a reasonable basis for a decision. Therefore, EDC/VCM sludges managed in a land treatment unit pose risks that support a proposed listing determination for these wastes.

As discussed previously, the risk assessment addresses nine of the listing criteria in 40 CFR 261.11. EPA believes the risks resulting from our analysis represent plausible management of EDC/VCM sludges (261.11(a)(3)(vii)) using reasonable assumptions for management in land treatment units. In addition, the risk analysis was developed using actual analytical data.

Of lesser concern, but still within our discretionary risk range, are the potential health effects associated with arsenic in EDC/VCM wastewater treatment sludges that are managed in land treatment units. We found that arsenic presents some risk from potential releases to groundwater from the land treatment unit. For the arsenic groundwater pathway, land treatment results in a high-end cancer risk of 1E–05 and a central tendency risk of 8E–07. However, the predicted time period for the peak arsenic concentration to reach a receptor well is 1,500 years. In addition, our modeled leachate concentrations for arsenic result in predicted receptor well concentrations of 0.5 ppb (high end) and 0.2 ppb (central tendency). By comparison, the average background concentration of arsenic in rain derived from terrestrial air masses is 0.46 ppb.[34] Therefore, EPA does not believe that the risk from arsenic in this waste is significant, as discussed below.

Even though the high-end cancer risk from arsenic is within the general action level risk range (*i.e.*, 1E–04 to 1E–06), the central tendency risk falls outside this range. Another factor that the Agency considered when evaluating the potential risks from arsenic in this wastestream is the significant period of time it is predicted to take for the concentration of arsenic in a receptor well to reach the peak concentration level (i.e., 1,500 years). Given these factors, the Agency concludes that the risk posed from potential releases of arsenic in this wastestream when managed in land treatment units is marginal, and in itself does not warrant listing the waste as hazardous. The Agency therefore is proposing to list EDC/VCM wastewater treatment sludges based solely on the presence of dioxin and the potential risk associated with dioxin when this waste is managed in land treatment units. As outlined in the preamble to the Agency's proposed listing determination for wastes generated by the Dyes and Pigments Industry, listing determinations for wastestreams for which risks are calculated to be 1E–04 or higher are considered to pose a substantial present or potential hazard to human health and the environment and are listed as hazardous.

Landfill. The Agency's risk assessment showed no significant risks associated with dioxin, and only marginal risk associated with potential groundwater releases of arsenic in the off-site landfill scenario. The risk assessment showed a high-end cancer risk from arsenic of 3E–05 and a central tendency risk of 9E–07. However, these risks levels are associated with a peak arsenic concentration in a receptor well that is predicted to occur only after a period of 8,800 years. Predicted high end arsenic concentration at a receptor well is 1.4 ppb and the central tendency arsenic concentration in a receptor well is 0.2 ppb. This level of arsenic contamination is very close to average background exposure levels for arsenic. As mentioned above, the current average background concentration of arsenic in rain derived from terrestrial air masses is 0.46 ppb. Average background exposure to inorganic arsenic is 14 ug/day from food, and 5 to 7 ug/L from water. EPA's modeling results indicate that the disposal of EDC/VCM sludge in an unlined landfill could (over a period of 8,800 years) increase the concentration of arsenic in groundwater in a downgradient well (102 meters from the landfill) by only 1.4 ug/L and would add approximately 2 ug/day of arsenic to the average daily exposure level (about 20 ug/day) for the highly exposed individual. Actual potential level of risk would be lower than those predicted by our modeling efforts, if the sludges are disposed in lined landfills.

Given that the Agency's risk assessment indicates potential risk within our discretionary range

[34] Andreae, M.O. 1980. *Arsenic in Rain and the Atmospheric Mass Balance of Arsenic.* Journal of Geophysical Research. v.85, pp. 4512–4518, as cited in Welch, A.H., M.S. Lico, and J.L. Hughes. 1988. Arsenic in Ground Water of the Western United States. Ground Water, v.26, n.3, pp. 333–347.

associated with a peak arsenic concentration in a receptor well that is predicted to occur only after a period of 8,800 years, and given the absence of significant risk from any other constituents of concern, EPA concludes that EDC/VCM wastewater treatment sludges do not pose a significant risk when managed in landfills.

Based upon the Agency's findings that EDC/VCM wastewater treatment sludges pose significant risks when managed in land treatment units but pose no significant risks when managed in landfills, the Agency is proposing a ''contingent management listing'' for this waste. EPA is proposing to list EDC/VCM wastewater treatment sludges as hazardous, unless the sludges are managed in landfills. Again, the Agency is proposing this listing determination based upon the fact that our risk assessment results for the land treatment unit scenario indicate a level of risk of 2E–04, well above the 1E–5 risk level the Agency uses as guidance in making listing determinations.

c. Why Is EPA Proposing a Contingent Management Approach as Most Appropriate for EDC/VCM Wastewater Treatment Sludges?

The Agency's analysis of the risks associated with EDC/VCM wastewater treatment sludges shows that one of the current waste management practices (land treatment) results in significant risk while the other primary management practice (disposal in subtitle D landfill) shows little risk. Therefore, the Agency is proposing to list EDC/VCM wastewater treatment sludges as EPA Hazardous Waste Number K174, unless the sludges are managed in a subtitle C or subtitle D landfill. The Agency believes that allowing the waste to continue to be managed under a low risk management scenario (i.e., subtitle D landfilling) outside of the subtitle C system achieves protection of human health and the environment, and that little additional benefit would be gained by requiring that all EDC/VCM wastewater treatment sludges be managed in accordance with RCRA subtitle C management standards. Given the Agency's finding that no significant risks are posed from managing EDC/VCM wastewater treatment sludges in a landfill, the Agency sees no reason to include sludges managed in this manner in the scope of the hazardous waste listing. Additionally (and after consideration of the predicted risk differential between land treatment and landfilling), because only one facility identified in the RCRA Section 3007 Survey employs land treatment for these wastes, this practice is somewhat anomalous compared with land disposal. It does not make sense to apply a traditional listing approach (i.e., list all wastes regardless of management practice) based upon a practice occurring at one facility, especially if a more tailored listing can prevent this risk.

A contingent management listing approach is within EPA's statutory authority. See *Military Toxics Project* v. *EPA,* 146 F.3d 948 (D.C. Cir. 1998). The Agency believes that making a listing determination that is tailored to specific waste management practices is particularly appropriate under these circumstances, where the management practices identified are clear and very easily distinguished (such as the difference between land treatment and land disposal), and the differences in risk presented by these practices are clearly defined. In the case of EDC/VCM wastewater treatment sludges, EPA believes that an opportunity exists to establish a conditional management listing for these sludges that will reduce the risks associated with unsafe waste management practices, while not imposing significant incremental costs upon generators managing the wastes in a manner that does not pose significant risk. While disposal of EDC/VCM wastewater treatment sludges in land treatment units is projected to pose significant risks, the disposal of these sludges in landfills does not result in significant risks. This arises because the constituent of most concern, dioxin/TCDD, is relatively immobile in groundwater. However, risks from this constituent can be significant if the waste is managed in a manner that does not control for airborne releases or surface erosion from runoff, both of which are better controlled at landfills. Therefore, EPA believes a contingent management listing for this waste is a preferable and permissible alternative to simply listing all EDC/VCM wastewater treatment sludges as hazardous wastes.

The Agency's proposed listing description for EDC/VCM wastewater treatment sludges that will define this waste as hazardous unless the waste is managed in a landfill is as follows:

K174 Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer, unless the sludges meet the following conditions: (i) they are disposed of in a subtitle C or D landfill licensed or permitted by the state or federal government; (ii) they are not otherwise placed on the land prior to final disposal; and (iii) the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer or ethylene dichloride, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, etc.) that the terms of the exclusion were met.

d. How Will This Contingent Management Listing Be Implemented?

Under this proposed listing, EDC/VCM wastewater treatment sludges will be hazardous wastes if managed by any method except disposal in a landfill. EPA has a clear interest in ensuring that these sludges are in fact disposed in a landfill, or else they would be listed hazardous waste at the point of generation. The Agency also has an interest in making sure that accurate records are kept to facilitate enforcement.

The Agency notes that based on the RCRA Section 3007 questionnaire results (which surveyed the universe of chlorinated aliphatics production facilities in the United States), the predominant management practice used for these wastes is disposal in a landfill, while one facility currently uses a land treatment facility. It is difficult for EPA to foresee a change in this well-established management practice. Therefore the Agency believes it is unlikely that these sludges will be sent to any type of facility other than a landfill, particularly if the approach proposed in today's rule is promulgated. Generators who choose to manage these sludges at non-landfill facilities must define their sludges as listed hazardous waste at the point of generation and manage them accordingly.

The Agency also is restricting the placement of EDC/VCM wastewater treatment sludges on the ground prior to

their being disposed in a landfill (*e.g.,* storage in waste piles, spills). EPA wants to ensure that these wastes, which are clearly capable of presenting unacceptable risk if improperly managed, are managed only in the manner found to be protective of human health and the environment.

Generators, and other parties involved in the management of EDC/VCM wastewater treatment sludges, claiming that their wastes fall outside the scope of the hazardous waste listing must be able to demonstrate that sludges excluded from the listing description are being managed in accordance with all of the conditions for being excluded from the listing. This means that parties claiming the waste falls outside the scope of subtitle C must be able to demonstrate that (1) previously generated and managed waste (which is being claimed as not meeting the K174 listing) was disposed of in a landfill; and (2) waste currently being managed is not being stored, or otherwise managed, on the land (*e.g.,* landfarms, waste piles) as well as demonstrate that the waste will be disposed of in a landfill (*e.g.,* have a contract in place with a landfill owner/operator that specifies intent to manage EDC/VCM sludges at the landfill facility). To further clarify how today's proposed approach would be implemented, below we describe these two distinct situations where a listing determination will be made under this proposed approach.

i. EDC/VCM Sludges Sent Off-Site

Under the proposed contingent management listing for K174, EDC/VCM sludges that already have been shipped from the generator facility to a subtitle C or subtitle D landfill were never a listed hazardous waste. In this instance, should a question arise as to the status of sludges previous shipped off-site, the implementing agency would look to indications such as contracts between the generator and the landfill owner/operator, invoices showing waste was delivered to a specific landfill, and other documents that clearly show the waste was transferred to a subtitle C or subtitle D landfill.

ii. EDC/VCM Sludges at Generator Site

In this situation, determining whether or not an EDC/VCM sludge meets the proposed K174 listing would be done in a prospective manner, not unlike many of the existing regulatory exclusions from the definition of solid waste (where determinations of whether or not a material is a waste are often based upon how the waste will be managed, *i.e.,* recycled. See, for example, requirements at 40 CFR 261.2, Table 1, and 261.4(b)). Under the existing generator requirements in 40 CFR Part 262, generators of solid waste must determine whether the waste is a listed hazardous waste (40 CFR 262.11(b)). Determinations made by generators regarding whether their EDC/VCM sludges are listed (where these sludges have not yet been disposed of off site in an appropriate landfill) will be made by virtue of where the waste will be sent. In situations where the implementing agency is questioning any claims by the generator of the non-listed status of sludges being stored on site, the generator should be able to show that there is an agreement already in place with a transporter and/or landfill indicating that these sludges will be delivered to a landfill. It is the EPA's experience that wastes cannot usually be shipped to a commercial landfill without first establishing a relationship with that landfill, where factors such as the amount of waste, the frequency of shipments, the physical and chemical make up of the waste, etc., are agreed upon before the waste ever arrives at the landfill.

In the case of generators who manage EDC/VCM in on-site landfills, the Agency requests comment on the types of records or documentation that may be used to verify or document that the waste is managed in the on-site landfill and not managed in a land treatment unit.

The Agency notes that it is not our intent to condition the regulatory status of the waste upon a recordkeeping or paperwork requirement. The Agency believes that the ability to demonstrate the commitment to dispose of the waste in a landfill is necessary to ensure the waste falls outside the scope of the listing. We do not believe that any specific recordkeeping requirement (*e.g.,* the completion and retention of a specific form) is necessary to make this demonstration. We believe that documentation of previous landfilling of the waste and a demonstration of a commitment to dispose of currently generated waste in a landfill may be made by several means. EPA is requesting comment on the types of records and/or documentation normally kept by generators and/or disposal facility owner/operators that may be used to make such demonstrations (see section III.E.2.f. below).

EDC/VCM wastewater treatment sludges that are not listed hazardous waste due to contingent management will be considered nonhazardous from their point of generation. As a result, such sludges will not be subject to RCRA subtitle C management requirements for generation, transport, or disposal (including the land disposal restrictions), if the waste *is destined for* disposal in a landfill (and the generator can demonstrate such intention).

Of course, if the waste is not disposed of in such a unit, then the exemption would no longer apply and the waste would have to be managed in compliance with subtitle C management requirements, from the point of generation. In other words, if the Agency finds that the waste is disposed of in a unit other than a subtitle C or D landfill, the Agency may cite the generator of the waste as being out of compliance with all applicable subtitle C management requirements. The Agency also points out that should EDC/VCM wastewater treatment sludges meet the listing description for another hazardous waste listing, or if the wastewater treatment sludges exhibit one or more of the characteristics of hazardous waste, the sludges must be managed as hazardous wastes and are not exempt from regulation under today's listing determination, regardless of how the sludges are managed.

e. What Specific Comments Is EPA Requesting on Implementation of the Contingent Management Listing Approach?

The Agency requests comments on this proposed contingent management listing approach, and may make changes to the implementation approach based on comments received. EPA notes that this contingent management approach necessitates that the Agency have the ability to confirm whether or not wastes claimed to fall outside the scope of the listing description are disposed of in a landfill as required by the proposed listing determination. As a result, some type of documentation or demonstration that the waste actually is disposed of in a landfill (or will be disposed of this way) is appropriate.

EPA is proposing that generators be able to provide documentation that waste previously generated (for which the claim is made that the waste is not K174) was disposed in an on-site landfill or transported to and received by an off-site landfill. In addition, a generator must be able to demonstrate that waste currently present at the generator's facility will be disposed in an on-site or off-site landfill, and that the waste will not be stored, or otherwise managed, on the land prior to disposal in a landfill. Appropriate types of documentation that may fulfill these requirements may include: contracts between a generator and a landfill owner/operator, invoices documenting that the waste was transported to and received by a landfill facility, bills of

lading or other shipping papers that clearly indicate the type and quantity of waste shipped off-site, the date of shipment, the name and address of the landfill receiving the waste, and the date the waste was received by the landfill.

EPA requests comment on the type of records, documentation, and demonstrations that may be adequate for determining compliance with the contingent management listing. EPA requests comment on what type of internal records may be kept by solid waste generators that may demonstrate intended management of the waste and whether such records are adequate for demonstrating compliance with the contingent management conditions for exclusion from the hazardous waste listing. EPA also requests comment on its proposal that waste that does not meet the terms of the conditional listing is hazardous from the point of generation.

3. VCM–A Wastewater Treatment Sludges

a. Is EPA Proposing To Regulate VCM–A Wastewater Treatment Sludges?

Yes, EPA is proposing to list as hazardous wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A). The sludge is generated at one facility as a result of treating water running off an area where spent mercury catalysts are removed from the VCM–A production process. The Agency has concluded that the waste meets the listing criteria in 40 CFR 261.11(a)(3) and is capable of posing a substantial present or potential hazard to human health and the environment if mismanaged. For reasons explained in more detail below, EPA is proposing two alternative approaches for listing this waste as hazardous. The Agency is requesting comment on both proposed approaches.

b. What Information Led EPA To Propose To List as Hazardous VCM–A Wastewater Treatment Sludges?

i. Background

As previously described in today's proposed rule, the manufacture of vinyl chloride monomer in an acetylene-based process using mercuric chloride catalysts generates non-process wastewaters as a result of precipitation runoff in the production area, as well as from using water to remove spent catalyst from the reactors. Because of its high mercuric chloride content, this wastewater is collected and treated in a dedicated non-biological treatment system that uses sodium sulfide to convert the mercuric chloride to mercuric sulfide, which precipitates as a sludge and is dewatered to form a filter cake. This treatment system is operated in a batch-process fashion, and treated effluent is discharged under the facility's NPDES permit. EPA knows of only one facility in the United States that operates an acetylene-based VCM production process. According to the facility's response to the RCRA Section 3007 survey, this waste was sent to a permitted hazardous waste landfill for disposal in 1996. Other information provided by the facility in response to a separate RCRA Section 3007 request from EPA indicates this waste was sent to the same permitted hazardous waste landfill from 1990 to 1994 as well. The facility generates approximately 120 metric tons of VCM–A wastewater treatment sludge per year.

ii. Analytical Results

EPA analyzed one sample of this sludge in 1996 in support of this listing determination. The analytical results showed the sludge contained 9,200 mg/kg total mercury, and 0.26 mg/L in leachate using TCLP. The results for a split sample analyzed by the facility were 17,700 ppm total mercury, and the TCLP result was 0.654 mg/L. These results indicate a very high total mercury concentration (approximately one to two percent of the waste is mercury), and the TCLP results exceed the regulatory level for the mercury toxicity characteristic of 0.2 mg/L. Data generated by EPA in support of a treatability study on this particular waste showed a total mercury concentration (in aliquots of a single sample) ranging from approximately 3,000 to 9,000 mg/kg, and TCLP results were all below the regulatory limit.[35] Other data available to EPA from the facility indicate that approximately 20 percent of the tested samples exceed the regulatory level for mercury [36].

iii. Assessment of Potential Risk

EPA's quantitative analysis of the potential groundwater risks posed by this waste assumes waste disposal in an unlined landfill. The Agency is making use of previously conducted groundwater modeling and risk analyses for the proposed Hazardous Waste Identification Rule (60 *FR* 66344, December 21, 1995) that resulted in an estimated dilution and attenuation factor (DAF) for mercury of 40. Using this DAF and the mercury leachate concentration of the VCM–A sludge analyzed by EPA (0.26 mg/L), the expected concentration of mercury at a modeled receptor well (after a release to groundwater from an unlined landfill) exceeds the maximum contaminant level (MCL) for mercury (0.002 mg/L) by a factor of three. Using the mercury leachate concentration from the facility's split sample (0.654 mg/L), the mercury MCL would be exceeded at a modeled receptor well by a factor of eight.

EPA is unable to quantitatively assess the potential risk this waste poses when disposed in a subtitle C landfill without prior treatment. However, we qualitatively considered the risk associated with such a management scenario. There is considerable uncertainty about the performance of engineered landfills. In the near term, especially at regulated subtitle C landfills, there are quality assurance controls to reduce the likelihood of significant material, installation, or facility operation errors that could degrade performance of the engineered systems. In addition, such landfills have ground water monitoring and leachate management controls to further reduce the chances of significant ground water risk. However, in the long-term, there is considerable uncertainty as to how well engineered systems will operate and whether there will continue to be long-term care and maintenance after the regulatory post-closure period ends. EPA can only qualitatively consider the potential long-term risk of wastes in subtitle C landfills. However, we considered the above mentioned uncertainties, along with the quantitative estimates of potential risk in unlined landfills, when assessing the potential risks of managing untreated wastes in a subtitle C landfill, such as VCM–A sludges that contain persistent constituents such as mercury.

iv. Rationale for Proposed Hazardous Waste Listing Determination

EPA is proposing two rationales to ''list'' this waste as hazardous, both of which lead the Agency to conclude we should propose to list this wastestream as hazardous waste. First, EPA believes it is plausible that this waste may be mismanaged and disposed of in an unlined and uncovered landfill and that it is capable of posing a substantial

[35] Paul Bishop, Renee A. Rauche, Linda A. Rieser, Markram T. Suidan, and Jain Zhang; ''Stabilization and Testing of Mercury Containing Wastes,'' Draft, Department of Civil and Environmental Engineering, University of Cincinnati, March 31, 1999. Please note that this is a draft EPA document not yet peer reviewed. Also, data within the report is still undergoing QA/QC review, and the text, data, and conclusions in the report may change before the document is finalized.

[36] Summary of Mercury TCLP Data on VCM–A Sludge from Borden Chemicals and Plastics, EPA July 1999.

hazard if so managed. Second, based upon information EPA has, including information on liner performance and the mobility of mercury under certain pH conditions, EPA believes that even when disposed of in a landfill that is compliant with Subtitle C landfill standards, this waste is likely to leach significant quantities and concentrations of mercury that long-term degradation of the landfill's leachate control systems (especially after post-closure care has ended) would plausibly cause an unacceptable release of mercury into groundwater and has the potential to pose a substantial hazard when this waste is so managed without improved prior treatment. EPA requests comment on the basis for the rationales described above, both for the disposal scenario in an unlined landfill, and the disposal scenario in a landfill compliant with subtitle C landfill standards.

The Agency's analysis of potential risk indicates that disposal of the VCM–A sludge in an unlined landfill may result in risks due to the migration of mercury in groundwater to a receptor well in concentrations that exceed the MCL for this constituent. The Agency notes that the single facility generating this waste reports managing the waste by disposing of it in a subtitle C landfill for certain years. Therefore, a simple conclusion may be to dismiss the potential risk for the groundwater pathway (assuming it continues to go to a subtitle C landfill) due to the presence of a landfill liner and leachate collection. In addition, (as mentioned previously) the mercury in the waste is in the form of mercuric sulfide, which generally is found to be a relatively insoluble form of mercury (indicated by only a relatively small percentage of the total mercury content of the waste leaching under the TCLP). However, data recently collected by the Agency and preliminary results from the analysis of this waste indicate that this waste may not behave in the same manner (in terms of the mobility of mercury in sulfidic form) in all environments. As discussed briefly below (and further in the Land Disposal Restrictions, Section V.F.), available data indicate that although the mercury in the VCM–A sludge remains relatively immobile at pH levels of 6 or lower, higher pH conditions will result in mercury mobilizing to the aqueous phase.[37]

Using data from a collected sample of the VCM–A wastewater treatment sludge, constant pH leaching tests were conducted on the waste sample to determine the effect pH has on the stability of the waste. The preliminary results of the constant pH leaching tests showed that mercury leachate concentrations were lower in samples leached at a pH of 6.0 or lower (e.g., 0.00582 mg/L at pH=6 after 24 hours), compared with concentrations at higher pH conditions. The same sample leached at pH of 10 produced a significantly higher mercury leachate concentration of 1.63 mg/L after 24 hours.[38]

Information obtained by EPA on the pH levels of actual leachate collected from the landfill cell in which the VCM–A wastewater treatment sludge currently is disposed show that the pH is greater than 9.[39] If this pH value is indeed indicative of the disposal environment for this waste, then based upon the pH relationship identified in the preliminary results of constant pH leach tests described above, one would predict that the mercury would be significantly mobilized under the disposal environment actually being used for this waste.

In summary, although the waste is disposed in a subtitle C landfill, the fact that the mercury in the waste may mobilize at pH levels greater than 6 means that the leach test results may under predict concentrations in leachate. In case of significant leachate contamination, the landfill liner may be the only guard against the release of mercury to the environment (due to the fact that the waste is not stable in this landfill disposal scenario). Should the liner fail, mercury present in the leachate would be released to the environment.

EPA acknowledges that a liner/leachate collection system in a subtitle C unit serves to contain and remove waste leachate and provides important environmental protection. However, EPA recognizes that there is inherent uncertainty in such systems, and it believes that the purpose of the RCRA hazardous waste treatment requirements (as expressed by Congress) is to reduce the uncertainty inherent in engineered containment approaches. EPA believes that waste containment systems will tend to degrade with time. Eventually, synthetic liners will degrade and leachate collection systems will cease operation. As put forth in the proposed Liner and Leak Detection Rule (52 FR 20218, May 29, 1987), no liner can be expected to remain impervious forever. Properly installed double liner and leachate collection systems, together with final covers placed at closure, will substantially reduce releases during the operating life and post-closure care period. However, these technologies may not always reduce the longer-term risk for landfills to acceptable levels for persistent, mobile, and highly toxic compounds. This is because the containment system may not prevent leachate release from the landfill indefinitely, for example after the post-closure period, when active maintenance of the cap and leachate collection system may be reduced or may end. The Agency has found that treatment of the waste under the LDR standards of RCRA subtitle C will significantly reduce potential risks from the disposal of this waste over the long term. This is particularly important for a constituent such as mercury, that is persistent and does not degrade. Treatment in accordance with prescribed BDAT can reduce the possibility that leachable mercury is available for release to the environment. Again, a liner/leachate collection system in a subtitle C unit is expected to contain waste leachate and lessen the risk while such a system is intact. However, even assuming a low probability of failure, because the TCLP may be significantly under predicting leachability for this waste in this subtitle C disposal scenario, there may still be a release of mercury that results in an exceedance of the MCL. While there are uncertainties in this assessment, it still illustrates that the mercury concentrations in the receptor well may be close to, and could even be higher than the MCL. Given the well-documented toxicity and persistence of mercury, the potential for greater mobility of mercury from this particular waste in a subtitle C landfill (than predicted by the TCLP), and the uncertainties associated with engineered landfills over the long-term—as reflected in statutory language regarding treatment requirements—EPA believes that the disposal of this waste, untreated, in a subtitle C landfill may not be protective and therefore may warrant listing the waste as hazardous.

In EPA's view, it may violate Congressional intent to allow a waste that the Agency otherwise would list as hazardous (absent the fact that the waste is managed untreated in a Subtitle C landfill) to be disposed in a hazardous waste landfill under conditions that may result in the hazardous constituents

[37] H. Lawrence Clever, Susan A. Johnson, and M. elizabeth Derrick, The Solubility of Mercury and Some Sparingly Soluble Mercury Salts in Water and Aqueous Electrolyte Solutions, J. Phys. Chem. Ref. Data, Vol. 14, No. 3, 1985, page 652.

[38] Paul Bishop, *op. cit.*, p. 14.

[39] E-mail communication to John Austin, U.S. EPA, from Mitch Hahn, Waste Management Corporation, April 14, 1999.

in the waste leaching from the waste (due to the high pH of the landfill environment). Congress clearly expressed its intent that the Agency is not to place excessive reliance or confidence in landfill design and liners for problematic wastes. In the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress explicitly added as one of the ''findings'' to RCRA that ''land disposal facilities are not capable of assuring long-term containment of certain hazardous wastes'' and that ''reliance on land disposal should be minimized or eliminated.'' [40] As a result of this finding, and others, Congress added the land disposal restriction program to RCRA, which significantly restricts land disposal of hazardous wastes and provided in section 3004(m) the mandate that EPA develop treatment standards for ''diminishing the toxicity of wastes or substantially reducing the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized.'' In addition, the legislative history to RCRA section 3004(m) states that this section ''makes Congressional intent clear that land disposal without prior treatment of these wastes with significant concentrations of highly persistent, bioaccumulative constituents is not protective of human health and the environment.'' (130 Cong. Rec. S 9178; daily ed. July 25, 1984). Were we to propose a no list determination for this waste based solely upon the fact that this waste currently is disposed in a subtitle C landfill—ignoring the high levels of total mercury in the waste, its potential for leaching (at high pH), and the likely benefits of treatment—we would be bypassing Congressional intent that wastes be treated to reduce toxicity and/or migration of hazardous constituents before final disposal.

EPA views the statute and legislative history as sufficient justification to evaluate in a listing determination all risks of land disposal, including in appropriate cases problems that might be associated with voluntary disposal of untreated wastes in permitted subtitle C facilities. This is particularly true where risks presented by a waste will be high if releases occur, if the waste is highly persistent, and treatment of the waste under subtitle C would significantly reduce these risks. In the case of the VCM–A wastewater treatment sludges, the potential risks presented by the high content of mercury in the waste if a release should occur, warrants the imposition of treatment standards in accordance with Congress's intent. Although the generator currently sends VCM–A wastewater treatment sludges to a lined subtitle C landfill facility, we believe that substantial risks are plausible, given the possibility of eventual landfill degradation or failure. The estimated risks due to migration from an unlined landfill provide an indication of the potential risks that will occur if mercury is released from the lined landfill due to failure of the unit to contain the waste leachate over time.

Absent a hazardous waste listing, the Agency has no mechanism for requiring that the waste be treated prior to disposal to ensure that the mercury in the waste does not leach from the waste to the surrounding environment (and hence provide some protection of human health and the environment in the event of a liner failure). Furthermore, the Agency has little assurance that the waste will continue to be managed in a subtitle C landfill.

Listing a waste as hazardous provides a level of certainty with regard to the management and stewardship of a waste as well. Given the quantity of mercury contained in the VCM–A wastewater treatment sludge and the potential solubility of this large quantity of mercury, the Agency tentatively concludes that it is appropriate that the waste be managed in accordance with the ''cradle-to-grave'' management system established under RCRA Subtitle C. By listing this waste as hazardous, EPA and the general public are afforded a greater level of certainty with respect to the manner in which the waste must be managed. It will have to be accumulated and stored in closed containers, sent off-site for treatment and disposal within a relatively short time of the time it was generated, transported by a registered hazardous waste transporter and accompanied by a manifest, and treated and disposed at facilities permitted to handle hazardous wastes.

The Agency bases its listing determinations on an evaluation of risks from plausible management practices. For the reasons just described, EPA believes that disposal of untreated VCM–A sludge in a subtitle C landfill represents one plausible management scenario and that this scenario could lead to significant problems. Equally important, the Agency questions whether the current waste management practices are the only practices that will be employed by the facility in the future. That is, the Agency believes other management practices are plausible. First, information available to the Agency documents only that the facility has sent VCM–A wastewater treatment sludges to a subtitle C landfill for disposal for some periods after 1990. Specifically, information provided by the facility in response to a specific RCRA Section 3007 request from EPA indicates this waste was sent to a subtitle C landfill from 1990 to 1994; and according to the facility's response to the RCRA Section 3007 survey, this waste was sent to a permitted hazardous waste landfill for disposal in 1996. In addition, we have no information with regard to the disposal of the waste prior to 1990. The Agency does know that the facility had as many as 800 drums of the mercuric sulfide sludge stored on site in 1985; however the Agency has no information with regard to the ultimate management of the waste.[41] Given the fact that the Agency does not have a complete record of how the VCM–A sludge was managed in the past, the Agency believes that it is reasonable to assume that the VCM–A sludge may be managed in an non-subtitle C landfill in the future.

Therefore, for the purposes of assessing potential risk, the Agency believes a plausible mismanagement scenario can also include an unlined landfill, the scenario in which the Agency's risk analysis indicates a potential for the concentration of mercury at a modeled receptor well to be as much as eight times higher than the MCL for mercury (based upon the TCLP results and a DAF of 40).

Our assessment includes predicted exceedances of the MCL (based upon the record sample EPA collected) assuming disposal in an unlined landfill; and a qualitative consideration of the possible risks when disposed in a subtitle C landfill without better treatment. Although risk analyses provide one of the principal bases for a listing determination, estimates of risk levels do not represent the sole basis for a listing determination. Other factors generally are considered in making a listing decision. In fact, the Agency's listing decision policy uses a ''weight-of-evidence'' approach in which calculated risk information is a single key factor. Available risk values are assessed with all other data available to determine whether a waste is or is not a hazardous waste (see the discussion of EPA's hazardous waste listing determination policy in the proposed listing for wastes generated by the dye and pigment industries at 59 FR 66073, December 22, 1994). In our decision to propose to list this sludge as hazardous,

[40] RCRA section 1002(b)(7), 42 U.S.C. 6902(b)(7).

[41] ''Reclassification Petition'' submitted to Louisiana Department of Environmental Quality, Hazardous Waste Division, by Borden Chemical, September, 1987, p. III–2.

the Agency considered several factors, including the extensive documentation on the toxicity of mercury, as well as the other criteria listed in 261.11(a)(3) to arrive at a listing determination, as further summarized below.

Mercury has been identified by several different governmental agencies, including EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), the Food and Drug Administration (FDA), and the Occupational Safety and Health Administration (OSHA), as a significant human toxicant. Each of these Agency's has developed regulations, guidelines, and/or standards to protect people from the serious potential health effects of exposure to mercury. In addition, it also is well documented that mercury is persistent in the environment, does not degrade, and bioaccumulates in wildlife, particularly fish. Agency studies, including the recently published *Mercury Study Report to Congress* [42] have documented the neurotoxicity of mercury and the potential adverse human health and environmental effects that may result from the release of mercury to the environment. In addition, ATSDR has published a toxicological profile for mercury which examines, summarizes and interprets toxicological information and epidemiological evaluations on mercury.[43] Research conducted by both EPA and ATSDR provides documentation of the highly toxic effects of human exposure to mercury. Human consumption of highly-contaminated food can produce overt mercury neurotoxicity. Neurotoxic effects from mercury contamination range from subtle decrements in motor skills and sensory ability at comparatively low doses to tremors, inability to walk, convulsions and death at extremely high exposures. Human consumption of fish or grain contaminated with high levels of mercury can result in permanent damage to the brain, kidneys and developing fetuses. Adverse effects of mercury on fish include death, reduced reproductive success, impaired growth and development and behavioral abnormalities. Exposure to mercury also can cause adverse effects in plants, birds and mammals. The extent and availability of toxicity assessments for mercury is relatively extensive (see EPA's ''Mercury Study Report to Congress'' and/or EPA's ''Action Plan for Mercury'') [44]. Certainty with regard to the potential risks to human health and the environment from exposure to mercury is well documented. Mercury presents significant human health threats when released to the environment.

Wastewater treatment sludges from the VCM–A process using mercuric chloride catalyst contain significant levels of total mercury. As mentioned previously, approximately 120 metric tons of the sludge, containing about one percent (or 1 MT) of mercury, is generated per year at a single facility. One metric ton of mercury is approximately 20 times as much mercury as is received typically by a single municipal solid waste landfill from all sources in one year. EPA also notes that in this particular case, we believe the mercury is likely to be significantly leachable at pH levels of a typical hazardous waste landfill. The Agency considers this quantity of potentially leachable mercury generated from a single facility and disposed of off-site to be significant. As outlined in the *Draft EPA Action Plan for Mercury* [45], and EPA's Waste Minimization National Plan [46], it is important to the protection of human health and the environment that all anthropogenic sources of mercury emissions to the environment be minimized. Given the inherent risks associated with mercury, EPA believes it is necessary to ensure, to the greatest extent possible, that wastes containing significant quantities of mercury are safely managed and to guard against potential mismanagement.

Upon consideration of the factors enumerated in 40 CFR 261.11(a)(3) and those summarized in the 1994 Dyes and Pigments Proposed Rule for making a hazardous waste listing determination, EPA made the following conclusions with respect to this waste. In terms of waste characterization, data available on this waste indicate with relative consistency that the waste contains a significant amount of total mercury, regardless of variation in pH and leachable mercury. Furthermore, in this particular case, we believe that the mercury is likely to be more leachable than the TCLP test indicates. It is well documented that mercury is a human toxicant. Mercury is persistent in the environment, does not degrade, and bioaccumulates in wildlife, particularly fish. These conclusions correspond to the listing factors at 40 CFR Sections 261.11(a)(3)(i), (iv), (v), and (vi), respectively.

After considering the listing factors in 261.11(a)(3), and in particular the factors at 261.11(a)(3)(i)–(vi) (which include potential risks to groundwater from unregulated disposal of this waste, the fact that mercury is a human toxicant, is persistent in the environment, does not degrade, bioaccumulates in wildlife, and is present in very high concentrations in this waste), as well as several of the ''additional factors'' listed in the 1994 Proposed Rule for Wastes Generated by the Dyes and Pigments Industry, and taking into account the Agency's overall goals to reduce releases of mercury to the environment, EPA is proposing to list this waste as hazardous. The proposed listing description is shown below.

K175 Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.

The proposed listing of VCM–A wastewater treatment sludges, which contain substantial amounts of total mercury is, in effect, an extension of the Agency's policy with regard to mercury emissions. The Agency believes that listing these wastewater treatment sludges as hazardous will provide incentive for the facility to find ways to reduce the overall quantity of mercury-containing VCM–A sludges generated. EPA believes there may be opportunities for this type of reduction through improved catalyst handling practices. Improved handling practices may result in a reduction in the amount mercuric chloride released in and around the VCM–A process area where it becomes available for introduction to the wastewater treatment system. In turn, this reduction would result in an overall decrease in the amount of mercury available for potential release to the environment.

Once a waste is listed as a hazardous waste, the waste is prohibited from land disposal unless it is treated in compliance with treatment standards established under the RCRA land disposal restrictions standards program. The mercuric sulfide sludge generated from the VCM–A production process is unique in that this waste contains a very high amount of total mercury, and the

[42] U.S. Environmental Protection Agency (1997), EPA–452–R–97–003–009.

[43] ''*Toxicological Profile for Mercury*,'' ATSDR, April, 1999; http://www.atsdr.cdc.gov/press/ma990419.html.

[44] ''Mercury Study Report to Congress,'' volumes I–VIII, EPA–452/R–97–003, December 1997; and EPA Action Plan for Mercury (Atttachment 1 to ''An Agency-Wide Multi-media Strategy for Priority PBT Pollutants''), http://www.epa.gov/ttnuatw1/112nmerc/mercury.html.

[45] Attachment to *A Multimedia Strategy for Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutants*, November 16, 1998, EPA 742/D98/001, http://www.epa.gov/opptintr/pbt/pbtstrat.htm.

[46] Waste Minimization National Plan, US EPA, 1994, EPA530–R–94–045, http://www.epa.gov/rgytgrnj/specinit/p2/volprog/wm.htm.

mercury is present in the waste in a relatively insoluble form as measured using the TCLP. However, the preliminary findings of the EPA/ORD study described above suggest that variability in the pH of the waste as generated, and higher pH conditions potentially encountered in the disposal unit where this waste is managed, can affect the stability of the VCM–A sludge when disposed in a subtitle C landfill. The Agency, therefore, is proposing specific LDR treatment standards for this waste to minimize the potential release of mercury to the environment from this waste. A discussion of the proposed BDAT treatment standards for newly listed VCM–A wastes is provided later in this notice.

c. What Alternative Is EPA Considering for a Proposed Listing Determination?

i. Summary of Alternative Listing Option

The alternative listing option EPA is proposing today is to list the VCM–A wastewater treatment sludges as hazardous waste, *unless* the waste is disposed in a subtitle C landfill. In addition, under this alternative option, VCM–A wastewater treatment sludges that exhibit the toxicity characteristic for mercury will be listed as hazardous. In other words, this waste will not meet the proposed K175 listing description, and therefore will not be listed hazardous waste from the point of generation, so long as it is disposed in a subtitle C landfill, and it does not exhibit the TC for mercury.

ii. Rationale for Alternative Listing Option

As described earlier, EPA believes that the VCM–A sludge meets the criteria for being listed as a hazardous waste, principally due to the high concentration of mercury, a highly toxic constituent, in this waste. Available information indicates that the direct disposal of untreated VCM–A sludge in a subtitle C landfill may result in a marked increase in the mobility of mercury, and that, should the liner system ultimately degrade, this mercury can be released to groundwater and potentially reach a receptor well in concentrations at the MCL. Also, the Agency believes that disposal of these wastes in an unlined landfill is a plausible mismanagement scenario, which would result in exceedances of the MCL by up to a factor of eight. The Agency is seeking comment on these tentative conclusions and this proposed listing determination. Should the Agency receive data or other information on the conclusions drawn by the Agency with regard to the management of the waste and the behavior of this waste in the environment, particularly with regard to the potential for the mercury in the waste to leach under conditions of high pH levels, the Agency will consider alternative approaches. For example, if direct disposal of untreated VCM–A sludge in a subtitle C landfill can be shown to be protective without further treatment of this waste, due to the relative insolubility of mercuric sulfide or expected long-term performance of subtitle C systems, EPA will consider a conditional listing of VCM–A. Such an conditional listing would specify that the wastewater treatment sludges are listed only if the waste is not disposed in a subtitle C landfill, or put another way, the sludges would *not* be listed hazardous waste from the point of generation if they *are* disposed in a subtitle C landfill.

As mentioned above, this alternative regulatory approach is based upon the presumption that disposal of untreated VCM–A sludge in a subtitle C landfill is protective. However, the Agency also is concerned that this waste can sometimes fail the TC for mercury (as discussed earlier, approximately 20 percent of the time based upon EPA and facility data). The existing treatment standards that otherwise would apply to this waste if it was characteristically hazardous for mercury include incineration (*i.e.*, D009 high mercury/organic subcategory requires either incineration or mercury recovery), which may not be the most environmentally-sound manner in which to treat the waste prior to disposal. This is discussed in more detail in the LDR portion of today's rule (Section V). Because of this concern, this alternative option is structured in a fashion that allows the treatment standards being proposed today for K175 to apply in lieu of the existing standards for D009 for those VCM–A wastes that exhibit the characteristic for mercury.

EPA requests comment on this proposed alternative listing approach. Also, EPA requests comment on whether it may be more appropriate to simply list the VCM–A wastewater treatment sludge unless it is sent to a subtitle C landfill, and propose alternative LDR treatment standards that would apply to VCM–A wastewater treatment sludges that exhibit the TC for mercury. We note that the Agency presently is revisiting the IMERC standard as part of a comprehensive re-evaluation of the LDR treatment standards for mercury-bearing wastes (see May 28, 1999 ANPRM; 64 *FR* 28958). To the extent time allows, the Agency will consider relevant issues raised in the ANPRM in developing this final listing determination. However, because of the different schedules of these two actions and the consent decree deadline for finalizing today's proposed rule, we will not necessarily be able to consider any comments submitted to the ANPRM in finalizing today's rule.

The Agency's proposed alternative listing description for VCM–A wastewater treatment sludges that will define this waste as hazardous only under certain conditions is as follows:

> K175 Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, *unless:* i) the sludges are disposed in a subtitle C landfill, and ii) the sludges do not fail the toxicity characteristic for mercury in 40 CFR 261.24, and iii) the generator maintains documentation demonstrating that the waste was disposed of in a subtitle C landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in a subtitle C landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (*e.g.*, contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, analytical results or other information showing the waste does not fail the toxicity characteristic for mercury, etc.) that the terms of the exclusion were met.

The Agency requests comment on this alternative listing approach for VCM–A sludge. As already mentioned, EPA might choose this alternative regulatory approach if it decides direct disposal of untreated VCM–A sludge is protective without further treatment of this waste, due to the relative insolubility of mercuric sulfide, and the groundwater protections a lined landfill does provide.

d. What Is the Status of Landfill Leachate From Previously Disposed Wastes?

Leachate derived from the treatment, storage, or disposal of listed hazardous wastes is classified as a hazardous waste by virtue of the ''derived-from'' rule in 40 CFR 261.3(c)(2). The Agency has been clear in the past that hazardous waste listings apply to wastes disposed

of prior to the effective date of a listing, even if the landfill ceases disposal of the waste when the waste becomes hazardous. See 53 *FR* 31147, August 17, 1988. We also have a well-established interpretation that listings likewise apply to leachate derived from the disposal of listed hazardous wastes, including leachate derived from wastes disposed before a listing effective date which meet the listing description. We are not reopening any of these issues with this proposed rulemaking.

Of course, as set out in detail in the August 1988 notice, this does not mean that landfills holding wastes that are listed now as hazardous become subject to subtitle C regulation. However, previously disposed wastes now meeting a listing description, including residues such as leachate that are derived from such wastes, and that are managed actively do become subject to subtitle C regulation. See 53 *FR* 31149, August 17, 1988. In many, indeed most circumstances, active management of leachate would be exempt from subtitle C regulation because the usual pattern of management is discharge either to POTWs via the sewer system, where leachate mixes with domestic sewage and is excluded from RCRA jurisdiction (see RCRA Section 1004(27) and 40 CFR 261.4(a)(1)), or to navigable waters, also excluded from RCRA jurisdiction (see RCRA Section 1004(27) and 40 CFR 261.4(a)(2)). In addition, management of leachate in wastewater treatment tanks prior to discharge under the CWA is exempt from RCRA regulation (40 CFR 264.1(g)(6)).

If actively managed, landfill leachate and gas condensate derived from the newly-listed VCM–A waste proposed for listing in today's notice could be classified as K175. In such circumstances, we would be concerned about the potential disruption in current leachate management that could occur, and the possibility of redundant regulation. Recently, this issue was raised to the Agency in the context of the petroleum refinery waste listings. See 63 *FR* 42173, August 6, 1998. A commenter expressed concern that, because some of the commenter's non-hazardous waste landfills received newly-listing petroleum wastes prior to the effective date of the listing decision, the leachate that is collected and managed from these landfills would be classified as hazardous. The commenter argued that this could lead to vastly increased treatment and disposal costs without necessarily any environmental benefit. After examining and seeking comment on this issue, we published a final rule that temporarily defers regulation of landfill leachate and gas condensate derived from certain listed petroleum refining wastes (K169–K172) that were disposed before, but not after, the new listings became effective, provided certain conditions are met. See 64 *FR* 6806, February 11, 1999.

At the time this issue was brought to the Agency's attention in the context of the petroleum refinery waste listings, EPA's Office of Water had recently proposed national effluent limitations guidelines and pretreatment standards for wastewater discharges—most notably, leachate—from certain types of landfills. See 63 *FR* 6426, February 6, 1998. In support of this proposal, EPA conducted a study of the volume and chemical composition of wastewaters generated by both subtitle C (hazardous waste) and subtitle D (non-hazardous waste) landfills, including treatment technologies and management practices currently in use. EPA proposed effluent limitations (for nine pollutants in the Non-Hazardous Subcategory) for direct dischargers. See 63 *FR* 6463. Most pertinent to finalizing the temporary deferral for the petroleum refining wastes, EPA did not propose pretreatment standards for subtitle D landfill wastewaters sent to POTWs because the Agency's information indicated that such standards were not required.

The conditions included in the temporary deferral published on February 11, 1999 are that the leachate is subject to regulation under the Clean Water Act, and the leachate cannot be stored in surface impoundments after February 13, 2001. See 40 CFR 261.4(b)(15). We believed that it was appropriate to temporarily defer the application of the new waste codes to such leachate in order to avoid disruption of ongoing leachate management activities while the Agency decides how to integrate the RCRA and CWA regulations consistent with RCRA Section 1006(b)(1). We believe that the same fact pattern fully discussed in the February 11, 1999 rulemaking applies in this situation as well. As such, we would be concerned about forcing pretreatment of leachate even though pretreatment is neither required by the CWA, nor needed. Therefore, we are proposing to temporarily defer the regulation of landfill leachate and gas condensate derived from the VCM–A wastes, with the same conditions as described in 40 CFR 261.4(b)(15) for petroleum wastes. We believe the issue of whether disruptions can be minimized through integration of CWA and RCRA rules will be more amenable to resolution once the CWA rulemaking is completed.

e. What Specific Comments Is EPA Requesting on the Agency's Proposed Listing of VCM–A Wastewater Treatment Sludges?

The Agency requests comments on the proposed listing of all VCM–A wastewater treatment sludges as well as the proposed conditional listing for this waste. In addition, the Agency requests comment on alternative management practices that may either be in use or may be appropriate for this wastestream, other than the disposal of these sludges in subtitle C landfills.

We also request any available information on whether or not the VCM–A wastes were previously disposed in non-hazardous landfills. Even if we do not receive any information that previously disposed VCM–A wastes will result in generation of hazardous landfill leachate and gas condensate, we may still choose to promulgate the temporary deferral for landfill leachate and gas condensate from this waste. This is because someone may discover this problem later (after the effective date of the listing), so, by having a temporary deferral in place, it would be possible to avoid disruption of ongoing leachate management activities while we further examine this issue and await the CWA final rule.

4. Methyl Chloride Wastewater Treatment Sludges

a. How Is EPA Proposing To Regulate Methyl Chloride Wastewater Treatment Sludges?

EPA is proposing not to list as hazardous sludges from the treatment of wastewaters generated from methyl chloride production processes. This wastestream does not meet the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous. It does not pose a substantial present or potential hazard to human health or the environment. The Agency identified limited risks to consumers of groundwater.

b. What Information Led EPA To Propose Not To List as Hazardous Methyl Chloride Wastewater Treatment Sludges?

EPA identified only one facility that generates sludges from the treatment of wastewaters generated from the production of methyl chloride and does not currently manage the waste as hazardous. The results of the RCRA Section 3007 survey for the chlorinated aliphatics industry show that this facility generates less than 800 metric tons of this sludge each year and disposes of the sludge in an on-site landfill along with other wastes from

the facility. The landfill is lined and has a leachate collection system.

In conducting the risk assessment for this sludge, EPA considered one management scenario, disposal in an on-site landfill. The Agency analyzed potential risks from methyl chloride wastewater treatment sludge by modeling a non-groundwater pathway. The Agency's analysis of potential risks due to volatile emissions from the landfill resulted in negligible risks to individuals in the surrounding area. The Agency also conducted a bounding (i.e., worst case) risk analysis to estimate potential risks to groundwater consumers. This analysis used the leachate concentration measured from a sample of the facility's methyl chloride wastewater treatment sludge, and assumed the direct ingestion of this leachate by an adult for a period of 58 years. This bounding analysis resulted in a risk of 5E–5 for one constituent, arsenic.

The Agency views the arsenic risk results from the bounding analysis as marginal. Assuming a landfill DAF of only 5 (a reasonable assumption for an *un*lined landfill), the predicted risk becomes 1E–5, which is the typical level identified by EPA as posing sufficient risk to require the waste to be listed as hazardous(see 59 FR 66072, 66077). However, for this particular facility, EPA believes that the actual risk from this waste will be much lower than the risk level predicted by the bounding analysis given that the landfill currently used by the single facility generating this waste is lined with a 24-inch clay liner and has a leachate collection system.

The Agency believes that the management practice of most concern (on-site landfill) was assessed, given that it is the only management practice used by the single facility generating the waste. Given that the landfill is located on site and has significant remaining capacity, the Agency sees no reason to assume that the facility will not continue to manage its wastewater treatment sludges from the production of methyl chloride in this manner.

Based on an analysis of potential risks associated with current management practices, EPA is proposing not to list as hazardous wastewater treatment sludges from the production of methyl chloride. The Agency found no significant risks arising from the on-site landfill management scenario. The only possible concern arises from the marginal risk associated with arsenic, which falls at the risk level generally identified by EPA for listing a waste as hazardous, when assuming a DAF of 5. The Agency believes this assumption is reasonable for an unlined landfill, and likely results in an overestimate of risk for the management practice identified by EPA (i.e., an on-site landfill that operates with a clay liner and leachate collection at a single facility).

The Agency requests comments on the approach taken to determine a no-list proposal for hazardous wastewater treatment sludges from methyl chloride manufacturing.

5. Allyl Chloride Wastewater Treatment Sludges

a. How Is EPA Proposing To Regulate Allyl Chloride Wastewater Treatment Sludges?

EPA is proposing not to list as hazardous sludges generated from treating wastewaters associated with the manufacture of allyl chloride. This wastestream does not meet the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous. It does not pose a substantial present or potential threat to human health or the environment. The Agency has identified no risks of concern associated with the current management of the waste.

b. What Information Led EPA To Propose To Not List as Hazardous Allyl Chloride Wastewater Treatment Sludges?

Wastewater treatment sludges from allyl chloride production are generated at a single facility. The sludges are generated from the facility's centralized wastewater treatment system. This wastewater treatment system is a non-dedicated system in that wastewaters from the facility's multiple production processes are discharged to the single system for combined treatment. Wastewaters from the production of allyl chloride contribute less than two percent to the system's total sludge loading. According to the RCRA Section 3007 survey response, the sludge generated from the facility's wastewater treatment system is incinerated on site in a non-hazardous waste incinerator.

During the investigations undertaken in support of the listing determinations, EPA collected one sample of this sludge. Two duplicate TCLP analyses were performed using the sample collected. The sample also was analyzed for total concentrations of dioxins and furans. The TCLP analyses indicated the presence of no TCLP constituents above regulatory levels. The total arsenic concentration in the waste was 11.7 mg/kg, while the total dioxin (TEQ/TCDD) concentration was 11.79 ng/kg.

The Agency does not anticipate any significant risk from the incineration of allyl chloride wastewater treatment sludge in a non-hazardous waste incinerator, since both the total arsenic level [47] and the total dioxin level [48] detected in the sludge are well within the range of background levels of those constituents in soils.

The Agency did not conduct an analysis of risk associated with other management practices, based upon the fact the waste is generated by a single facility and currently is not managed in a manner other than non-hazardous waste incineration.

Given that wastewater treatment sludges from allyl chloride production are generated by a single facility, that the sludge generated is the product of a facility-wide non-dedicated (*i.e.*, not process-specific) wastewater treatment system, and that no significant risks are posed by the waste attributable to the allyl chloride production process, the Agency is proposing not to list this waste as hazardous.

The Agency requests comments on the approach taken to determine to propose not to list as hazardous wastewater treatment sludges from allyl chloride manufacturing.

F. Constituents Proposed for Addition to Appendix VIII to 40 CFR Part 261

Two of the constituents of concern that are present in the chlorinated aliphatic wastewaters (K173) and the EDC/VCM wastewater treatment sludges (K174) proposed to be listed as hazardous waste do not currently appear on the list of hazardous constituents at 40 CFR part 261, appendix VIII. Therefore, EPA is proposing to add these two constituents, octachlorodibenzo-p-dioxin (OCDD) and octachlorodibenzofuran (OCDF), to appendix VIII. OCDD and OCDF are members of the large family of polychlorinated dioxins and furans. Certain of these compounds, most notably, 2,3,7,8 TCDD, have been shown to be extremely toxic.

As discussed in section III.D of today's proposed rule, the Agency's risk assessment found significant risks associated with the presence of dioxins

---

[47] Alkhatib, Eid, and O'Connor, Timothy, ''*Background Levels of Priority Pollutant Metals in Soil, American Environmental Laboratory*, Vol. 10, No. 3, April, 1998.

Hunter, Philip M., ''Air-Force Wide Background Concentrations of Inorganics Occurring in Ground Water and Soil,'' *Proceedings from the Fourteenth Annual Waste Testing and Quality Assurance Symposium*, Pp. 73–77, 1998.

Welch, Alan H., Lico, Michael S., and Hughes, Jennifer L., ''*Arsenic in Ground Water of the Western United States*,'' *Ground Water*, Vol. 26, No. 3, May/June, 1988.

[48] See Table 4–4 of ''Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination,'' EPA, June 25, 1999.

in both chlorinated aliphatic wastewaters and EDC/VCM wastewater treatment sludges. In the case of our analysis of risk for both categories of waste, the dioxin/furan concentrations were measured on a TCDD TEQ basis. As previously discussed in today's proposed rule, TCDD TEQ concentrations are calculated by multiplying each 2,3,7,8 congener by the appropriate TEF, and then summing the resultant concentrations to come up with a TCDD TEQ value. OCDD and OCDF are part of this calculation.

Available data indicate that 2,3,7,8-substituted congeners of chlorinated dibenzo-p-dioxin and dibenzofurans have toxic effects similar to 2,3,7,8,-TCDD. Data available from in vivo and in vitro studies reveal a strong structure-activity relationship, in which the 2,3,7,8-substituted congeners are much more biologically active than other congeners. Both OCDD and OCDF are 2,3,7,8-substituted congeners. Available data also show that the relative responses of different PCDDs and PCDFs are generally consistent across a variety of toxicity end points.[49] In regard to OCDD specifically, test animals exhibited initial signs of ''dioxin toxicity'' in a subchronic study of mice exposed to OCDD at low levels.[50]

EPA also points out that the oral slope factors for OCDD and OCDF (calculated by multiplying the cancer slope factor for 2,3,7,8 TCDD by the TEFs for OCDD and OCDF, which are both 0.0001[51]) are relatively high (15/(mg/kg)/day) compared to the oral slope factor of other hazardous constituents currently listed in appendix VIII to 40 CFR 261 (*e.g.,* arsenic has an oral slope factor of 1.5/(mg/kg)/day).

Therefore, we have concluded that, based upon sufficient evidence to show that OCDD and OCDF are hazardous constituents and based upon the fact that OCDD and OCDF are the only congeners that make up TCDD TEQ that are not currently listed in appendix VIII, OCDD and OCDF should be added to appendix VIII of 40 CFR part 261. The Agency requests comment on its proposal to add OCDD and OCDF to the list of hazardous constituents in appendix VIII to 40 CFR 261.

[49] U.S. Environmental Protection Agency. 1989 Update to the Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs). Washington, D.C.: Risk Assessment Forum, March, 1989. EPA/625/3–89/016.

[50] Couture, L.A., M.R. Elwell, and L.S. Birnbaum. ''Dioxin-like Effects Observed in Male Rats Following Exposure to Octachlorodibenzo-p-dioxin (OCDD) during a 13-week Study.'' Toxicology and Applied Pharmacology, Vol. 93, Pp 31–46, 1988.

[51] Using the toxicity equivalency factor (TEF) developed by the World Health Organization, see section III.D.1.g.ii of today's proposed rule for discussion of TEFs.

IV. Economic Analysis

A. What Is the Purpose of the Economic Analysis?

The primary purpose of the economic analysis presented in the *''Economic Background Document,''* is to estimate potential industry compliance costs associated with this listing proposal. Secondary purposes are to provide descriptive information about the economic (industry) sectors affected, and about the economic activities involving chlorinated aliphatic hydrocarbon chemicals (CAHCs). The Economics, Methods, and Risk Assessment Division (EMRAD) of EPA's Office of Solid Waste (OSW) conducted the economic analysis. The *''Economic Background Document''* is available to the public from the RCRA docket (refer to the introduction to this preamble for instructions on how to obtain a copy). The findings of the economic study are summarized in this section of the preamble. References to statements below pertaining to facts, data, assumptions and other types of information, are identified in the document.

B. How May the Public Participate in the Economic Analysis?

The USEPA encourages the public to provide comments and suggestions about the design, accuracy, representativeness and completeness of the *''Economic Background Document.''*

In preparing the *Economic Background Document,* the EPA preferred to the maximum extent possible, to use publicly-available rather than confidential business information (CBI) as information and data sources, to facilitate transparency for public review and comment. However, some information was designated by survey companies as CBI when collected in the 1992 and 1997 Section 3007 surveys administered by EPA (described elsewhere in this preamble). Consequently, the background data and information available to the EPA during development of this listing proposal also consisted of CBI information. In order to minimize reliance on CBI data, and to exhaust available public information sources, EPA consulted many other databases as supplements and substitutes to the RCRA Section 3007 survey, in conducting the economic study.

EPA particularly requests written comments from the public on the information elements listed below pertaining to the economic analysis presented in the ''Economic Background Document:''

1. *Study Design:* Suggestions for modifications and improvements to the scope, methodology, and organization of the *Economic Background Document* (e.g., 30-year cost annualization ''period-of-analysis'' applied).

2. *Facility Universe:* Correct number and locations of CAHC manufacturing and any other types of facilities and entities potentially affected by the RCRA listing proposal.

3. *Affected Wastes:* Correct average annual quantities, types and industrial source (origin) of potentially affected CAHC manufacturing wastes.

4. *Industry Profile:* Characterization of the role, functions and industrial organization associated with the production and use of CAHCs in the US economy.

5. *Baseline Waste Management:* Characterization of baseline (current) waste management practices associated with CAHC manufacturing wastes (both onsite and offsite management practices), including the types and relative waste quantities managed, types of waste management units, costs of waste management ($/ton basis), waste commingling and segregation, etc. In particular, there is uncertainty in the Section 3007 survey data, about the exact number and sizes of wastewater management tanks used by CAHC manufacturing facilities.

6. *Compliance Waste Management:* Adaptation of CAHC manufacturing facilities to the RCRA listing proposal if finalized, such as changes in CAHC manufacturing plant & equipment, facility layout, production processes and methods, business arrangements, CAHC product mixes, etc. What are possible operating consequences to waste management facilities for meeting K175 waste pH and sulfide landfill restrictions?

7. *Facility Process Modifications:* Identification and dollar value of lump-sum capital investment costs required (per industrial operating unit or facility).

8. *Unit Costs:* Overall representativeness of unit costs applied to the universe of CAHC manufacturing facilities for industrial waste management, involving both non-hazardous and hazardous waste handling.

9. *Impact Benchmarks:* The appropriateness of the alternative company financial benchmarks (*e.g.,* annual sales revenues, annual profits, capital expenditures, short-term credit) presented in this study, and of other benchmarks not presented, for purpose of providing measurement references relative to assessing the dollar magnitude of the estimated industry compliance costs.

10. *Supporting Data:* The data applied in the economic study are from sources published over a number of years, and for some key data elements, are more than five years old (*e.g.,* during preparation of this study, the US Bureau of Census' 1997 Survey of Manufacturers data reports were not yet available).

11. *Other Considerations:* Any other comments pertaining to other aspects of the economic study, or to topics which have been omitted or are outside the scope of the

study, if relevant to assessing the economic impact of the listing proposal.

C. How Are Chlorinated Aliphatic Chemicals Used in the Economy?

Chlorinated aliphatic hydrocarbon chemicals (CAHCs) entered into commerce in the US in the early 1920s, and as of 1994, approximately 38 billion pounds of 50 different commercially significant CAHCs were manufactured by 23 chemical plants (facilities) in the United States. The US production of CAHCs has grown an average annual rate of 4.4 percent over the last 30 years.

CAHCs are a group of organic chemicals—most of which are colorless liquids at room temperature—primarily used as intermediate feedstocks for the production of polyvinyl chloride (PVC) plastics; CAHCs are also used directly in liquid form as various types of solvents, as intermediates for the production of other types of chemicals, and in assorted other commercial use categories. As of 1996, three CAHCs—ethylene dichloride, vinyl chloride, methyl chloride—were on the list of top-50 chemicals produced in the United States.

D. Where Are CAHCs Manufactured in the United States?

In conjunction with contacts of industry representatives, EPA identified an initial subset of industrial facilities relevant to the scope of the listing proposal, according to both the (a) types of chemical products manufactured, as well as the (b) types of industrial wastestreams generated from the chemical manufacturing processes. EPA identified a total of 28 facilities in the 1992 Section 3007 industry survey, and a total of 26 facilities in the 1997 follow-up survey, as a result of two facility closures in the interim period. Three of the 26 facilities were discovered to be either ''de minimus'' producers of CAHCs, or double-counted in the survey, which resulted in a final subset of 23 relevant CAHC manufacturing facilities.

The relevant subset of 23 CAHC manufacturing facilities surveyed in USEPA-OSW's 1997 survey are located in eight states (Kansas, Kentucky, Louisiana, Maryland, Michigan, New York, Tennessee, and Texas), and employ an average of over 700 employees per facility. Total employment for all 23 facilities is about 19,000 employees, and the total employment associated with the 16 parent companies which own these 23 facilities is much larger, estimated at 526,700 employees.

E. Have CAHCs Been Produced Historically in Other Locations in the United States?

In addition to current databases, there are assorted documents which contain historical information about the CAHC production industry in the United States. Historically, CAHCs have been manufactured and/or used as feedstocks and intermediates in chemical production plants in at least 15 states in the US. The historical data on the number and location of CAHC production facilities serves to illustrate the dynamic business activity in this industry sector. As late as 1975, CAHCs were produced in the US by 32 companies in 58 plant locations.

F. What Are the Estimated Potential Industry Costs of This Listing?

There are two associated categories of potential compliance costs for CAHC manufacturers under this listing proposal: (a) process wastewater listing costs, and (b) wastewater treatment sludge listing costs. These costs are incremental to current waste management costs in this industry, in the sense that all CAHC manufacturing facilities are currently regulated under RCRA (*i.e.*, as chlorinated aliphatic manufacturers via the existing RCRA F025 and F026 wastecodes, among others), and some facilities currently manage most or all of their CAHC manufacturing wastes as hazardous. Consequently, this listing proposal will not have a full incremental impact on these facilities, and the marginal impact on their existing operations in relation to current RCRA compliance and hazardous waste handling practices may be less than it otherwise would be if these companies and facilities did not have experience with baseline RCRA waste management practices.

As summarized in Table IV–1 below, EPA estimates the total industry compliance cost—excluding paperwork burden as separately estimated in the Information Collection Request—associated with the two wastestream components of the listing proposal (*i.e.*, sludges and wastewaters), at $2.355 million in average annual cost, for annual waste management in conformance with the terms of the listing proposal. This total cost consists of an estimated $1.320 million in initial capital expenditures (30-year annualized equivalent of $0.046 million), and an estimated $2.309 million in recurring annual costs.

TABLE IV–1.—SUMMARY OF ESTIMATED INDUSTRY COMPLIANCE COSTS FOR THE RCRA LISTING PROPOSAL; WASTEWATER TREATMENT SLUDGES AND WASTEWATERS. AVERAGE ANNUAL EQUIVALENT TOTAL INDUSTRY COST

Item	Type of CAHC facility potentially affected by the proposed RCRA listing options	Initial capital costs ($ lump-sum)	Recurring annual O&M costs ($/year)
A.	SLUDGE LISTING ESTIMATED COSTS:		
A1	Non-landfilled EDC/VCM sludge	$0	$1,333,000
A2	VCM–A process w/mercury catalyst	0	209,000
	Subtotal sludge costs	0	1,542,000
B.	WASTEWATER LISTING ESTIMATED COSTS:		
B1	Tank fixed roof + valve	1,084,600	81,600
B2	Tank roof vent + carbon control	150,900	591,200
B3	Tank ''Subpart CC'' ancillary costs*	0	23,700
B4	Initial waste testing for dioxins	84,500	0
B5	Annual waste retesting for dioxins	0	70,400
	Subtotal wastewater costs	1,320,000	766,900
C.	SLUDGE + WASTEWATER COSTS (column totals)	1,320,000	2,309,000

TABLE IV–1.—SUMMARY OF ESTIMATED INDUSTRY COMPLIANCE COSTS FOR THE RCRA LISTING PROPOSAL; WASTEWATER TREATMENT SLUDGES AND WASTEWATERS. AVERAGE ANNUAL EQUIVALENT TOTAL INDUSTRY COST—Continued

Item	Type of CAHC facility potentially affected by the proposed RCRA listing options	Initial capital costs ($ lump-sum)	Recurring annual O&M costs ($/year)
	Total annualized equivalent cost	.....	2,355,000

V. Proposed Treatment Standards Under RCRA's Land Disposal Restrictions

A. What Are EPA's Land Disposal Restrictions (LDRs)?

The RCRA statute requires EPA to establish treatment standards for all wastes destined for the land disposal. These are the so called ''land disposal restrictions'' or LDRs. For any hazardous waste identified or listed after November 8, 1984, EPA must promulgate these LDR treatment standards within six months of the date of identification or final listing (RCRA Section 3004(g)(4), 42 U.S.C. 6924(g)(4)). RCRA also requires EPA to set as these treatment standards ''* * * levels or methods of treatment, if any, which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized.'' (RCRA Section 3004(m)(1), 42 U.S.C. 6924(m)(1)).

Wastes that meet treatment standards established by EPA may be land disposed. Wastes that do not meet these standards are prohibited from land disposal (except in so-called no-migration units). Each waste proposed for listing as hazardous in this rule will be subject to all the land disposal restrictions on the same day their respective listing becomes effective.

B. How Does EPA Develop LDR Treatment Standards?

To establish LDR treatment standards, EPA first identifies the best demonstrated available technology (BDAT) for the hazardous constituents present in the hazardous waste, and then determines what constituent concentrations can be achieved by the technology or technologies identified as BDAT.

EPA typically has established treatment standards based on performance data from the treatment of the waste at issue, if such data are available, and also from the treatment of wastes with similar chemical and physical characteristics or similar concentrations of hazardous constituents. Treatment standards typically cover both wastewater and nonwastewater waste forms on a constituent-specific basis. The constituents selected for regulation under the LDR program are not necessarily limited to those present in a proposed listing, but also may include those constituents or parameters that will ensure that treatment technologies are operated properly. For listed waste EPA identifies these as ''regulated constituents'' and they appear individually in the Table at 40 CFR 268.40, along with their respective treatment standards.

EPA may develop and promulgate either technology-specific treatment standards or numerical treatment standards. Should EPA elect to use technology-specific standards, all wastes that meet the listing designations would have to be treated by the technology or technologies specified before disposal. These technologies are also identified in the Table at § 268.40 and are further described in § 268.42. Should EPA elect to use numerical treatment standards, the Agency allows the use of any technology (other than impermissible dilution) to comply with the treatment standards.

After developing the LDR treatment standards, we must also determine if significant treatment capacity is available to treat the expected volumes of wastes. If so, the LDR treatment standards become effective essentially at the same time a listing does. If not, EPA may grant up to a two-year national capacity variance (NCV) during which time the LDR treatment standards are not effective.

For a more detailed overview of the Agency's approach for developing treatment standards for hazardous wastes, see the final rule on solvents and dioxins (51 FR 40572, November 7, 1986) and section III.A.1 of the preamble to the final rule that set land disposal restrictions for the ''Third Third'' wastes (55 FR 22535, June 1, 1990). EPA also has explained its BDAT procedures in ''Best Demonstrated Available Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology (EPA/OSW, October 23, 1991)'' . This document is available in the docket supporting this rulemaking.

C. What Kind of Treatment Standards Are Proposed?

EPA has gathered data on waste characteristics and current management practices for wastes proposed in this action as part of the administrative record for this rule, and has evaluated these data to develop specific treatment standards. An examination of the constituents that are the basis of the proposed listings shows that the Agency has previously developed numerical treatment standards for most of the constituents of concern. After reviewing the available characterization data and the available information on waste management practices for these wastes proposed for listing, EPA has determined that it is technically feasible and justified to apply existing universal treatment standards (UTS) to the regulated hazardous constituents of concern in the wastes proposed to be listed as K173 and K174. For K175, EPA is proposing a metals recovery requirement as the treatment standard, namely roasting and retorting. Although the mercury in K175 would be recovered, other treatment residuals will exist. For these residuals, we are proposing that existing UTS will be applicable.

Available information also shows that these wastes and the treatment residuals can be managed in existing treatment and reclamation units that routinely manage similar or as-difficult-to-treat hazardous wastes that currently are prohibited from land disposal. The BDAT background document provides further information on EPA's rationale for applying UTS to these wastes and the treatment standard of metals recovery to K175. Also see LDR Phase II final rule, 59 FR 47982, September 19, 1994, for a further discussion of UTS.

For proposed K173 and K174, EPA is proposing to regulate specific constituents from each of these hazardous wastes. A list of the proposed regulated hazardous constituents and

the proposed treatment limits can be found in the following preamble section and in the proposed regulatory Table 268.40—Treatment Standards for Hazardous Wastes. If EPA makes a final decision to list the identified wastes, these constituents and standards would apply.

EPA has provided in the BDAT background document a review of thermal and nonthermal technologies that can be used to meet the proposed numerical concentration limits for proposed K173 and K174, assuming the design and operation of these technologies are optimized. Since EPA is proposing numerical concentration limits, the use of other technologies capable of achieving the proposed treatment standards is allowed, except for those treatment or reclamation practices constituting land disposal or impermissible dilution (see 40 CFR 268.3). As noted above, EPA is proposing a specified technology-specific treatment standard for K175. K175 waste would therefore have to be treated by the required technology and the residues thereof or subsequent residues would have to meet numerical UTS concentration limits. [52]

D. Other LDR-Related Provisions

We propose that the provisions in 40 CFR 268.45 would also be applicable for the treatment and disposal of hazardous debris contaminated with proposed K173, K174, and K175. Hazardous debris treated in accordance with the provisions of 40 CFR 268.45 may be allowed for land disposal in a hazardous waste disposal facility. As a result, debris contaminated with proposed K173, K174, and K175 would be required to be treated prior to land disposal, using specific technologies from one or more of the following families of debris treatment technologies: extraction, destruction, or immobilization. Residuals generated from the treatment of debris contaminated with proposed K173, K174, or K175 will have to meet the applicable UTS limits proposed today. See 57 FR 37277, August 18, 1992, for additional information on the applicability, scope, and content of the hazardous debris provisions.

We note that, when the listings proposed today become final, the alternative soil treatment standards in 40 CFR 268.49 would be available for any soils contaminated with the newly listed wastes. Soils that must meet LDRs before land disposal may be treated to the levels in the alternative soil treatment standards as long as the soils will not be used in a manner constituting disposal. Even though EPA is proposing a method of treatment for K175, the waste contains an analyzable hazardous constituent. Consequently, the alternative treatment standards may apply and specify that the analyzable constituent must be at specified levels for soil contaminated with the waste to be disposed. See 268.49(c)(3)(B), promulgated at 63 FR 28751. Such soils can only be land disposed (here, recycled by being placed on the land) if they first meet UTS. See 63 FR 28609–28610 (May 26, 1988).

A facility is not required to use these alternative soil treatment standards and may elect to comply with the traditional LDR treatment standards for process waste. The choice of whether to do so potentially impacts how many constituents must meet LDR treatment standards. If a site chooses to meet the alternative soil treatment standards and their soils are contaminated with a listed waste, then they are required to treat both the regulated hazardous constituents specified in 268.40 and also any underlying hazardous constituents. Potential underlying hazardous constituents are listed in the UTS Table at 268.48. However, if the traditional treatment standards are applied to a soil contaminated with a listed waste, then only the regulated constituents specified in 268.40 must meet the treatment standards. For further discussion of the alternative soil treatment standards, please refer to the final Phase IV LDR rule (63 FR 28556, 28609, May 26, 1998) and the subsequent clarification notice (64 FR 25410–25411, May 11, 1999).

Lastly, because land disposal also includes placement in injection wells (40 CFR 268.2(c)) application of the land disposal restrictions to proposed K173, K174, and K175 requires the modification of injection well requirements found in 40 CFR 148. We propose that K167 and K168 be prohibited from underground injection. See 40 CFR 148. Therefore, wastes proposed to be listed as K173, K174, and K175 may not be underground injected unless they have been treated in compliance with the LDR treatment standards or a no migration petition for these wastes has been approved.

E. What Standards Is EPA Proposing for K173?

EPA is proposing to apply existing Universal Treatment Standards to proposed K173 wastes. We have examined the constituents that comprise the basis of the proposed listing and identified the presence of those other constituents near on in excess of current numerical universal treatment standards. Wastes that exceed these levels require treatment of the constituents to diminish the toxicity of the waste and to reduce the likelihood of migration of the hazardous constituents. Based on this examination, we propose treatment standards for bis(2-chloroethyl)ether, chloroform, pentachlorophenol, phenol, 2,4,6-trichlorophenol, chromium(total), and nickel in addition to tetrachlorodibenzodioxins, pentachlorodibenzodioxins, hexachlorodibenzodioxins, heptachlorodibenzodioxins, tetrachlorodibenzofurans, pentachlorodibenzofurans, hexachlorodibenzofurans, heptachlorodibenzofurans, OCDD, and OCDF in proposed K173.

Existing LDR standards for the wastes that contain chlorinated dibenzo-*para*-dioxins and dibenzofurans are expressed in terms of all tetrachlorodibenzo-*p*-dioxins, pentachlorodibenzo-*p*-dioxins, hexachlorodibenzo-*p*-dioxins, tetrachlorodibenzofurans, pentadibenzofurans, hexachlorodibenzofurans, OCDD, and OCDF. Today's notice proposes treatment standards for five additional dioxin/furan congeners, namely 1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin, 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,5,7,8,9-heptachlorodibenzofuran, OCDD, and OCDF. We are doing so because these constituents are present at concentrations that present significant risks should proposed hazardous waste K173 be mismanaged.

For proposed K173 nonwastewaters, we propose that the LDRs for the three new congeners (1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin, 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,5,7,8,9-heptachlorodibenzofuran, OCDD, and OCDF) be set at the quantitation limits of method 8280A. These quantitation limits are achievable routinely, and being 3 to 4 times the detection limit of residues from combustion, they are a reasonable approximation of 2.8 times the method detection limit normally used to develop treatment standards from detection limit data to account for

[52] There are two exceptions. Where the treatment technology is not appropriate to the waste, regulations provide a petition process whereby the generator or treatment facility may petition the Administrator for a variance. See 40 CFR 268.44. In addition, persons can petition the Administrator for an alternate treatment method by showing that the alternate method can achieve a measure of performance equivalent to the method specified by rule.

potential treatment variability.[53] Since method 8280A was first developed, the more sensitive high-resolution mass spectrometry method 8290 has been developed. Method 8290 may achieve detection limits orders of magnitude more sensitive than Method 8280A. However, we lack actual treatment performance data for these wastes using method 8290. Further, because of the trace levels of dioxins/furans that method 8290 is capable of detecting, we can not presume that combustion would achieve the much lower non-detectable levels of method 8290. Therefore, we are proposing to base treatment standards for the five congeners cited above on the more widely available method 8280A. We specifically invite data to be submitted on the levels that can be achieved using method 8290.

From past trial burns, we have confidence that incineration has been fully demonstrated for treating dioxin-containing wastes. As explained in 1989 solvents and dioxin rule, Method 8280A failed to detect chlorinated dibenzo-*p*-dioxins and dibenzofurans in residues from trial burns. This has led the Agency to conclude that the residual levels of chlorinated dibenzo-*p*-dioxins and dibenzofurans that remain after treatment would be well below the levels proposed. See 51 FR 1734, January 14, 1986. Therefore, for the three new congeners, we are proposing standards based on these data showing that high temperature thermal treatment achieved destruction of these constituents to levels below the stated quantitation limits of method 8280A.

For proposed K173 wastewaters, we propose that the UTS treatment level of 0.000035 mg/L for pentachlorodibenzofuran be transferred to 1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin, 1,2,3,4,6,7,8-heptachlorodibenzofuran, and 1,2,3,5,7,8,9-heptachlorodibenzofuran. Pentachlorodibenzofuran is a structural homologue of these constituents with similar physical properties, which allows us to assume similar treatment efficiencies. Similarly, we propose that the UTS treatment level of 0.000063 mg/L for tetrachlorodibenzofuran be transferred to OCDD and OCDF. For all other dioxin/furan congeners, we propose to transfer the current, corresponding universal treatment standards.

For the specific numerical standards proposed to be applicable to proposed K173, see the proposed amendments to 40 CFR 268.40 at the end of this preamble. We request comment on the proposed treatment standards for proposed K173.

F. What Standards Is EPA Proposing for K174?

EPA is proposing to apply existing Universal Treatment Standards (UTS) to these wastes. We have examined the constituents that comprise the basis of the proposed listing and identified the presence of those other constituents near on in excess of current numerical universal treatment standards. Waste that exceed these levels require treatment of the constituents to diminish the toxicity of the waste and to reduce the likelihood of migration of the hazardous constituents. Based on this examination, we propose that wastes proposed to be listed as K174 be treated for arsenic, tetrachlorodibenzo-*p*-dioxins, pentachlorodibenzo-*p*-dioxins, hexachlorodibenzo-*p*-dioxins, heptachlorodibenzo-*p*-dioxins, tetrachlorodibenzofurans, pentachlorodibenzofurans, hexachlorodibenzofurans, heptachlorodibenzofurans, OCDD, and OCDF. We are proposing to apply the new numerical standards for the five new congeners (one heptachlorodibenzo-*p*-dioxin, two heptachlorodibenzofurans, OCDD, and OCDF), discussed in the previous section, to proposed hazardous waste K174 because these constituents are also present in proposed K174 wastes at significant concentrations that would present risks should the wastes be mismanaged.

We request comment on the proposed treatment standards for wastes proposed to be listed as K174.

G. What Standards Is EPA Proposing for K175?

Proposed hazardous waste K175 is generated from the treatment of catalyst change-out wastewaters from the chlorination of acetylene on a mercuric chloride catalyst. As with the above wastes, we have examined the constituents that comprise the basis of the proposed listing and identified the presence of mercury as the only constituent that would require treatment to diminish the toxicity of the waste and to reduce the likelihood of migration. Proposed K175 contains in excess of 260 mg/kg mercury and is greater than one percent in organic constituents. This type of waste profile is similar to wastes that are currently deemed to be characteristically hazardous under the D009 waste code. Therefore, in assessing what type of LDR treatment standards are warranted for proposed K175, we look first to the D009 treatment standards.

Current regulations for similar D009 wastes require either retorting or roasting (RMERC) or incineration in units operated in accordance with the technical operation requirements of 40 CFR Part 264, Subpart O and Part 265, Subpart O (IMERC). However, current regulations do not require combustion units to capture and recover mercury from the combustion gases produced. If all the mercury contained in these wastes were combusted without capture and removal, the result would be over one metric ton per year of mercury emissions. Under the upcoming revisions to the hazardous waste combustion regulations, it is not clear that facilities are going to choose to employ air pollution control devices (capture and removal devices) to comply with mercury emission limits. They might instead simply choose to reduce their feed rate, which will not reduce the total amount of mercury emitted over the long term. Given this uncertainty about future compliance strategies by the hazardous waste combustion industry, we are proposing that mercury recovery by retorting or roasting (RMERC) be the required treatment technology for this waste. RMERC requires processing in devices subject to mercury emission controls resulting in mercury capture and removal, and also subject to emission standards such as the National Emissions Standard for Hazardous Air Pollutants (NESHAP) for mercury. See 40 CFR 268.42. For residues of the RMERC process, we propose to adopt the current standard of 0.20 mg/L TCLP mercury.

The Agency has contacted a treatment vendor of RMERC technology who indicated that treatment of the subject wastes may be difficult, but is possible.[54] We therefore request treatment performance data regarding the use of retorting for these waste.

Absent definitive treatment data, we have considered whether an alternative treatment standard to retorting might be feasible to propose for comment. One alternative is to establish a numerical concentration limit. Under current regulations, mercury wastes that are stabilized are subject to a standard of 0.025 mg/L TCLP mercury. This differs from the initial option of retorting in two key respects. First, use of specific treatment technology would not be required and, second, the treated waste or waste residuals would be subject to a numerical standard about one order of

[53] See Best Demonstrated Available Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology, EPA, October 23,1991.

[54] Personal communication with John Boyle, Bethlehem Apparatus Co., Inc.

magnitude more stringent—0.2 mg/L for retorting residuals under the first option vs. 0.025 mg/L for all treatment residuals under this second option.

Without the assurance of treatment that a requirement for retorting would provide, the tighter standard of 0.025 mg/L TCLP is appropriate to propose as a potential treatment standard. This standard would apply to all treatment residuals included in the listing description for proposed hazardous waste K175, regardless of the type of treatment used. In practice, this standard would involve the immobilization of the mercury in the waste before land disposal. If regulations were to be promulgated in this form, the waste could be land disposed if a standard of 0.025 mg/L TCLP mercury was achieved using any technology other than impermissible dilution.

Calculated solubilities of mercury sulfide (metacinnabar) as a function of pH have revealed that above pH 6.0 the presence of sulfide complexes results in significantly increased solubility.[55] Preliminary results from constant pH leaching measurements of the subject waste, as part of an on-going study, have shown similar results.[56] At pH 6.0 the waste tested leached 0.0058 mg/L. However, at pH 10, 1.63 mg/L mercury was solubilized. Current landfill disposal site conditions for this waste are reported to be pH 9.48–9.57.[57] Under these conditions, mercury in the waste would be expected to be mobilized especially if excess sulfides were present. Therefore, controlled treatment and disposal conditions are warranted to avoid mobilization of the mercury in the waste, which could pose a significant threat to human health and the environment. To insure operational stability of the treatment process and proper long-term disposal, EPA proposes two conditions as part of the LDR treatment standards. First, the waste residue generated, if in mercuric sulfide form, must itself be pH 6.0 or below. We therefore propose that mercuric sulfide residues of this waste be treated to attain a pH of less than or equal to 6.0. Second, if proposed K175 wastes are to be co-disposed in a landfill with other wastes, co-disposal will be restricted to wastes with similar pH (i.e., not greater than 6.0). To comply with these requirements disposal facilities would be required to certify and maintain operating records available for inspection of codisposed wastes to demonstrate compliance.

Currently, the wastes proposed to be listed as K175 are landfilled after treatment has converted mercuric chloride in wastewaters to mercuric sulfide. We believe significant opportunities exist for source reduction and waste minimization to reduce or eliminate the generation of this waste. For example, the need to hydroblast spent mercuric chloride catalyst from reactors could be eliminated by internal segmentation of the reactor bed that would allow the segments to be sent intact for mercury recovery. Thus, generation of the waste could be eliminated or significantly reduced. Beyond modifications to the physical plant, the treatment of the wash waters could be modified to incorporate addition of caustic and organic phase separation. This would result in a mercuric oxide sludge more amenable to recovery by retorting prior to sulfide treatment of the resulting brine. As a result of such changes, a smaller volume of mercuric sulfide sludge with reduced organic content would be generated, as would a larger volume of a more easily recoverable mercuric oxide sludge.

We request treatment performance data on the treatment standards proposed and on other alternative treatment technologies that would meet the statutory criteria for all LDR standards ''minimizing threats to human health and the environment by reductions in the toxicity or mobility of the wastes through the treatment process. We also request comment on the feasibility of source reduction and waste minimization alternatives described above.

H. What Other Land Disposal Restrictions Aspects Are There to the Proposal?

EPA is proposing to add the numerical standards derived for the 1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin, 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,4,7,8,9-heptachlorodibenzofuran, 1,2,3,4,6,7,8,9-octachlorodibenzo-*p*-dioxin (OCDD) and 1,2,3,4,6,7,8,9-octachlorodibenzofuran (OCDF) to the Table of Universal Treatment Standards (UTS) at 40 CFR 268.48. These constituents have been shown to represent significant risks to human health or the environment in the risk assessment accompanying this proposal, and their presence in other wastes should be mitigated to avoid similar risks. If promulgated, all characteristic wastes which have these constituents as underlying hazardous constituents above the UTS thus will require treatment of those constituents before land disposal.

Furthermore, we are proposing that the constituents 1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin; 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,4,7,8,9-heptachlorodibenzofuran; OCDD; and OCDF be added to the list of regulated constituents in hazardous waste F039 multisource leachate. F039 applies to multiple listed hazardous waste landfill leachates in leu of the original waste codes, and F039 wastes are subject to all numerical treatment standards applicable to all listed wastes. To maintain regulatory consistency with this regulatory architecture and the implementation benefits of having one waste code for multisource leachate, the treatment standards for F039 are updated each time a new LDR standard is developed for listed wastes. As a result, if today's proposal is ultimately promulgated, all leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted hazardous waste will have to meet UTS for all hazardous constituents above the UTS.

I. Is There Treatment Capacity for the Proposed Wastes?

1. What Is a Capacity Determination?

EPA must determine whether adequate alternative treatment capacity exists nationally to manage the wastes subject to LDR treatment standards. RCRA section 3004 (h)(2). Thus, LDRs are effective when the new listings are effective as well (typically 6 months after the new listings are published in the **Federal Register**), unless EPA grants a national capacity variance from the otherwise-applicable date and establishes a different date (not to exceed two years beyond the statutory deadline) based on ''* * * the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available'' (RCRA section 3004(h)(2), 42 U.S.C. 6924(h)(2)).

Our capacity analysis methodology focuses on the amount of waste currently disposed on the land, which will require alternative or additional treatment as a result of the LDRs. The quantity of wastes that is not disposed

[55] H. Lawrence Clever, Susan A. Johnson, and M. Elizabeth Derrick, The Solubility of Mercury and Some Sparingly Soluble Mercury Salts in Water and Aqueous Electrolyte Solutions, J. Phys. Chem. Ref. Data, Vol. 14, No. 3, 1985, page 652.

[56] Paul Bishop, Renee A. Rauche, Linda A. Rieser, Markram T. Suidan, and Jain Zhang; ''Stabilization and Testing of Mercury Containing Wastes,'' Draft, Department of Civil and Environmental Engineering, University of Cincinnati, March 31, 1999. Please note that this is a draft EPA document not yet peer reviewed. Also, data within the report is still undergoing QA/QC review, and the text, data, and conclusions in the report may change before the document is finalized.

[57] May 14, 1999, landfill parameters, e-mail from Mitch Hahn, Waste Management.

on the land, such as discharges regulated under NPDES, discharges to a POTW, or treatment in a RCRA-exempt tank, is not included in the quantities requiring additional treatment as a result of the LDRs. Also, land-disposed wastes that do not require alternative or additional treatment are excluded from the required capacity estimates (i.e., those that currently are treated to meet the LDR treatment standards). Land-disposed wastes requiring alternative or additional treatment or recovery capacity that is available on site or within the same company also are excluded from the required commercial capacity estimates. The resulting estimates of required commercial capacity then are compared to estimates of available commercial capacity. If adequate commercial capacity exists, the waste is restricted from further land disposal. If protective alternative capacity does not exist, EPA has the authority to grant a national capacity variance.

In making the estimates described above, the volume of waste requiring treatment depends on the current waste management practices employed by the waste generators before this proposed regulation is promulgated and becomes effective. Data on waste management practices for these wastes were collected during the development of this proposed rule. However, we realize that as the regulatory process proceeds, generators of these wastes may decide to minimize or recycle their wastes or otherwise alter their management practices. Thus, we will monitor changes and update data on current management practices as these changes will affect the volume of wastes ultimately requiring commercial treatment or recovery capacity.

The commercial hazardous waste treatment industry can change rapidly. For example, national commercial treatment capacity changes as new facilities come on line or old facilities go off line, and as new units and new technologies are added at existing facilities. The available capacity at commercial facilities also changes as facilities change their commercial status (e.g., changing from a fully commercial to a limited commercial or ''captive''—company owned—facility). Thus, EPA also continues to update and monitor changes in available commercial treatment capacity.

We request data on the annual generation volumes and characteristics of wastes affected by this proposed rule, including proposed hazardous wastes K173, K174, and K175 in wastewater and nonwastewater forms, soil or debris contaminated with these wastes, residuals generated from the treatment or recycling of these wastes, and the current and planned management practices for the wastes, waste mixtures, and treatment residuals.

We also request data on the current treatment or recovery capacity capable of treating these wastes, facility and unit permit status related to treatment of the proposed wastes and any plans that facilities may have to expand or reduce existing capacity, or construct new capacity. Of particular interest to us are waste characteristics, such as pH, total organic carbon content, constituent concentrations, and physical forms that may limit the availability of certain treatment technologies. Also of interest are any analytical difficulties associated with identifying and monitoring the regulated constituents in these wastes.

2. What are the Capacity Analysis Results?

This preamble only provides a brief summary of the capacity analysis performed to support this proposed regulation. For additional and more detailed information, please refer to the ''Background Document for Capacity Analysis for Land Disposal Restrictions: Newly Identified Chlorinated Aliphatics Process Wastes (Proposed Rule), July 1999.''

For this capacity analysis, we examined data on waste characteristics and management practices gathered for the purpose of the chlorinated aliphatics hazardous waste listing determination. The source for these data is primarily the 1992 RCRA Section 3007 survey and the follow-up survey specific to these wastes conducted in 1997 (see the docket for this proposed regulation for more information on these survey instruments).

The available data sources indicate that proposed K173 wastes are predominantly wastewaters, but may exhibit total suspended solids content greater than 1 percent, such that they would be classified as nonwastewaters with respect to the LDR requirements (40 CFR 268.2). EPA has found that most facilities generating proposed K173 manage these wastes in tank-based systems prior to a permitted discharge to a surface water or POTW. The non-CBI portions of the Section 3007 survey responses, as well as other publicly available information, indicate that certain facilities manage proposed K173 using underground injection with existing approved no-migration determinations. Proposed K173 managed by land disposal units may require alternative treatment if onsite management to meet the LDR standards or alternative onsite management is not available. EPA expects that sufficient offsite treatment capacity is available to manage proposed K173 generated by these facilities. Specifically, EPA estimates that approximately 37 million tons per year of offsite wastewater treatment capacity are available, which is well above the quantity of proposed K173 generated by these facilities. Therefore, sufficient commercial capacity exists to manage proposed K173 from these facilities should the need for treatment of proposed K173 wastes arise.

As discussed in this section earlier, the LDR treatment standards become effective essentially at the same time a listing does unless EPA grants a national capacity variance because of a lack of available treatment capacity (see RCRA section 3004(h)(2)). Also, RCRA allows generators to apply for an extension to the LDR effective date on a case-by-case basis for specific wastes generated at a specific facility for which there is not adequate capacity (RCRA section 3004(h)(3)). For those facilities managing proposed K173 wastes, they may choose to meet treatment standards by onsite or offsite treatment, submit a modified no-migration petition to include newly listed wastes if necessary, or transport their wastes to a commercial Class I hazardous disposal well facility.

Based on EPA's information, the facilities managing proposed K173 wastes by underground injection have existing approved no-migration determinations. If an injection well has received a no-migration determination, it can inject a newly prohibited waste if the waste is similar to wastes included in the initial no-migration petition (63 FR 28626, May 26, 1998). EPA has information showing that the facilities already manage these newly-proposed K173 wastes in their underground injection wells. Further, EPA's sampling and analysis results for wastewater from one of the facilities shows that none of the constituents being proposed for inclusion in 40 CFR 268.40 for proposed K173 (i.e., numerical treatment standards) were present at concentrations greater than the proposed numerical treatment standards. This suggests that for this facility, the newly-proposed treatment standards for proposed K173 might already be met.

Based on the available data presented above, EPA is not proposing a national capacity variance for surface-disposed or underground-injected proposed K173 wastes. However, EPA recognizes that there are uncertainties in the available data such that a facility may require extra time (beyond the effective date) to

comply with the new listing and land disposal restrictions requirements, if finalized. For example, EPA realizes that proposed K173 can be variable in composition and not always exhibit concentrations below the proposed numerical treatment standards. Also, any facility with an approved no-migration determination without the waste already incorporated in the determination may need to submit a modified petition (40 CFR Part 148.20 (f)). Potentially, the modification process for the existing no-migration petition, as well as the permit modification itself, may be time-consuming. There are potential logistical difficulties associated with accessing available treatment capacity for wastewater, as well. For example, if a facility generates high volumes of proposed K173 and cannot manage the waste onsite in a manner compliant with the LDR standards, they may need to make considerable logistical adjustments such as repiping, retooling, and development of transportation networks at the plant in order to ship the wastewater offsite for treatment or disposal. Additionally, although commercial treatment or disposal capacity is available, the logistics of transporting high volumes of wastewater may be problematic, particularly if existing piping, onsite storage, or loading are not in place. Should these difficulties arise such that both onsite and offsite treatment and disposal are not available for facilities currently using underground injection, EPA will consider all available data and information provided during the public comment period and revise its capacity analysis accordingly in making the final capacity determination.

For K174 wastes, the available data sources indicate that there is no quantity of the wastewater form of K174 that will require alternative commercial treatment. There is adequate wastewater treatment capacity available should the need for treatment of the wastewater form of K174 arise. From the available data sources, required alternative treatment capacity for K174 nonwastewater may be as low as 1,900 tons per year if most generators meet the proposed requirements for contingent management listing. If the generators do not manage K174 nonwastewater according to contingent management for the listing designation, the waste generated must meet LDR standards before land disposal, and the total quantity requiring treatment may be up to 106,000 tons per year. As described in the BDAT section above, we are proposing that numerical treatment standards be applied to K174 nonwastewaters. These standards were derived by estimating the concentration level following use of combustion technologies. We estimate that the commercially available sludge and solid combustion capacity is at least 300,000 tons per year and therefore sufficient to treat the proposed K174 hazardous waste that would require treatment. Therefore, EPA is proposing not to grant a capacity variance for K174 nonwastewaters or wastewaters.

For wastes proposed to be listed as K175, the available data sources indicate that there is no quantity of the wastewater form of proposed K175 that will require alternative commercial treatment. There is adequate wastewater treatment capacity available should the need for treatment of the wastewater form of K175 arise. For nonwastewater form of proposed K175, EPA estimates that up to 130 tons per year may require alternative commercial treatment. As described in the BDAT section above, two options are proposed as the treatment standard. In one option, the treatment standard was proposed as a technology standard (RMERC), with residues meeting a concentration level. We have identified at least one facility that operates commercially and that potentially can be used for the treatment of wastes proposed to be listed as K175; there are other treaters which conduct RMERC and the details are discussed in the Capacity Analysis Background Document. We recognize that treatment residuals from these wastes may require additional treatment capacity (e.g., stabilization of the ash following combustion of the wastes) to achieve the UTS for any metal constituents that may be present in the residuals. We estimate that there is several million tons per year of commercial stabilization capacity available. In the second option for nonwastewater form of proposed K175 described in the BDAT section above, the treatment standard would be a numerical standard followed by certain landfill restrictions. EPA expects that commercial treaters can customize their treatment process to immobilize the waste, attain a pH of less than 6.0, and meet the treatment standard. Therefore, sufficient commercial treatment capacity exists for this proposed K175 hazardous waste. EPA is proposing to not grant a national capacity variance from LDR treatment standards for nonwastewater or wastewater forms of proposed K175.

Also, the ultimate volumes of wastes estimated to require alternative or additional commercial treatment may change if the final listing determinations change; should this occur, we will revise the capacity analysis accordingly.

For soil and debris contaminated with these wastes, EPA believes that the vast majority of contaminated soil and debris contaminated with these wastes will be managed on site and therefore will not require substantial commercial treatment capacity. Therefore, we are not proposing to grant a national capacity variance for hazardous soil and debris contaminated with the newly listed wastes covered under this proposal. Based on the 1992 RCRA 3007 Survey questionnaire responses and 1997 updated responses, there are no data showing mixed radioactive wastes associated with the proposed listings. We are not proposing to grant a national capacity variance for mixed radioactive wastes (i.e., radioactive wastes mixed with proposed K173, K174, or K175) or soil and debris contaminated with these mixed radioactive wastes. As discussed in this section earlier, EPA also is not proposing to grant a national capacity variance for proposed K173, K174, or K175 wastes being surface-disposed or underground injected.

EPA requests comments on current and future management practices and the volumes managed for these wastes. Also, we request comments on other commercially-available thermal and non-thermal treatment or recovery capacity that would achieve proposed LDR treatment standards for these wastes and on chemical and physical constraints of treatment technologies for the wastes. Specifically, EPA requests comments on its proposal to not grant a capacity variance for proposed K173 waste. EPA solicits comments on physical and chemical characteristics of proposed K173 wastes, any treatment problems before disposing of proposed K173, the time and necessary procedures required for permit modifications for proposed K173 generators or commercial treatment or disposal facilities, required changes for operating practices, and any specific difficulties in making treatment capacity unavailable that would warrant a variance. For nonwastewater form of proposed K175, we solicit any information regarding the availability of RMERC for treating the wastes, and regarding chemical and physical constraints to meet numerical standards and pH restriction for this waste.

IV. Compliance Dates

A. Notification

Under RCRA Section 3010 any person generating, transporting, or managing a hazardous waste must notify EPA (or an authorized State) of its activities.

Section 3010(a) allows EPA to waive, under certain circumstances, the notification requirements under Section 3010 of RCRA. EPA is proposing to waive the notification requirement as unnecessary for persons already identified within the hazardous waste management universe (i.e., persons who have an EPA identification number under 40 CFR 262.12). EPA is not proposing to waive the notification requirement for waste handlers who have neither notified the Agency that they may manage hazardous wastes nor received an EPA identification number. Such individuals will have to provide notification under Section 3010. Any person who generates, transports, treats, stores, or disposes of these wastes and has not previously received an EPA identification number, must do so within 90 days of the effective date of the final rule.

B. Interim Status and Permitted Facilities

Today's proposed rule is being proposed under the authorities granted to EPA under HSWA. Because HSWA requirements are applicable in authorized States at the same time as in unauthorized States, EPA will regulate the newly identified wastes listed under HSWA until States are authorized to regulate these wastes. Thus, once this regulation becomes effective as a final rule, EPA will apply Federal regulations to these wastes and to their management in both authorized and unauthorized States.

VII. State Authority

A. Applicability of Rule in Authorized States

Under Section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. (See 40 CFR Part 271 for the standards and requirements for authorization.) Following authorization, EPA retains enforcement authority under Sections 3007, 3008, 3013, and 7003 of RCRA, although authorized States have primary enforcement responsibility.

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

By contrast, under Section 3006(g) of RCRA, 42 U.S.C. 6926(g), new requirements and prohibitions imposed by the HSWA (including the hazardous waste listings proposed in this notice) take effect in authorized States at the same time that they take effect in non-authorized States. EPA is directed to implement those requirements and prohibitions in authorized States, including the issuance of permits, until the State is granted authorization to do so. While States must still adopt HSWA-related provisions as State law to retain final authorization, the Federal HSWA requirements apply in authorized States until the States revise their program and receive authorization for the revisions.

B. Effect on State Authorizations

Because this proposal (with the exception of the actions proposed under CERCLA authority) will be promulgated pursuant to the HSWA, a State submitting a program modification is able to apply to receive either interim or final authorization under Section 3006(g)(2) or 3006(b), respectively, on the basis of requirements that are substantially equivalent or equivalent to EPA's requirements. The procedures and schedule for State program modifications under Section 3006(b) are described in 40 CFR 271.21. It should be noted that all HSWA interim authorizations are currently scheduled to expire on January 1, 2003 (see 57 *FR* 60129, February 18, 1992).

Section 271.21(e)(2) of EPA's State authorization regulations (40 CFR Part 271) requires that states with final authorization modify their programs to reflect Federal program changes and submit the modifications to EPA for approval. Once EPA approves the modification, the State requirements become RCRA subtitle C requirements. Because this rule would be promulgated pursuant to HSWA, if the proposal is adopted as a final rule, Table 1 at 40 CFR 271.1 will be amended accordingly. If finalized, EPA will implement this rule in all States, including authorized States, until the States modify their authorized programs to reflect this rule.

VIII. Designation of Chlorinated Aliphatic Wastes (Proposed K173, K174 and K175) Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

A. What Is the Relationship Between RCRA and CERCLA?

CERCLA defines the term ''hazardous substance'' to include RCRA hazardous wastes. When EPA adds a hazardous waste under RCRA, the Agency also will add the waste to its list of CERCLA hazardous substances. EPA establishes a reportable quantity or RQ for each CERCLA hazardous substance. EPA provides a list of the CERCLA hazardous substances along with their RQs in Table 302.4 at 40 CFR 302.4. If you are the person in charge of a vessel or facility that releases a CERCLA hazardous substance in an amount that equals or exceeds its RQ, then you must report that release to the National Response Center (NRC). You also may have to notify State and local authorities.

B. Is EPA Proposing To Add Chlorinated Aliphatic Wastes to CERCLA?

Yes. Today, EPA is proposing to add chlorinated aliphatic wastes (Proposed K173, K174 and K175) to the list of CERCLA hazardous substances. As discussed below, EPA also proposes to adjust the RQs for these wastes.

C. How Does EPA Determine Reportable Quantities?

Under CERCLA, all new hazardous substances automatically have a statutory one-pound RQ. EPA adjusts the RQ of a newly added hazardous substance based on an evaluation of its intrinsic physical, chemical, and toxic properties. These intrinsic properties—called ''primary criteria''—are aquatic toxicity, mammalian toxicity (oral, dermal, and inhalation), ignitability, reactivity, chronic toxicity, and potential carcinogenicity. EPA evaluates the data for a hazardous substance for each primary criterion. To adjust the RQs, EPA ranks each criterion on a scale that corresponds to an RQ value of 1, 10, 100, 1,000, or 5,000 pounds. For each criterion, EPA establishes a tentative RQ. A hazardous substance may receive several tentative RQ values based on its particular intrinsic properties. The lowest of the tentative RQs becomes the ''primary criteria RQ'' for that substance.

After the primary criteria RQs are assigned, EPA further evaluates substances for their susceptibility to certain degradative processes. These are secondary adjustment criteria. The

natural degradative processes are biodegradation, hydrolysis, and photolysis (BHP). If a hazardous substance, when released into the environment, degrades rapidly to a less hazardous form by one or more of the BHP processes, EPA generally raises its RQ (as determined by the primary RQ adjustment criteria) by one level. Conversely, if a hazardous substance degrades to a more hazardous product after its release, EPA assigns an RQ to the original substance equal to the RQ for the more hazardous substance.

The standard methodology used to adjust the RQs for RCRA hazardous waste streams differs from the methodology applied to individual hazardous substances. The procedure for assigning RQs to RCRA waste streams is based on the results of an analysis of the hazardous constituents of the waste streams. The constituents of each RCRA hazardous waste stream are identified in 40 CFR Part 261, Appendix VII. EPA first determines an RQ for each hazardous constituent within the waste stream using the methodology described above. The lowest RQ value of these constituents becomes the adjusted RQ for the waste stream. When there are hazardous constituents of a RCRA waste stream that are not CERCLA hazardous substances, the Agency develops an RQ, called a ''reference RQ,'' for these constituents in order to assign an appropriate RQ to the waste stream (see 48 FR 23565, May 25, 1983). In other words, the Agency derives the RQ for waste streams based on the lowest RQ of all of the hazardous constituents, regardless of whether they are CERCLA hazardous substances.

D. When Do I Need To Report a Release of Proposed K173, K174 or K175 Under CERCLA?

Today, EPA is proposing to adjust statutory RQs for the proposed K173, K174 or K175 waste streams to one pound based on their hazardous constituents. EPA is proposing to adjust the RQ at one pound for the proposed K173 and K174 waste streams based on their hazardous constituents, chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs). EPA is proposing to adjust the RQ at one pound for the proposed K175 waste stream based on its hazardous constituent, mercury. However, in determining when to report a release of proposed K173, K174 or K175, EPA is proposing to allow you to apply the mixture rule, codified in 40 CFR 302.6, using the maximum observed concentrations of the hazardous constituents within the respective waste streams.

The mixture rule provides that ''discharges of mixtures and solutions are subject to RQ regulations only where a component hazardous substance of the mixture or solution is discharged in a quantity equal to or greater than its RQ'' (44 FR 50767, August 29, 1979). Therefore, if the concentration of a hazardous constituent is known, the amount of release needed to reach its RQ can be calculated. By using the maximum observed concentration that EPA is proposing today, you may apply the mixture rule, even if you don't know the concentration of constituents released. That is, if you are the person in charge, you must immediately report the release as soon as you know that you have released proposed K173, K174 or K175 in an amount that will reach the RQ for the waste stream. This approach is reasonable and conservative because the sampling data presented in the Listing Background Document accurately identify the maximum observed concentrations of the hazardous constituents in the chlorinated aliphatics waste streams. Table VIII–1 below identifies the hazardous constituents for each waste stream, their maximum observed concentrations in parts per million (ppm), and their constituents' RQs or reference RQs.

TABLE VIII–1.—MAXIMUM OBSERVED CONCENTRATION AND CORRESPONDING RQ FOR HAZARDOUS CONSTITUENTS THAT ARE BASIS FOR LISTING PROPOSED K173, K174, AND K175

Waste	Constituent	Max. Concentration (ppm (mg/kg))	RQ (lb)
K173	2,3,7,8–TCDD	0.000000017	1
	1,2,3,7,8–PeCDD	0.00000015	1
	1,2,3,4,7,8–HxCDD	0.00000012	1
	1,2,3,6,7,8–HxCDD	0.00000091	1
	1,2,3,7,8,9–HxCDD	0.00000092	1
	1,2,3,4,6,7,8–HpCDD	0.000044	1
	OCDD	0.00022	1
	2,3,7,8–TCDF	0.00000045	1
	1,2,3,7,8–PeCDF	0.0000012	1
	2,3,4,7,8–PeCDF	0.0000015	1
	1,2,3,4,7,8–HxCDF	0.000042	1
	1,2,3,6,7,8–HxCDF	0.000045	1
	1,2,3,7,8,9–HxCDF	0.000014	1
	2,3,4,6,7,8–HxCDF	0.000027	1
	1,2,3,4,6,7,8–HpCDF	0.0013	1
	1,2,3,4,7,8,9–HpCDF	0.00017	1
	OCDF	0.006	1
	Chloroform	7.1	10
K174	2,3,7,8–TCDD	0.000039	1
	1,2,3,7,8–PeCDD	0.0000108	1
	1,2,3,4,7,8–HxCDD	0.000024	1
	11,2,3,6,7,8–HxCDD	0.000083	1
	1,2,3,7,8,9–HxCDD	0.000062	1
	1,2,3,4,6,7,8–HpCDD	0.00123	1
	OCDD	0.0129	1
	2,3,7,8–TCDF	0.000145	1
	1,2,3,7,8–PeCDF	0.0000777	1
	2,3,4,7,8–PeCDF	0.000127	1
	1,2,3,4,7,8–HxCDF	0.001425	1
	1,2,3,6,7,8–HxCDF	0.000281	1

TABLE VIII–1.—MAXIMUM OBSERVED CONCENTRATION AND CORRESPONDING RQ FOR HAZARDOUS CONSTITUENTS THAT ARE BASIS FOR LISTING PROPOSED K173, K174, AND K175—Continued

Waste	Constituent	Max. Concentration (ppm (mg/kg))	RQ (lb)
	1,2,3,7,8,9–HxCDF	0.00014	1
	2,3,4,6,7,8–HxCDF	0.000648	1
	1,2,3,4,6,7,8–HpCDF	0.0207	1
	1,2,3,4,7,8,9–HpCDF	0.0135	1
	OCDF	0.212	1
K175	Mercury	9200	1

For example, if proposed K173 is released from your facility and you do not know the actual concentrations of its constituents, you may assume that the concentrations are those identified in Table VIII–1. Thus, applying the mixture rule to the assumed maximum concentrations indicated in the table, you would have to release 1,408,450 pounds to reach the RQ for this waste (based on the maximum observed concentration of chloroform). If proposed K174 waste is released from your facility and you do not know the actual concentrations of its constituents, you may apply the mixture rule to the assumed maximum concentrations indicated in the table. You would have to release 4,716,981 pounds of proposed K174 to reach the RQ for this waste (based on the maximum observed concentration of OCDF). If proposed K175 is released from your facility and you do not know the actual concentration of mercury, you may assume that the concentration is 9200 ppm. Applying the mixture rule, you would have to release 108.7 pounds of this waste to reach the RQ.

E. What if I Know the Concentration of the Constituents in My Waste?

If you know the concentration levels of all the hazardous constituents in a particular chlorinated aliphatic waste, you may apply the mixture rule (see 40 CFR 302.6(b)) to the actual concentrations. You would need to report a release of either waste when an RQ or more of any of their respective hazardous constituents is released.

F. How Did EPA Determine the RQs for Proposed K173, K174 and K175 and Their Hazardous Constituents?

The hazardous constituents identified as the basis for listing the proposed K173 and K174 waste streams include chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs). Previously, EPA had established an adjusted RQ of one pound for 2,3,7,8–TCDD (see 54 FR 33426). EPA has not established adjusted RQs for the other CDD and CDF congeners. However, EPA recognizes that a number of these congeners exhibit dioxin-like toxicity and has established ''reference RQs'' of one pound for these congeners to support the development of the adjusted RQs for the proposed K173 and K174 waste streams.

The adjusted RQ for 2,3,7,8–TCDD was established as one pound based on potential carcinogenicity, considering the weight of evidence that this substance is carcinogenic, and considering its estimated carcinogenic potency. To establish reference RQs for the other CDD and CDF congeners in the waste stream, EPA applied the toxicity equivalency factors (TEFs) established for dioxin-like compounds to the potency factor used as the basis for the adjusted RQ for 2,3,7,8–TCDD. Of the 210 CDD and CDF congeners, only those with chlorine substitutions in, at least, the 2, 3, 7, and 8 positions (a total of 17 CDD and CDF congeners) are considered to have dioxin-like toxicity. Applying the TEFs established for these 17 congeners to the potency factor established for 2,3,7,8–TCDD indicates that all of the congeners fit into RQ Potency Group 1 with a corresponding reference RQ of one pound.[58] Therefore, because each of the hazardous constituents has an RQ or reference RQ of one pound, EPA is proposing to establish an adjusted RQ of one pound for the proposed K173 and K174 waste streams.

The hazardous constituent identified as the basis for proposing to list the K175 waste stream is mercury. Previously, EPA had established an adjusted RQ of one pound for mercury (see 50 FR 13456, April 4, 1985). Because the hazardous constituent used as the basis for listing the K175 waste stream has an RQ of one pound, EPA is proposing to establish an adjusted RQ of one pound for this waste.

G. How Do I Report a Release?

To report a release of proposed K173, K174 or K175 (or any other CERCLA hazardous substance) that equals or exceeds its RQ, you must immediately notify the National Response Center (NRC) as soon as you have knowledge of that release. The toll-free telephone number of the NRC is 1–800–424–8802; in the Washington, DC, metropolitan area, the number is (202) 267–2675.

You also may have to notify State and local authorities. The Emergency Planning and Community Right-to-Know Act (EPCRA) requires that owners and operators of certain facilities report releases of CERCLA hazardous substances and EPCRA extremely hazardous substances (see list in 40 CFR Part 355, Appendix A) to State and local authorities. After the release of an RQ or more of any of those substances, you must report immediately to the community emergency coordinator of the local emergency planning committee for any area likely to be affected by the release, and to the State emergency response commission of any State likely to be affected by the release.

H. What Is the Statutory Authority for This Program?

Section 101(14) of CERCLA defines the term hazardous substance by referring to substances listed under several other environmental statutes, as well as those substances that EPA designates as hazardous under CERCLA Section 102(a). In particular, CERCLA Section 101(14)(C) defines the term hazardous substance to include ''any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act.'' CERCLA Section 102(a) gives EPA authority to establish RQs for CERCLA hazardous substances. CERCLA Section 103(a) requires any person in charge of a vessel or facility that releases a CERCLA hazardous substance in an amount equal to or

[58] For an explanation of how potency factors are calculated and potency groups and RQs are established, see the Technical Background Document to Support Rulemaking Pursuant to CERCLA Section 102, Volume 3, July 27, 1989. This document can be viewed by calling the EPA Superfund Docket Center, 703–603–8917, and requesting document number 102 RQ 273C.

greater than its RQ to report the release immediately to the federal government. EPCRA Section 304 requires owners or operators of certain facilities to report releases of CERCLA hazardous substances and EPCRA extremely hazardous substances to State and local authorities.

I. How Can I Influence EPA's Thinking on Regulating Proposed K173, K174 and K175 Under CERCLA?

In developing this proposal, EPA tried to address the concerns of all our stakeholders. Your comments will help us to improve this proposal. We invite you to provide your views on this proposal and how it may affect you. We also are interested in receiving any comments that you have on the information provided in Table VIII–1, including the hazardous constituents identified for proposed K173, K174 and K175 and the maximum observed concentrations for each constituent.

IX. Administrative Assessments

A. Executive Order 12866

Under Executive Order 12866 (September 30, 1993), EPA must determine whether a regulatory action is ''significant'' and, therefore, subject to OMB review and the other provisions of the Executive Order. A significant regulatory action is defined by Executive Order 12866 as one that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or rights and obligations or recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in Executive Order 12866.

Pursuant to the terms of Executive Order 12866, EPA has determined that this rule is a ''significant regulatory action'' because of point four (4) above: The rule raises two novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order. Today's proposed rule, which includes proposed alternative listing approaches for two wastestreams deviates from the Agency's standard or historic listing approach in the following two ways:

- *Targeted wastestream listing:* Historically, the Agency's listing program captured entire quantities of targeted wastestream posing unacceptable risks to human health and the environment. Today's proposed listing approach for two wastestreams (i.e., EDC/VCM wastewater treatment sludges and one alternative option for VCM–A wastewater treatment sludges) proposes listing as hazardous only those quantities of the waste that are managed in a manner that reflects unacceptable risks.
- *Wastewater treatment units:* In addition, today's action proposes to change a long-standing Agency policy of exempting from RCRA regulation the management of hazardous wastes in wastewater treatment units regulated under § 402 or § 307(b) of the Clean Water Act. To address the risks associated with the wastewaters proposed to be listed as hazardous under today's action, the Agency believes that it is necessary to regulate these management units when used to manage chlorinate aliphatic wastewaters, to ensure against hazardous air emissions from this wastestream. (In section III.E.1.a.vi. of today's preamble, EPA is requesting comment on this approach.)

Due to the Agency's decision to propose a deviation from our historical hazardous waste listing approach and to change our long-standing policy regarding the regulation of wastewater treatment units, the Agency is deeming today's action to be ''significant'' and is submitting these proposed policy changes to OMB for review. Changes made to the Agency's proposed actions in response to OMB suggestions or recommendations are documented in the public record.

Although today's proposed rule is not ''economically significant,'' the Agency prepared an ''Economic Background Document'' in support of today's rule. The Agency's economic assessment addresses, among other factors, industry compliance costs, industry financial impacts, and potential for small entity impacts. A summary of findings from our economic assessment is presented in Section IV. The complete Economic Background Document is available for public review from the RCRA docket, according to instructions provided in the introduction to this preamble.

B. Regulatory Flexibility Act

Pursuant to the 1980 Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment, a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). However, regulatory flexibility analysis is not required if the head of an agency certifies that the rule will not have a ''significant'' economic impact on a substantial number of small entities.

SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a ''significant'' economic impact on a substantial number of small entities. The following discussion explains EPA's determination.

EPA has examined this rule's potential effects on small entities as required by the RFA/SBREFA, and has determined that this action will not have a significant economic impact on a substantial number of small entities. This is evidenced by the fact that only one of the potentially affected, parent companies determined to be producers of chlorinated aliphatic products in the U.S., may be classified as a ''small business,'' according to the U.S. Small Business Administration's employee size standards (i.e., less than or equal to 1,000 employees) and according to that company's primary Standard Industrial Classification (SIC) code (SIC 2869).

I hereby certify that this rule will not have a significant economic impact on a substantial number of small entities. This rule, therefore, does not require a regulatory flexibility analysis.

C. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* An Information Collection Request (ICR) document was prepared by EPA (ICR No. 1924.01) and a copy may be obtained from Sandy Farmer by mail at OP Regulatory Information Division; U.S. Environmental Protection Agency (2137); 401 M Street, S.W.; Washington, D.C. 20460, by E-mail at *farmer.sandy@epamail.epa.gov*, or by calling (202) 260–2740. A copy also may be downloaded off the Internet at http://www.epa.gov/icr.

This proposed rule includes new information collection requirements subject to OMB review under the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.* In addition to complying with the existing subtitle C recordkeeping and reporting requirements for the newly listed waste streams, EPA is proposing that facilities generating chlorinated aliphatic wastewaters comply with testing requirements. In conjunction with testing requirements, we are proposing that generators maintain documentation of detailed standard operating procedures for the sampling and

analysis protocols that were employed, sensitivity and bias of the measurement process, precision of the results, and the analytical results from testing events. These requirements are being proposed to ensure generators are complying with the proposed technical standards for controlling air emissions of dioxins from wastewater treatment tanks.

EPA also is proposing that generators be able to document their compliance with the conditions provided for exclusion from the scope of the two conditional hazardous waste listings proposed in today's notice. This requirement is necessary to ensure that both EDC/VCM wastewater treatment sludges and VCM–A wastewater treatment sludges are managed in a manner that is safe for human health and the environment. In addition, EPA is requiring′ disposal facilities that manage VCM–A wastewater treatment sludges to maintain records documenting that these sludges are co-disposed only with other wastes that have a pH level of 6.0 or lower. This requirement is necessary to ensure that the mercury contained in the waste does not leach from the waste after disposal.

The Agency estimated the burden associated with complying with the requirements in this proposed rule. Included in the ICR are the burden estimates for the following requirements for industry respondents: reading the regulations; performing testing and waste analyses; keeping records of testing results; completing and submitting certifications; incorporating testing and waste analysis requirements into permits; keeping records documenting compliance with conditions for exclusion from hazardous waste listings; and keeping records documenting compliance with landfill waste disposal requirements for the disposal of VCM–A wastewater treatment sludges. Included also are the burden estimates for State respondents for applying for State authorization. The Agency determined that all of this information is necessary to ensure compliance with today's proposed rule.

To the extent that this rule imposes any information collection requirements under existing RCRA regulations promulgated in previous rulemakings, those requirements have been approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, and have been assigned OMB control numbers 2050–0009 (ICR No. 1573, Part B Permit Application, Permit Modifications, and Special Permits); 2050–0120 (ICR No. 1571, General Facility Hazardous Waste Standards); 2050–0028 (ICR No. 261, Notification of Hazardous Waste Activity); 2050–0034 (ICR No. 262, RCRA Hazardous Waste Permit Application and Modification, Part A); 2050–0039 (ICR No. 801, Requirements for Generators, Transporters, and Waste Management Facilities under the Hazardous Waste Manifest System); 2050–0035 (ICR No. 820, Hazardous Waste Generator Standards); and 2050–0024 (ICR No. 976, 1997 Hazardous Waste Report).

EPA estimates that the projected annual hour burden for industry respondents will be 1,088 hours, and cost of $184,186. Total estimates over three years are 3,264 hours and $552,558.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and use technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR Part 9 and 48 CFR Chapter 15.

Comments are requested on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques. Send comments on the ICR to the Director, OP Regulatory Information Division; U.S. Environmental Protection Agency (2137); 401 M Street, S.W.; Washington, D.C. 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, N.W.; Washington, D.C. 20503, marked ''Attention: Desk Officer for EPA.'' Include the ICR number in any correspondence. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after August 25, 1999, a comment to OMB is best assured of having its full effect if OMB receives it by September 24, 1999. The final rule will respond to any OMB and public comments on the information collection requirements contained in this proposal.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Pub. L. 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under Section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, Section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of Section 205 do not apply when they are inconsistent with applicable law. Moreover, Section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under Section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

The Agency's analysis for compliance with the UMRA found that the proposed action imposes less than the $100 million expenditure threshold on the private sector; thus, today's rule is not subject to the requirements of Sections 202 and 205 of UMRA.

E. Executive Order 12875: Enhancing the Intergovernmental Partnership

Under Executive Order 12875, EPA may not issue a regulation that is not required by statute and that creates a mandate upon a State, local or tribal government, unless the Federal government provides the funds

necessary to pay the direct compliance costs incurred by those governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 12875 requires EPA to provide to the Office of Management and Budget a description of the extent of EPA's prior consultation with representatives of affected State, local and tribal governments, the nature of their concerns, any written communications from the governments, and a statement supporting the need to issue the regulation. In addition, Executive Order 12875 requires EPA to develop an effective process permitting elected officials and other representatives of State, local and tribal governments ''to provide meaningful and timely input in the development of regulatory proposals containing significant unfunded mandates.''

F. Executive Order 13084: Consultation and Coordination With Indian Tribal Governments

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian tribal governments, and that imposes substantial direct compliance costs on those communities, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments ''to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities.''

Today's rule does not significantly or uniquely affect the communities of Indian tribal governments. There is no impact to tribal governments as the result of the proposed action. In addition, this proposed rule is required by statute (HSWA). Accordingly, the requirements of Section 3(b) of Executive Order 13084 do not apply to this rule.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

Executive Order 13045, ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997), applies to any rule that: (1) is determined to be ''economically significant'' as defined under E.O. 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency. This proposed rule is not subject to the Executive Order because it is not economically significant as defined in E.O. 12866, and because the Agency does not have reason to believe the environmental health or safety risks addressed by this action present a disproportionate risk to children.

The topic of environmental threats to children's health is growing in regulatory importance as scientists, policy makers, and village leaders continue to recognize the extent to which children are particularly vulnerable to environmental hazards. Recent EPA actions have been in the forefront of addressing environmental threats to the health and safety of children. Today's proposed rule further reflects our commitment to mitigating environmental threats to children.

A few significant physiological characteristics are largely responsible for children's increased susceptibility to environmental hazards. First, children eat proportionately more food, drink proportionately more fluids, and breathe more air per pound of body weight than do adults. As a result, children potentially experience greater levels of exposure to environmental threats than do adults. Second, because children's bodies are still in the process of development, their immune systems, neurological systems, and other immature organs can be more easily and considerably affected by environmental hazards.

Today's proposed rule will reduce risks posed by the hazardous constituents found in the listed waste streams by requiring more appropriate and safer management practices. EPA considered risks to children in its risk assessment. The more appropriate and safer management practices proposed in this rule are projected to reduce risks to children potentially exposed to the constituents of concern. The public is invited to submit or identify peer-reviewed studies and data, of which the agency may not be aware, that assess results of early life exposure to the proposed hazardous constituents from wastewaters and wastewater treatment sludges from the production of chlorinated aliphatic chemicals.

H. National Technology Transfer and Advancement Act of 1995

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (''NTTAA''), Pub. L. No. 104–113, Section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities, unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This proposed rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

I. Executive Order 12898: Environmental Justice

Under Executive Order 12898, ''Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,'' as well as through EPA's April 1995, ''Environmental Justice Strategy, OSWER Environmental Justice Task Force Action Agenda Report,'' and National Environmental Justice Advisory Council, EPA has undertaken to incorporate environmental justice into its policies and programs. EPA is committed to addressing environmental justice concerns, and is assuming a leadership role in environmental justice initiatives to enhance environmental quality for all residents of the United States. The Agency's goals are to ensure that no segment of the population, regardless of race, color, national origin, or income, bears disproportionately high and adverse human health and environmental effects as a result of EPA's policies, programs, and activities.

Today's proposed rule is intended to reduce risks of hazardous wastes as proposed, and to benefit all populations. As such, this rule is not expected to cause any disproportionately high and adverse impacts to minority or low-

income communities versus non-minority or affluent communities.

In making hazardous waste listing determinations, we base our evaluations of potential risk from the generation and management of solid wastes on an analysis of potential individual risk. In conducting risk evaluations, our goal is to estimate potential risk to any population of potentially exposed individuals (e.g., home gardeners, adult farmers, children of farmers, anglers) located in the vicinity of any generator or facility handling a waste. Therefore, we are not putting poor, rural, or minority populations at any disadvantage with regard to our evaluation of risk or with regard to how the Agency makes its proposed hazardous waste listing determinations.

In proposing today to list three wastes as hazardous (i.e., chlorinated aliphatic wastewaters, EDC/VCM wastewater treatment sludges managed in land treatment units, and VCM–A wastewater treatment sludges), all populations potentially exposed to these wastes or potentially exposed to releases of the hazardous constituents in the wastes will benefit from the proposed listing determination. In addition, listing determinations are effected at the national level. The wastes proposed to be listed as hazardous will be hazardous regardless of where they are generated and regardless of where they may be managed. Although the Agency understands that the proposed listing determinations, if finalized, may affect where these wastes are managed in the future (in that hazardous wastes must be managed at subtitle C facilities), the Agency's decision to list these wastes as hazardous is independent of any decisions regarding the location of waste generators and the siting of waste management facilities.

Similarly, in cases where the Agency is proposing not list a solid waste as hazardous because the waste does not meet the criteria for being identified as a hazardous waste, these decisions are based upon an evaluation of potential individual risks located in proximity to any facility handling the waste. In the case of wastewater treatment sludges from the production of allyl chloride and methyl chloride and the case of EDC/VCM wastewater treatment sludges managed in landfills, we believe the potential risk levels associated with the wastes are safe for all populations potentially exposed to the wastes and their constituents.

The Agency is soliciting comment and input from all stakeholders, including members of the environmental justice community and members of the regulated community. We encourage all interested parties to provide comments or further information related to potential environmental justice concerns or impacts, including information and data on facilities that have evaluated potential ecological and human health impacts (taking into account subsistence patterns and sensitive populations) to minority or low-income communities.

List of Subjects

40 CFR Part 148

Administrative practice and procedure, Hazardous waste, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 261

Environmental protection, Hazardous materials, Recycling, Waste treatment and disposal.

40 CFR Part 264

Environmental protection, Air pollution control, Hazardous waste, Insurance, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds.

40 CFR Part 265

Air pollution control, Hazardous waste, Insurance, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds, Water supply.

40 CFR Part 268

Environmental protection, Hazardous materials, Reporting and recordkeeping requirements, Waste management.

40 CFR Part 271

Environmental protection, Administrative practice and procedure, Confidential business information, Hazardous material transportation, Hazardous waste, Indians-lands, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Water pollution control, Water supply.

40 CFR Part 302

Environmental protection, Air pollution control, Chemicals, Hazardous chemicals, Hazardous materials, Hazardous materials transportation, Hazardous substances, Hazardous waste, Intergovernmental relations, Natural resources, Reporting and recordkeeping requirements, Superfund, Waste treatment and disposal, Water pollution control, Water supply.

Dated: July 30, 1999.

Carol M. Browner,

Administrator.

For the reasons set forth in the preamble, title 40, chapter I of the Code of Federal Regulations is proposed to be amended as follows:

PART 148—HAZARDOUS WASTE INJECTION RESTRICTIONS

1. The authority citation for part 148 continues to read as follows:

Authority: Sec. 3004, Resource Conservation and Recovery Act, 42 U.S.C. 6901 *et seq.*

2. Section 148.18 is amended by adding paragraphs (l) and (m) to read as follows:

§ 148.18 Waste-specific prohibitions—newly listed and identified wastes.

* * * * *

(l) Effective [date six months after publication of final rule], the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K173, K174, and K175 are prohibited from underground injection.

(m) The requirements of paragraphs (a) through (l) of this section do not apply:

(1) If the wastes meet or are treated to meet the applicable standards specified in subpart D of part 268 of this chapter; or

(2) If an exemption from a prohibition has been granted in response to a petition under subpart C of this part; or

(3) During the period of extension of the applicable effective date, if an extension has been granted under § 148.4.

PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

3. The authority citation for part 261 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6921, 6922, 6924(y), and 6938.

4. Section 261.3 is amended by adding a paragraph (c)(2)(ii)(F) to read as follows:

§ 261.3 Definition of hazardous waste.

* * * * *

(c) * * *

(2) * * *

(ii) * * *

(F) Wastewater treatment sludges derived from the treatment of chlorinated aliphatic wastewaters listed in § 261.32 as EPA Hazardous Waste No. K173. However, this paragraph does not exempt from the definition of hazardous waste any wastewater treatment sludges that are explicity listed (e.g., K174, K175) or that meet any other listing in

subpart D of this part, as a result of the derived-from rule.

* * * * *

5. Section 261.4 is amended by revising paragraph (b)(15) to read as follows:

§ 261.4 Exclusions.

* * * * *

(b) * * *

(15) Leachate or gas condensate collected from landfills where certain solid wastes have been disposed, provided that:

(i) The solid wastes disposed would meet one or more of the listing descriptions for Hazardous Waste Codes K169, K170, K171, K172, K174, and K175 if these wastes had been generated after the effective date of the listing;

(ii) The solid wastes described in paragraph (b)(15)(i) of this section were disposed prior to the effective date of the listing:

(iii) The leachate or gas condensate do not exhibit any characteristic of hazardous waste nor are derived from any other listed hazardous waste;

(iv) Discharge of the leachate or gas condensate, including leachate or gas condensate transferred from the landfill to a POTW by truck, rail, or dedicated pipe, is subject to regulation under Sections 307(b) or 402 of the Clean Water Act.

(v) After February 13, 2001, leachate or gas condensate derived from K169–K172 will no longer be exempt if it is stored or managed in a surface impoundment prior to discharge. After [date 24 months after publication date of the final rule], leachate or gas condensate derived from K175 will no longer be exempt if it is stored or managed in a surface impoundment prior to discharge. There is one exception: if the surface impoundment is used to temporarily store leachate or gas condensate in response to an emergency situation (e.g., shutdown of wastewater treatment system), provided the impoundment has a double liner, and provided the leachate or gas condensate is removed from the impoundment and continues to be managed in compliance with the conditions of this paragraph (b)(15)(v) after the emergency ends.

* * * * *

6. In § 261.32, the table is amended by adding in alphanumeric order (by the first column) the following waste streams to the subgroup ''Organic Chemicals'' to read as follows:

§ 261.32 Hazardous waste from specific sources.

* * * * *

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
*	*	*
Organic Chemicals:		
*	*	*
K173	Wastewaters from the production of chlorinated aliphatic hydrocarbons, except wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	(T)
K174	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater), unless the sludges meet the following conditions: they are disposed of in a subtitle C or D landfill licensed or permitted by the state or federal government; they are not otherwise placed on the land prior to final disposal; and the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer or ethylene dichloride, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, etc.) that the terms of the exclusion were met.	(T)
K175	*Option 1:* Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.	(T)
	Option 2: Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, *unless* the sludges are disposed in a subtitle C landfill; and the sludges do not fail the toxicity characteristic for mercury in 40 CFR 261.24; and the generator maintains documentation demonstrating that the waste was disposed of in a subtitle C landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in a subtitle C landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the landfill owner/operator, invoices documenting delivery of waste to landfill, analytical results or other information showing the waste does not fail the toxicity characteristic for mercury, etc.) that the terms of the exclusion were met.	(T)
*	*	*

7. Appendix VII to Part 261 is amended by adding the following wastestreams in alphanumeric order (by the first column) to read as follows:

Appendix VII to Part 261—Basis for Listing Hazardous Waste

EPA hazardous waste No.	Hazardous constituents for which listed
*	* * * * * *
K173	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (1,2,3,4,6,7,8-HpCDD), 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8,-HpCDF), 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,6,7,8,9-HpCDF), HxCDDs (All Hexachlorodibenzo-*p*-dioxins), HxCDFs (All Hexachlorodibenzofurans), PeCDDs (All Pentachlorodibenzo-*p*-dioxins), OCDD (1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin, OCDF (1,2,3,4,6,7,8,9-Octachlorodibenzofuran), PeCDFs (All Pentachlorodibenzofurans), TCDDs (All tetrachlorodi-benzo-*p*-dioxins), TCDFs (All tetrachlorodibenzofurans).
K174	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (1,2,3,4,6,7,8-HpCDD), 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8,-HpCDF), 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,6,7,8,9-HpCDF), HxCDDs (All Hexachlorodibenzo-*p*-dioxins), HxCDFs (All Hexachlorodibenzofurans), PeCDDs (All Pentachlorodibenzo-*p*-dioxins), OCDD (1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin, OCDF (1,2,3,4,6,7,8,9-Octachlorodibenzofuran) PeCDFs (All Pentachlorodibenzofurans), TCDDs (All tetrachlorodi-benzo-*p*-dioxins), TCDFs (All tetrachlorodibenzofurans).
K175	Mercury

8. Appendix VIII to part 261 is amended by adding in alphabetical sequence of common name the following entries:

Appendix VIII to Part 261—Hazardous Constituents

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
* * *	* *	*	*
Octachlorodibenzo-*p*-dioxin (OCDD)	1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin	3268–87–9	
Octachlorodibenzofuran (OCDF)	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001–02–0	
* * *	* *	*	*

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

9. The authority citation for part 264 continues to read as follows:

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

Subpart A—General

10. Section 264.1 is amended by adding a sentence to the end of paragraph (g)(6) to read as follows:

§ 264.1 Purpose, scope and applicability.

* * * * *

(g) * * *

(6) * * * However, if the owner or operator is managing EPA Hazardous Waste No. K173 (chlorinated aliphatic wastewater) in a tank, the owner/operator must comply with § 264.1080(h).

* * * * *

Subpart CC—Air Emission Standards for Tanks, Surface Impoundments, and Containers

11. Section 264.1080 is amended by adding paragraph (h) to read as follows:

§ 264.1080 Applicability.

* * * * *

(h) Notwithstanding the applicability requirements in paragraph (a) of this section, any tank (including wastewater treatment units as defined in § 260.10 of this chapter) managing EPA Hazardous Waste No. K173, where the dioxin concentration in the influent wastewater to the tank is greater than or equal to 1 ng/L TCDD TEQ at a 95% upper confidence limit around the mean, must comply with the requirements of this paragraph, and with § 264.1084 as appropriate. In order to determine whether the influent concentration of EPA Hazardous Waste No. K173 is greater than or equal to 1 ng/L TCDD TEQ at a 95% upper confidence limit around the mean, the generator or owner/operator must comply with the requirements in 40 CFR 265.1080(h)(1) through (5).

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

12. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6906, 6912, 6922, 6923, 6924, 6925, 6935, 6936, and 6937, unless otherwise noted.

Subpart A—General

13. Section 265.1 is amended by adding a sentence to the end of paragraph (c)(10) to read as follows:

§ 265.1 Purpose, scope, and applicability.

* * * * *

(c) * * *

(10) * * * However, if the owner or operator is managing EPA Hazardous Waste No. K173 (chlorinated aliphatic wastewater) in a tank, the owner/operator must comply with § 265.1080(h).

* * * * *

Subpart CC—Air Emission Standards for Tanks, Surface Impoundments, and Containers

14. Section 265.1080 is amended by adding paragraph (h) to read as follows:

§ 265.1080 Applicability

* * * * *

(h) Notwithstanding the applicability requirements in paragraph (a) of this section, any tank (including wastewater treatment units as defined in § 260.10 of this chapter) managing EPA Hazardous Waste No. K173, where the dioxin concentration in the influent wastewater to the tank is equal to or greater than 1 ng/L TCDD TEQ at a 95% upper confidence limit around the mean, must

comply with the requirements of this paragraph, and with § 265.1085 as appropriate. In order to determine whether the influent concentration of EPA Hazardous Waste No. K173 is greater than or equal to 1 ng/L TCDD TEQ at a 95% upper confidence limit around the mean, the generator or owner/operator must comply with the following:

(1) *Waste sampling and analysis plans.* (i) *General.* The generator of K173 shall develop and follow a written waste sampling and analysis plan which describes the procedures for sampling and analysis of the hazardous waste at the influent to each wastewater treatment tank to be excluded from the requirements of this part. The waste sampling and analysis plan shall be developed in accordance with the applicable sections of the ''Test Methods for Evaluating Solid Waste, Physical/Chemical Methods'' (SW–846) or other appropriate guidance. The plan shall be followed and retained at the facility claiming an exemption for one or more wastewater treatment tanks.

(ii) At a minimum, the plan must include:

(A) A detailed description of the test method(s) used to test for 2,3,7,8-substituted chlorinated dibenzo-p-dioxin (CDD) and 2,3,7,8-substituted chlorinated dibenzo-p-furan (CDF) congeners;

(B) The sampling method used to obtain representative samples of each wastewater tank influent; and

(C) How the design of the sampling program accounts for any expected fluctuations in concentrations over time, while ensuring that the samples collected are grab samples and that all samples are collected within a timeframe that will allow for the analyses to account for potential variabilities in the wastestream.

(2) *Sampling and analysis.* (i) *General.* For each wastewater treatment tank for which an exemption is claimed, the generator of K173 must:

(A) Test for all 2,3,7,8-substituted CDDs/CDFs; or

(B) Use process knowledge for tanks downstream of a tank that is exempt as a result of testing specified in paragraph (h)(2)(i)(A) of this section.

(ii) The K173 generator may use any reliable analytical method to demonstrate that the TCDD TEQ does not exceed the trigger level. It is the responsibility of the generator to ensure that the sampling and analysis are unbiased, precise, and representative of the waste.

(iii) The generator must ensure that the measurements are sufficiently sensitive, accurate and precise to demonstrate that the maximum TCDD TEQ in any sample analyzed does not exceed the specified trigger level.

(iv) For the tank to be eligible for exemption, a generator must demonstrate that:

(A) The maximum TCDD TEQ in the influent to the tank does not exceed 1 ng/L at the 95% upper confidence limit around the mean;

(B) The TCDD TEQ for each sample shall be determined by multiplying the concentration of any 2,3,7,8-substituted CDD or CDF detected and the appropriate toxicity equivalency factor (TEF), as described below, and summing these products for each sample;

(C) The following toxicity equivalence factors shall be used:

Compound	WHO–TEF
2,3,7,8–TetraCDD	1
1,2,3,7,8–PentaCDD	1
1,2,3,4,7,8–HexaCDD	0.1
1,2,3,7,8,9–HexaCDD	0.1
1,2,3,6,7,8–HexaCDD	0.1
1,2,3,4,6,7,8–HeptaCDD	0.01
1,2,3,4,5,7,8,9–OctaCDD	0.0001
2,3,7,8–TetraCDF	0.1
2,3,4,7,8–PentaCDF	0.5
1,2,3,7,8–PentaCDF	0.05
1,2,3,4,7,8–HexaCDF	0.1
1,2,3,7,8,9–HexaCDF	0.1
1,2,3,6,7,8–HexaCDF	0.1
2,3,4,6,7,8–HexaCDF	0.1
1,2,3,4,7,8,9–HeptaCDF	0.01
1,2,3,4,6,7,8–HeptaCDF	0.01
1,2,3,4,6,7,8,9–OctaCDF	0.0001

(D) The analysis could have detected the presence of the CDD/CDF congeners at or below the trigger level of 1 ng/L at the 95% upper confidence limit around the mean.

(v) In an enforcement action, the burden of proof to establish conformance with the exemption specification shall be on the generator claiming the exclusion.

(vi) The generator must conduct sampling and analysis in accordance with their waste sampling and analysis plan developed under paragraph (h)(1) of this section.

(vii) The influent to exempt wastewater treatment tanks must be re-tested, at a minimum, annually and must be retested after a process change that could change the TCDD TEQ level in the waste.

(3) *Records.* The generator must maintain records of the following information on-site:

(i) All information required to be submitted to the implementing authority as part of the notification of the claim:

(A) The owner/operator name, address, and RCRA facility ID number of the person claiming the exemption; and

(B) The certification signed by the person claiming the exclusion or his authorized representative.

(ii) A brief description of the tanks covered by the claimed exemption, including dimensions and service in the wastewater treatment system;

(iii) A description and process flow diagram of the wastewater treatment system, clearly identifying the exempt tanks and sampling points;

(iv) The results of all analyses and all detection limits achieved as required under paragraph (h)(2) of this section;

(v) The waste sampling and analysis plan;

(vi) The results of the sampling and analysis, including the following:

(A) The dates and times waste samples were obtained, and the dates the samples were analyzed;

(B) The names and qualifications of the person(s) who obtained the samples;

(C) A description of the temporal and spatial locations of the samples;

(D) The name and address of the laboratory facility at which analyses of the samples were performed;

(E) A detailed description of the analytical methods used, including any clean-up and sample preparation methods;

(F) All quantitation limits achieved and all other quality control results for the analysis (including method blanks, duplicate analyses, matrix spikes, etc.), laboratory quality assurance data, and description of any deviations from analytical methods written in the plan or from any other activity written in the plan which occurred;

(G) All laboratory analytical results demonstrating that the trigger exemption level has not been exceeded at the tank influent, for each exempt tank; and

(H) All laboratory documentation that support the analytical results, unless a contract between the claimant and the laboratory provides for the documentation to be maintained by the laboratory for the period specified in paragraph (h)(4) of this section and also provides for the availability of the documentation to the claimant upon request; and

(4) *Records retention.* Records must be maintained for the period of three years. A generator must maintain a current waste sampling and analysis plan during that three year period.

(5) *Notification and certification.* The waste generator must submit a one-time notification and certification to the EPA Region or an authorized State (by mail or delivery service which provides return receipt) within 60 days following the effective date of the final rule or initial use of a wastewater treatment

tank used to manage K173. The notification must include the waste generator's name and address, a representative's name and telephone number, and a description of the wastewater treatment system and the assessed tanks. The certification must be signed by an authorized representative and must state as follows:

I certify under penalty of law that the influent(s) to the tanks identified in this certification do not exceed 1 ng/L TCDD TEQ. I am aware that there are significant penalties for submitting a false, inaccurate, or incomplete certification, including the possibility of fine and imprisonment.

PART 268—LAND DISPOSAL RESTRICTIONS

15. The authority citation for part 268 continues to read as follows:

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

Subpart A—General

16. Section 268.7 is amended by adding paragraph (f) to read as follows:

§ 268.7 Testing, tracking, and recordkeeping requirements for generators, treaters, and disposal facilities.

* * * * *

(f) The owner or operator of a facility codisposing wastes with wastes identified as hazardous waste K175 must maintain records available for inspection of the pH of the wastes so codisposed.

Subpart C—Prohibitions on Land Disposal

17. Section 268.33 is revised to read as follows:

§ 268.33 Waste specific prohibitions—chlorinated aliphatic wastes.

(a) Effective [*date 90 days from date of publication of final rule*], the wastes specified in 40 CFR Part 261 as EPA Hazardous Wastes Numbers K173, K174, and K175, and soil and debris contaminated with these wastes are prohibited from land disposal.

(b) Effective [date two years from date of publication of final rule], the following wastes are prohibited from land disposal: soil and debris contaminated with radioactive wastes mixed with EPA Hazardous wastes K173, K174, and K175.

(c) Between [date of publication of final rule] and [Insert date two years from date of publication of final rule], radioactive waste mixed with K173, K174, and K175 wastes and/or soil and debris may be disposed in a landfill or surface impoundment only if such unit is in compliance with the requirements specified in § 268.5(h)(2).

(d) The requirements of paragraphs (a), (b) and (c) of this section do not apply if:

(1) The wastes meet the applicable treatment standards specified in subpart D of this part;

(2) Persons have been granted an exemption from a prohibition pursuant to a petition under § 268.6, with respect to those wastes and units covered by the petition;

(3) The wastes meet the applicable treatment standards established pursuant to a petition granted under § 268.44;

(4) Hazardous debris has met the treatment standards in § 268.40 or the alternative treatment standards in § 268.45; or

(5) Persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to these wastes covered by the extension.

(e) To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards specified in § 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentrations in the waste extract or the waste, or the generator may use knowledge of the waste. If the waste contains regulated constituents in excess of the applicable Universal Treatment Standard levels of § 268.48, the waste is prohibited from land disposal, and all requirements of this part are applicable, except as otherwise specified.

(f) Disposal of K175 wastes containing mercuric sulfide is restricted to units to which disposal of wastes in excess of pH 6.0 is prohibited.

18. In § 268.40, the Table is amended in the entry for F039 to add constituents in alphabetical order and by adding in alphanumeric order new entries for K173, K174, and K175 to read as follows:

§ 268.40 Applicability of treatment standards.

* * * * *

TREATMENT STANDARDS FOR HAZARDOUS WASTES

Waste code	Waste description and treatment/regulatory subcategory [1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS [2] No.	Concentration in mg/L,[3] or technology code [4]	Concentration in mg/kg [5] unless noted as "mg/L TCLP", or technology code
*	* *	* *		*	*
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under Subpart D of this part. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Waste retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028) * * *.	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (1,2,3,4,6,7,8-HpCDD).	35822–39–4	0.000035	0.0025
.....		1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF).	67562–39–4	0.000035	0.0025
.....		1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF).	55673–89–7	0.000035	0.0025

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory [1]	Regulated hazardous constituent		Wastewaters	Nonwastewaters
		Common name	CAS [2] No.	Concentration in mg/L,[3] or technology code [4]	Concentration in mg/kg [5] unless noted as "mg/L TCLP", or technology code
*	* *	* *		*	*
		1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD).	3268–87–9	0.000063	0.0025
		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF).	39001–02–0	0.000063	0.005
*	* *	* *		*	*
K173	Wastewaters from the production of chlorinated aliphatic hydrocarbons, except wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution.	Bis(2-chloroethyl)ether	111–44–4	0.033	6.0
		Chloroform	67–66–3	0.046	6.0
		Pentachlorophenol	87–86–5	0.089	7.4
		Phenol	108–95–4	0.039	6.2
		2,4,6-Trichlorophenol	88–06–2	0.035	7.4
		1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (1,2,3,4,6,7,8-HpCDD).	35822–39–4	0.000035	0.0025
		1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF).	67562–39–4	0.000035	0.0025
		1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF).	55673–89–7	0.000035	0.0025
		HxCDDs (All Hexachlorodibenzo-*p*-dioxins)	34465–46–8	0.000063	0.001
		HxCDFs (All Hexachlorodibenzofurans)	55684–94–1	0.000063	0.001
		1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD).	3268–87–9	0.000063	0.005
		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF).	39001–02–0	0.000063	0.005
		PeCDDs (All Pentachlorodibenzo-*p*-dioxins)	36088–22–9	0.000063	0.001
		PeCDFs (All Pentachlorodibenzofurans)	30402–15–4	0.000035	0.001
		TCDDs (All tetrachlorodi-benzo-*p*-dioxins)	0.000063	0.001	
		TCDFs (All tetrachlorodibenzofurans)	55722–27–5	0.000063	0.001
		Chromium (Total)	7440–47–3	2.77	0.60 mg/L TCLP
		Nickel	7440–02–0	3.98	11 mg/L TCLP
K174	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer.	1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (1,2,3,4,6,7,8-HpCDD).	35822–39–4	0.000035	0.0025
		1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF).	67562–39–4	0.000035	0.0025
		1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF).	55673–89–7	0.000035	0.0025
		HxCDDs (All Hexachlorodibenzo-*p*-dioxins)	34465–46–8	0.000063	0.001
		HxCDFs (All Hexachlorodibenzofurans)	55684–94–1	0.000063	0.001
		1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD).	3268–87–9	0.000063	0.005
		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF).	39001–02–0	0.000063	0.005

TREATMENT STANDARDS FOR HAZARDOUS WASTES—Continued

Waste code	Waste description and treatment/regulatory subcategory [1]	Regulated hazardous constituent: Common name	Regulated hazardous constituent: CAS [2] No.	Wastewaters: Concentration in mg/L,[3] or technology code [4]	Nonwastewaters: Concentration in mg/kg [5] unless noted as "mg/L TCLP", or technology code
		PeCDDs (All Pentachloro-dibenzo-*p*-dioxins)	36088–22–9	0.000063	0.001
		PeCDFs (All Pentachloro-dibenzofurans)	30402–15–4	0.000035	0.001
		TCDDs (All tetrachlorodi-benzo-*p*-dioxins).	41903–57–5	0.000063	0.001
		TCDFs (All tetrachlorodibenzofurans)	55722–27–5	0.000063	0.001
		Arsenic	7440–36–0	1.4	5.0 mg/L TCLP
K175	K175 (wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process) nonwastewaters that contain greater than or equal to 260 mg/kg total mercury.	Mercury	7438–97–6	NA	RMERC
	K175 nonwastewaters that contain less than 260 mg/kg total mercury that are residues from RMERC.	Mercury	7438–97–6	NA	0.20 mg/L TCLP
	Other K175 nonwastewaters that contain less than 260 mg/kg total mercury and are not residues from RMERC.	Mercury	7438–97–6	NA	0.025 mg/L TCLP
		pH		NA	pH <6.0
	All K175 wastewaters	Mercury	7438–97–6	0.15	NA
*	* *	*	*	*	*

*Note: NA means not applicable.

[1] The waste descriptions provided in this table do not replace waste descriptions in 40 CFR Part 261. Descriptions of Treatment/Regulatory Subcategories are provided, as needed, to distinguish between applicability of different standards.

[2] CAS means Chemical Abstract Services. When the waste code and/or regulated constituents are described as a combination of a chemical with its salts and/or esters, the CAS number is given for the parent compound only.

[3] Concentration standards for wastewaters are expressed in mg/L and are based on analysis of composite samples.

[4] All treatment standards expressed as a Technology Code or combination of Technology Codes are explained in detail in 40 CFR 268.42 Table 1-Technology Codes and Descriptions of Technology-Based Standards.

[5] Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards expressed as a concentration were established, in part, based upon incineration in units operated in accordance with the technical requirements of 40 CFR Part 264 Subpart O or Part 265 Subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268.40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

19. In § 268.48(a) the Table is amended by adding in alphabetical order the following entries under the heading organic constituents: (The footnotes are republished without change.)

§ 268.48 Universal treatment standards.

(a) * * *

UNIVERSAL TREATMENT STANDARDS

Regulated constituent common name	CAS [1] number	Wastewater standard concentration in mg/L [2]	Nonwastewater standard concentration in mg/Kg [3] unless noted as "mg/L TCLP"
* * * * *		*	*
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin (1,2,3,4,6,7,8-HpCDD)	35822–39–4	0.000035	0.0025
1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	67562–39–4	0.000035	0.0025
1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,6,7,8,9-HpCDF)	55673–89–7	0.000035	0.0025
* * * * *		*	*
1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD)	3268–87–9	0.000063	0.005
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001–02–0	0.000063	0.005
* * * * *		*	*

* Note: NA means not applicable.
[1] CAS means Chemical Abstract Services. When the waste code and/or regulated constituents are described as a combination of a chemical with its salts and/or esters, the CAS number is given for the parent compound only.
[2] Concentration standards for wastewaters are expressed in mg/L and are based on analysis of composite samples.
[3] Except for Metals (EP or TCLP) and Cyanides (Total and Amenable) the nonwastewater treatment standards expressed as a concentration were established, in part, based upon incineration in units operated in accordance with the technical requirements of 40 CFR Part 264, Subpart O, or Part 265, Subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may comply with these treatment standards according to provisions in 40 CFR 268.40(d). All concentration standards for nonwastewaters are based on analysis of grab samples.

* * * * *

PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS

20. The authority citation for part 271 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), and 6926.

21. Section 271.1(j) is amended by adding the following entries to Table 1 and Table 2 in chronological order by date to read as follows.

§ 271.1 Purpose and scope. (j) * * *

* * * * *

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	Federal Register reference	Effective date
*	*	*	*
[insert date of signature of final rule]	Listing of Hazardous Wastes K173, K174, and K175	[insert Federal Register page numbers]	[insert effective date of final rule]
*	*	*	*

TABLE 2.—SELF IMPLEMENTING PROVISIONS OF THE SOLID WASTE AMENDMENTS OF 1984

Effective date	Self-implementing provision	RCRA citation	Federal Register reference
*	*	*	*
[effective date of final rule].	Prohibition on land disposal of K173, K174, and K175 wastes, and prohibition on land disposal of radioactive waste mixed with K173, K174, and K175 wastes, including soil and debris.	3004(g)(4)(C) and 3004(m).	[date of publication of final rule], [FR page numbers].
*	*	*	*

PART 302—DESIGNATION, REPORTABLE QUANTITIES, AND NOTIFICATION

22. The authority citation for part 302 continues to read as follows:

Authority: 42 U.S.C. 9602, 9603, and 9604; 33 U.S.C. 1321 and 1361.

23. In § 302.4, Table 302.4 is amended by adding the following new entries in alphanumeric order at the end of the table to read as follows:

§ 302.4 Designation of hazardous substances

* * * * *

TABLE 302.4—LIST OF HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES

[Note: All Comments/Notes Are Located at the End of This Table]

Hazardous substance	CASRN	Regulatory synonyms	Statutory			Final RQ	
			RQ	Code †	RCRA waste No.	Category	Pounds (Kg)
K173 [f]	.....	.....	*1	4	K173	X	1(0.454)
K174 [f]	.....	.....	*1	4	K174	X	1(0.454)
K175 [f]	.....	.....	*1	4	K175	X	1(0.454)

† Indicates the statutory sources as defined by 1, 2, 3, and 4 below.
* * * * *
4—Indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA Section 3001.
*1—Indicates that the 1-pound RQ is a CERCLA statutory RQ.
* * * * *
[f] See 40 CFR 302.6(b)(1) for application of the mixture rule to this hazardous waste.

24. Section 302.6 is amended by revising paragraph (b)(1)(iii) introductory text and by adding entries K173, K174, and K175 to the table in paragraph (b)(1)(iii) in numerical order to read as follows:

§ 302.6 Notification requirements.

* * * * *

(b) * * *

(1) * * *

(iii) For waste streams K169, K170, K171, K172, K173, K174, and K175, knowledge of the quantity of all of the hazardous constituent(s) may be assumed, based on the following maximum observed constituent concentrations identified by EPA:

Waste	Constituent	Max ppm
*	*	*
K173	2,3,7,8-TCDD	0.000000017
	1,2,3,7,8-PeCDD	0.00000015
	1,2,3,4,7,8-HxCDD	0.00000012
	1,2,3,6,7,8-HxCDD	0.00000091
	1,2,3,7,8,9-HxCDD	0.00000092
	1,2,3,4,6,7,8-HpCDD	0.000044
	OCDD	0.00022
	2,3,7,8-TCDF	0.00000045
	1,2,3,7,8-PeCDF	0.0000012
	2,3,4,7,8-PeCDF	0.0000015
	1,2,3,4,7,8-HxCDF	0.000042
	1,2,3,6,7,8-HxCDF	0.000045
	1,2,3,7,8,9-HxCDF	0.000014
	2,3,4,6,7,8-HxCDF.	0.000027
	1,2,3,4,6,7,8-HpCDF	0.0013
	1,2,3,4,7,8,9-HpCDF	0.00017
	OCDF	0.006
	Chloroform	7.1
K174	2,3,7,8-TCDD	0.000039
	1,2,3,7,8-PeCDD	0.0000108
	1,2,3,4,7,8-HxCDD	0.0000241
	1,2,3,6,7,8-HxCDD	0.000083
	1,2,3,7,8,9-HxCDD	0.000062
	1,2,3,4,6,7,8-HpCDD	0.00123
	OCDD	0.0129
	2,3,7,8-TCDF	0.000145
	1,2,3,7,8-PeCDF	0.0000777
	2,3,4,7,8-PeCDF	0.000127
	1,2,3,4,7,8-HxCDF	0.001425
	1,2,3,6,7,8-HxCDF	0.000281
	1,2,3,7,8,9-HxCDF	0.00014
	2,3,4,6,7,8-HxCDF.	0.000648
	1,2,3,4,6,7,8-HpCDF	0.0207
	1,2,3,4,7,8,9-HpCDF	0.0135
	OCDF	0.212
K175	Mercury	9200

* * * * *

[FR Doc. 99–20753 Filed 8–24–99; 8:45 am]

BILLING CODE 6560–50–P