ENVIRONMENTAL PROTECTION AGENCY

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

[SWH–FRL–6882–6]

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: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is listing as hazardous two wastes generated by the chlorinated aliphatics industry. EPA is finalizing these regulations under the Resource Conservation and Recovery Act (RCRA), which directs EPA to determine whether certain wastes from the chlorinated aliphatics industry may present a substantial hazard to human health or the environment. The effect of listing these two wastes is 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 finalizing a contingent-management listing approach for one of these wastes. Under the contingent management listing determination, the waste will not be a listed hazardous waste, if it is sent to a specific type of management facility. EPA also is finalizing determinations not to list as hazardous four wastes generated by the chlorinated aliphatics industry.

EFFECTIVE DATE: This final rule is effective May 7, 2001.

ADDRESSES: Supporting materials are available for viewing in the RCRA Information Center (RIC), located at Crystal Gateway I, First Floor, 1235 Jefferson Davis Highway, Arlington, VA. The Docket Identification Number is F–2000–CALF–FFFFF. The RIC is open from 9 a.m. to 4 p.m., Monday through Friday, excluding federal holidays. To review docket materials, it is recommended that the public make an appointment by calling (703) 603–9230. The public may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost $0.15/page. The index and some supporting materials are available electronically. See the beginning of the Supplementary Information section for information on accessing them.

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, DC, 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, 1200 Pennsylvania Avenue, NW, Washington, DC 20460. [E-mail address and telephone number: elliott.ross@epamail.epa.gov, (703) 308–8748.]

SUPPLEMENTARY INFORMATION: Wherever ''we'' is used throughout this document, it refers to the Environmental Protection Agency (EPA).

The index and some supporting materials for this rulemaking are available 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. The official record is the paper record maintained at the address in **ADDRESSES** at the beginning of this document.

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

I. Who Potentially Will Be Affected by Today's Final Rule?

Today's final rule could directly affect those who generate and handle the types of chlorinated aliphatic hydrocarbon production wastes that EPA is adding to the Agency's list of hazardous industrial wastes under RCRA. Although there are an estimated 39 chlorinated aliphatic hydrocarbon chemical manufacturing facilities in the United States as of 1999, the K174 and K175 listing final rule only applies to 18 of these facilities (17 for the K174 listing and one for the K175 listing), which manufacture two such chemicals; ethylene dichloride (EDC) and vinyl chloride monomer (VCM). Furthermore, because of the final rule's ''conditional listing'' approach, in comparison to current (baseline) waste management practices in this industry, EPA anticipates that three of the 18 chemical manufacturing facilities subject to the final rule as generators of K174 and K175 hazardous wastes, will incur costs to modify their current waste management practices, while the remaining 15 facilities will incur only minimal regulatory costs, primarily associated with documentation of current waste management practices. In addition, EPA anticipates that four industrial waste management facilities also will be affected by the final rule due to potential changes in the annual quantities of hazardous wastes handled and associated changes to business revenues that will be the result of modifications to current waste management practices to comply with the provisions of today's final rule.

In addition to waste generators targeted by the rule, because of RCRA's ''cradle-to-grave'' statutory design, EPA anticipates that four waste handlers (three for the K174 listing and one for the K175 listing) are likely to experience ''induced effects'' from this final rule. In addition, EPA's regional offices and states with RCRA-authorized programs potentially will incur some costs because they must administer new RCRA listings. Several additional stakeholders also will have to read the final rule.

As defined in the Economics Background Document prepared for today's final rule, ''targeted effects'' are the anticipated costs of the final rule incurred by the unique class of industrial facilities that generate the newly listed hazardous wastes K174 and K175. ''Induced effects'' are anticipated costs of direct, indirect or secondary impacts the final rule may have on entities linked economically to the targeted facilities such as offsite waste management facilities, and on entities which are likely affected by other generic provisions of the final rule, such as states with RCRA authorized programs which will implement and enforce the rule. ''Incidental effects'' are anticipated consequential impacts on other types of entities, such as on other chemical manufacturers (to read the rule), other Federal agencies (to read the rule), and other non-governmental organizations (such as industry trade associations to read and propagate the rule to its member companies).

EPA's estimate of expected regulatory costs for these 116 potentially affected entities, is described in EPA's ''Economics Background Document'(USEPA 2000a) [1] for this final rule, which is available for public review from the RCRA Docket. A summary of the potentially affected industry sectors (by respective SIC and NAICS codes) is displayed in the table below.

SUMMARY OF ENTITIES POTENTIALLY AFFECTED BY THE RCRA K174/K175 FINAL RULE

Item	Economic sector classification			Number entities potentially affected			
	SIC	NAICS	Description	Targeted	Induced	Incidental	Total
1	2869	32511	Industrial organic chemical manufacturers* (waste generators).	18	0	21	39
2	4953	562211	Hazardous waste treatment & disposal (waste handlers).	0	4	0	4
3	9511	92411	State government environmental departments (public administration).	0	49	0	49
4	9511 9611 9621	92411 92611 92612	Federal government offices (environmental, economic & transportation public administration).	0	11	1	12
5	8742	54161	Management consulting services (non-governmental organizations).	0	0	12	12
			Total	18	64	34	116

Explanatory Notes:
(a) *Parent company codes may differ from the codes associated with the facility units targeted by the rule.
(b) This list of sector classification codes for ''induced effect'' entities may not be exhaustive for at least two reasons:
- Non-hazardous and hazardous industrial waste collection transporters (SIC 4212, 4953, NAICS 562111, 562112) may be affected, depending upon whether waste collected from K174/K175 generators is transported by waste treatment/disposal facilities, or by separate, unaffiliated transporter companies.
- If waste remediation is required, such entities may be affected (SIC 4959, NAICS 56291).

[1] USEPA. 2000a. Economics Background Document, USEPA Final Rule Listing Industrial Wastewater Treatment Sludges Generated by Chlorinated Aliphatic Chemical Manufacturing Facilities, as RCRA Hazardous Wastecodes K174 & K175: Industry Profile and Estimation of Regulatory Costs. Office of Solid Waste. 31 July.

The list of potentially affected entities in the above table may not be exhaustive. Our aim is to provide a guide for readers regarding 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 part 260 and 261 carefully in concert with the 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.**

II. What Is the Legal Authority and Background of Today's Final Rule?

A. What Are the Statutory Authorities for This Rule?

These regulations are being promulgated 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 promulgated.

B. Schedule Suit

In 1989, the Environmental Defense Fund (EDF) [2] 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. 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 was required to propose listing determinations by July 30, 1999 and promulgate final listing determinations on or before September 30, 2000. Today EPA is promulgating listing determinations for these wastes in accordance with the consent decree.

[2] Now known as Environmental Defense.

III. Summary of Today's Action

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

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 listing these wastes as hazardous based on the criteria set out in 40 CFR 261.11(a)(3) for listing a waste as hazardous. EPA assessed and considered these criteria for each of six wastestreams generated by the chlorinated aliphatics industry through the use of risk assessments and risk modeling, as well as a consideration of other pertinent factors. Today's final listing determination follows the elements of the Agency's listing decision policy that was presented in the proposed listing determination for wastes generated by the dye and pigment industries published in the **Federal Register** on December 22, 1994 (see 59 FR at 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 the effective date of the hazardous waste listings promulgated today, 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)). 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 promulgating an alternative approach to listing wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (EDC/VCM), rather than listing this waste in accordance with the Agency's traditional listing approach. The Agency is promulgating a conditional listing approach because the Agency evaluated the ways in which the wastes are likely to be managed and determined that the waste may present significant risks to human health and the environment, although it concluded that a particular waste management practice is protective of human health and the environment. Under the conditional listing approach, EPA is listing the waste as hazardous only if the waste is managed in a way other than the manner in which the Agency has determined is protective of human health and the environment. In developing this conditional-listing approach, the Agency has determined 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 will be subject to enforcement actions. The conditional-listing approach being promulgated today for certain wastes generated from chlorinated aliphatics processes is further discussed in section VI.B. of today's rule.

Today's action also promulgates no list decisions for the following four wastes:

- Process wastewaters from the production of chlorinated aliphatics (other than wastewaters from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process),
- 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
- Wastewater treatment sludges from the production of allyl chloride.

EPA considers the listing criteria set out in 40 CFR 261.11, in light of information relevant to the criteria, in making listing determinations. The criteria provided in 40 CFR 261.11 include eleven factors for determining whether a waste is capable of posing a ''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). In the preamble to the proposed rule (64 FR 46476), we discussed the human health risk analyses and ecological risk screening analyses EPA conducted to support our proposed listing determinations for chlorinated aliphatics wastewaters, EDC/VCM wastewater treatment sludges, and methyl chloride wastewater treatment sludges. These analyses, as well as comments EPA received on the analyses, are further discussed in this notice in section VI below. We considered the results of the risk analyses, as well as comments received, and the results of analyses conducted in response to information provided by public commenters in finalizing our listing decisions for each wastestream. The risk analyses conducted in support of our proposed listing determination are presented in detail in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination and in the 1999 Addendum to Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination which are located in the docket for the proposed rule. Additional information and analyses conducted with regard to our original risk assessment in response to comments received on our proposed rule are included in the September 2000 Addendum to Risk Assessment Background Document for the Chlorinated Aliphatics Listing Determination. This document is located in the docket for today's final rule.

IV. What Proposed Listing Determinations Led to Today's Final Rule?

In the August 25, 1999 proposed rule (64 FR 46476), EPA proposed to list three wastes generated by the chlorinated aliphatics production industry as hazardous wastes under RCRA. The wastes the Agency proposed to list as hazardous included chlorinated aliphatics manufacturing process wastewaters, wastewater treatment sludges generated from the treatment of wastewaters from the production of ethylene dichloride and/or vinyl chloride monomer (EDC/VCM), and wastewater treatment sludges from the treatment of wastewaters from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A). EPA proposed a conditional listing approach for EDC/VCM wastewater treatment sludges, based upon available information regarding the management of these sludges and the results of the Agency's risk assessment.

In connection with the proposed listings, EPA proposed to amend Appendix VIII of 40 CFR Part 261 to add two constituents, octachlorodibenzo-p-dioxin (OCDD) and octachlorodibenzofuran (OCDF). These constituents are found in chlorinated aliphatic wastewaters and in EDC/VCM wastewater treatment sludges.

In the proposed rule, the Agency also proposed not to list as hazardous wastewater treatment sludges generated from the treatment of wastewaters from the production of methyl chloride and the production of allyl chloride. In addition, the Agency proposed not to list process wastewaters from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.

The Agency proposed to add to the list of CERCLA hazardous substances those wastes that were proposed to be listed as hazardous. EPA also proposed adjusted Reportable Quantities (RQs) for each waste.

A. What Was the Proposed Listing Determination for Chlorinated Aliphatic Wastewaters?

As explained in Section III.A.1. of the proposed rule (64 FR 46479), 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. In addition, many process wastewaters generated from the production of chlorinated aliphatic hydrocarbons contain similar constituents of concern.

EPA proposed 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). Results of the risk assessment conducted in support of the proposed rule, indicated that the wastewaters met the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous. Risk assessment results identified risks of concern associated with air releases of dioxins from wastewater treatment systems using aerated biological treatment in open tanks.

EPA proposed not to list as hazardous process wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A wastewaters). EPA proposed not to list this waste as hazardous due to the fact that the wastewater exhibits the toxicity characteristic for both mercury and vinyl chloride. Therefore, the wastewater already is defined as hazardous waste. In addition, any risks associated with the management and disposal not addressed by RCRA (*i.e.,* direct discharge) of the wastewaters are addressed by other environmental regulations. With respect to the discharge of this 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 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 proposed not to list VCM–A wastewaters as hazardous waste.

B. What Were the Proposed Listing Determinations for Wastewater Treatment Sludges?

1. EDC/VCM Wastewater Treatment Sludges

EPA proposed to list as hazardous sludges generated from treating wastewaters from the production of ethylene dichloride (EDC) and/or vinyl chloride monomer (VCM). The Agency proposed to list this waste due to the fact that the Agency identified risks of concern associated with the management of this waste in a land treatment unit. Our risk assessment identified dioxin and arsenic as contaminants of concern, and found that high-end cancer risk to the farmer receptor from dioxin was 2E–04. The dioxin risks are associated with airborne releases and subsequent deposition and food chain contamination from dioxin. Surface erosion due to runoff also contributes to risk from dioxin. The risk assessment results for the land treatment unit scenario indicated a risk level above EPA's levels of concern for dioxin.

The risk assessment for EDC/VCM wastewater treatment sludges also included modeling a landfill management scenario. Our risk assessment showed no significant risk from dioxin, and only marginal risk from arsenic associated with the groundwater pathway. Based upon the Agency's findings that EDC/VCM wastewater treatment sludges pose significant risks when managed in land treatment units but do not pose significant risks when managed in landfills, the Agency proposed a ''contingent management listing'' for this waste. EPA proposed to list EDC/VCM wastewater treatment sludges as hazardous, unless the sludges are managed in landfills.

As explained in the proposal, the Agency believes that allowing the waste to continue to be managed under a low risk management scenario (*i.e.,* non-hazardous waste landfilling) outside of the subtitle C system achieves protection of human health and the environment, and that little additional benefit will 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 3007 Survey employs land treatment for these wastes, this practice is somewhat anomalous compared with land disposal. The Agency proposed that 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.

2. VCM–A Wastewater Treatment Sludges

EPA proposed to list as hazardous wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A). EPA proposed to list this waste as hazardous based upon the fact that it exhibited the toxicity characteristic for mercury when sampled by the Agency and based upon the Agency's assessment of potential risks from this waste, given its high mercury content and given the uncertainties associated with the disposal of untreated wastes of potential high toxicity in lined landfills.

3. Methyl Chloride Wastewater Treatment Sludges

EPA proposed not to list as hazardous sludges from the treatment of wastewaters generated from methyl chloride production processes. The results of our risk assessment indicated that this waste does not pose a substantial present or potential hazard to human health or the environment. As explained in the proposal, EPA identified only one facility that generates sludges from the treatment of wastewaters from the production of methyl chloride and does not currently manage the waste as hazardous. 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. The Agency analyzed potential risks from methyl chloride wastewater treatment sludge by modeling non-groundwater pathways and conducting a screening analysis for groundwater pathway risk. The Agency concluded that no significant risks are posed by the management of methyl chloride sludges in an on-site landfill.

4. Allyl Chloride Wastewater Treatment Sludges

EPA proposed not to list as hazardous sludges generated from treating wastewaters associated with the manufacture of allyl chloride. The Agency identified no risks of concern associated with the current management of the waste.

Only one facility generates wastewater treatment sludge from the production of allyl chloride, and this facility does not currently manage the sludge as hazardous waste. The sludge is generated from the treatment of commingled wastewaters managed at 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. The sludge generated from the facility's wastewater treatment system is incinerated on site in a non-hazardous waste incinerator.

TCLP analyses of the sludge conducted by EPA indicated the presence of no TCLP constituents above regulatory levels. As explained in the proposal, 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 and the dioxin level detected in the sludge are well within typical soil background levels for these constituents.

C. Which Constituents Did EPA Propose To Add to Appendix VIII of 40 CFR Part 261?

EPA proposed to add two constituents, octachlorodibenzo-p-dioxin (OCDD) and octachlorodibenzofuran (OCDF) to the list of hazardous constituents at 40 CFR part 261, Appendix VIII. These two constituents of concern are present in the EDC/VCM wastewater treatment sludges and the chlorinated aliphatic wastewaters that the Agency proposed to list as hazardous. OCDD and OCDF are members of the large family of polychlorinated dioxins and furans. The Agency proposed to add these two dioxin congeners to Appendix VIII of 40 CFR part 261 because they are constituents of concern in the wastes proposed to be listed as hazardous, studies showed that OCDD and OCDF

have toxic effects and are therefore hazardous, and EPA also noted that OCDD and OCDF are the only congeners that make up 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD or ''TCDD'') toxic equivalence (TEQ) that are not currently listed in Appendix VIII.

D. What Were the Proposed Treatment Standards Under RCRA's Land Disposal Restrictions Standards?

In the proposal, EPA proposed to apply existing universal treatment standards (UTS) to the regulated hazardous constituents of concern in the wastes that were proposed to be listed as K173 (chlorinated aliphatic wastewaters) and K174 (EDC/VCM wastewater treatment sludges). For K175 (VCM–A wastewater treatment sludges), EPA proposed a metals recovery requirement, roasting and retorting, as the treatment standard. Since treatment residuals would exist after mercury recovery, EPA proposed the residuals meet existing UTS prior to land disposal. Information available to the Agency at the time of the proposal indicated that each of the wastes proposed to be listed as hazardous, as well as the treatment residuals, could 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 provided detailed information on EPA's rationale for proposing to apply UTS to the wastes and for proposing a treatment standard of metals recovery to K175.

In the case of hazardous debris contaminated with proposed K173, K174 and K175, EPA proposed that the provisions in 40 CFR 268.45 apply to the treatment and disposal of hazardous debris. 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 debris treatment technologies such as extraction, destruction, or immobilization. Residuals generated from the treatment of contaminated debris would have to meet the applicable UTS limits proposed for K173, K174, and K175.

In the case of proposed K175, EPA proposed an alternative treatment standard. The alternative standard proposed was to subject K175 to a numerical concentration limit of 0.025 mg/L TCLP mercury. Under the alternative proposal, K175 could be land disposed if a standard of 0.025 mg/L TCLP mercury is achieved using any technology other than impermissible dilution.

In the proposal, the Agency explained that the solubility of the mercury in K175 (in the form of mercuric sulfide) varies as a function of pH. In fact, above pH 6.0 the presence of sulfide complexes results in significantly increased solubility. Therefore, controlled treatment and disposal pH conditions were proposed to avoid mobilization of the mercury in the waste. To insure operational stability of the treatment process and proper long-term disposal, EPA proposed two conditions as part of the LDR treatment standards. First, the waste would have to be treated to (or otherwise be generated to meet) a pH of 6.0 or below. Second, EPA proposed that if K175 were to be co-disposed in a landfill with other wastes, co-disposal would be restricted to wastes with similar pH (*i.e.,* pH not greater than 6.0). EPA proposed that disposal facilities be required to certify and maintain operating records demonstrating compliance with this disposal condition.

EPA also proposed 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. As explained in the proposal, these constituents have been shown to have the potential to cause significant risks to human health or the environment and their presence in wastes should be mitigated to avoid such potential risks. EPA proposed that all characteristic wastes which have these constituents as underlying hazardous constituents above the UTS be required to be treated to UTS levels for those constituents before land disposal.

Furthermore, EPA proposed 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 lieu of the original waste codes, and F039 wastes are subject to all numerical treatment standards applicable to all listed wastes. To maintain the regulatory implementation benefits of having one waste code for multisource leachate, the treatment standards for F039 must be updated to include the constituents of newly listed wastes.

E. What Risk Assessment Approach Was Used for the Proposed Rule?

EPA conducted human health risk analyses for chlorinated aliphatics wastewaters, EDC/VCM wastewater treatment sludges and methyl chloride wastewater treatment sludges that provided estimates of the incremental human health risks resulting from exposure to contaminants detected in these wastes. The incremental human health risks were expressed as estimates of excess lifetime cancer risk for carcinogenic (cancer-causing) contaminants and hazard quotients (HQs) for those contaminants that produce noncancer health effects.

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.

EPA conducted both ''central tendency'' and ''high end'' deterministic risk assessments to attempt to quantify the cancer risk or non-cancer hazard for the typical 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). In the case of the 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 were either mean (average) or 50th percentile (median) values.

We used 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) [3] 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

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

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.

EPA used probabilistic risk assessment to support the results of the deterministic risk analyses and to allow us 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 high end deterministic analysis exceeded the following criteria: a cancer risk of 1×10^{-6} or a hazard quotient of 1. 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 was approximated through repetitive calculation of the fate and transport and exposure equations and models using input parameters randomly selected from the Probability Density Functions (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 five 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 preamble to proposed rule provided a detailed discussion of how EPA completed each of these tasks for the risk assessments conducted to support the chlorinated aliphatics listing determination (see 64 FR 46483).

V. What Changes Were Made to the Proposed Rule?

As a result of comments and additional information provided to the Agency in response to the proposed rule, we made certain modifications to the risk modeling assumptions used in the risk assessment for the proposed rule. Changes made to the risk analysis resulted in changes in our risk assessment results. These changes subsequently caused us to re-evaluate, and in some instances change, our proposed listing determinations. These changes and the consequent scope of today's final action are described below. Detailed reasoning behind these changes and a summary of each of our final listing determinations is provided in Section VI.

A. Listing Determination for Chlorinated Aliphatic Wastewaters

In response to comments and information provided by commenters in response to the proposed rule, the Agency examined the record and reconsidered the risk assessment and proposed listing determination for chlorinated aliphatic wastewaters. Commenters to the proposed rule provided detailed comments on the risk assessment approach used to evaluate the potential risks from the management of chlorinated aliphatic wastewaters in aerated biological treatment tanks. These comments generally fell into one of six topic areas: concern about the waste management scenarios EPA evaluated; concern about the exposure scenarios EPA evaluated; EPA's methods for calculating exposure point concentrations; the way that EPA estimated exposure; EPA's assessment of contaminant toxicity; and EPA's characterization of estimated risks. To fully respond to critical issues raised by commenters, EPA decided to make modifications to some modeling assumptions and data inputs used in the risk assessment for the proposed rule. Modifications were made to fully consider the potential impacts of those issues raised by commenters that the Agency found to have merit. In addition, we evaluated the merits of other suggestions provided by commenters, and found these to be of no importance to the listing determination, or we disagreed with the suggested changes. Specifically, we agreed with commenters who pointed out that the intake rates that we used to calculate exposure to beef should have accounted for the mass of beef that is lost during cooking and post-cooking activities (for example, dripping and volatile losses, bones, excess fat, scraps, and juices). We also adjusted our analysis to reflect the variability of dioxin concentrations in air over an area that would be more consistent with the area of a pasture where cattle graze. In addition we were convinced by commenters that our modeling assumptions should have accounted for the removal of wastewater solids prior to wastewaters entering aerated biological treatment tanks.

After we accounted for these modifications, our adjusted risk assessment results indicated that the management of chlorinated aliphatic wastewaters in aerated biological treatment tanks do not pose substantial risks to human health and the environment. The Agency has concluded that available information provides sufficient basis to determine that chlorinated aliphatic wastewaters should not be listed as hazardous waste. A more detailed discussion of the issues raised by public commenters and the modifications made to our risk assessment results to account for some of these issues is provided in Section VI below.

The final listing determination for chlorinated aliphatic wastewaters is based upon EPA's consideration and review of public comments submitted in response to the proposed listing determination, and other relevant information available to the Agency and in the rulemaking record. The final determination is based on the Agency's evaluation as to whether the waste meets the criteria in 40 CFR 261.11(a)(3) for listing wastes as hazardous. We have assessed and considered the factors contained in these criteria primarily by incorporating them as elements in the revised risk assessment, which is based on the methodology described in the preamble to the proposed rule and subsequent modifications described in this preamble and the support documents in the rulemaking record. EPA bases its final listing determinations on the entire rulemaking record, including applicable sections of the preamble to the proposed rule, analyses and background documents developed for the proposed rule, the Agency's responses to the comments on significant issues raised in the preamble to the proposal, and all other relevant information available to the Agency.

B. Modification of Wastewater Treatment Unit Exemption and Application of Subpart CC Requirements for Tanks Managing Chlorinated Aliphatic Wastewaters

Because we are not finalizing the listing for chlorinated aliphatic wastewaters as proposed, the proposed amendments to regulations for tanks

managing chlorinated aliphatic wastewaters are not necessary and are not being finalized in today's rule. This includes the proposed amendments to the wastewater treatment unit exemption in 40 CFR 264.1 and 265.1, as well as the proposed amendments to the 40 CFR parts 264 and 265 subpart CC requirements for implementing the tank cover requirements and the waste sampling and analysis requirements.

C. Landfill Leachate Derived From Previously Disposed VCM–A Wastewater Treatment Sludges

In the proposal, EPA proposed amending the existing exemption from the definition of hazardous waste (40 CFR 261.4(b)(15)) to include leachate derived from non-hazardous waste landfills that previously accepted newly-listed VCM–A wastewater treatment sludges (K175). The Agency would have temporarily deferred the application of the new waste code to such leachate to avoid disruption of ongoing leachate management activities during a time period in which the Agency would decide how to integrate RCRA and CWA regulations governing the management of landfill leachate.

The Agency proposed the deferral because information available to EPA at the time of the proposal indicated that VCM–A wastewater treatment sludges may have been managed previously in non-hazardous waste landfills. However, information provided by the one generator of this waste in response to the proposed rule, indicates that since 1985 these sludges have not been disposed in a non-hazardous waste landfill. The generator has assured EPA that the VCM–A sludges always have been disposed in subtitle C landfills. Based upon this information, the Agency sees no need to finalize the proposed deferral for landfill leachate at this time.

The Agency is not finalizing (but is deferring a final decision on) the proposed temporary deferral for applying the new K175 waste code to leachate from non-hazardous waste landfills that previously accepted waste that meets the K175 listing description. Should the Agency receive information at a later date indicating that one or more non-hazardous waste landfills did accept this waste prior to the effective date of today's rulemaking, we may re-consider our decision not to finalize the proposed deferral.

VI. What is the Rationale for Today's Final Rule, and What Are EPA's Responses to the Comments?

A. Chlorinated Aliphatic Wastewaters (Other Than Wastewaters From the Production of VCM–A Using Mercuric Chloride Catalyst in an Acetylene-Based Process)

The sections that follow provide a discussion of the comments received by the Agency in response to the EPA's proposal to list chlorinated aliphatic wastewaters as hazardous waste, the Agency's response to these comments, and the impact of the comments on the Agency's evaluation of risk and the final listing determination.

1. Summary of the Agency's Listing Decision for Chlorinated Aliphatic Wastewaters

EPA is issuing a final decision not to list wastewaters from chlorinated aliphatic production processes. The Agency has determined that these wastewaters do not pose substantial risks when managed in aerated biological treatment tanks.

The Agency proposed to list chlorinated aliphatic wastewaters based upon an estimated high-end deterministic risk from dioxin for an adult farmer of 2E–05. As explained in more detail below, as a result of our analysis of information provided by commenters, we determined that it was appropriate to adjust our risk assessment results to account for certain factors not addressed in the risk assessment for the proposed rule. These factors include accounting for cooking and post-cooking losses for beef, assuming a more realistic size of the pasture (or field) supporting cattle that are indirectly exposed to dioxin emissions, and accounting for the potential for solids removal prior to wastewater treatment in aerated biological treatment tanks. After calculating these adjustments to our proposed risk assessment results, EPA found that they would reduce our high end deterministic risk estimate for the adult farmer. Specifically, accounting for cooking and post-cooking losses for beef would modify the risk estimate by a factor of 0.78, and accounting for a more reasonable pasture size would modify the risk estimate by a factor of approximately 0.50, resulting in an overall risk estimate of 7E–06. Accounting for solids removal from the wastewater prior to biological treatment could modify the overall risk estimate by an additional factor of 0.67 to 0.94, that is, could result in a risk estimate as low as 4E–06.

Given the Agency's finding, we are not finalizing the proposed amendment to the existing wastewater treatment unit exemption (40 CFR 264.1(g)(6) and 265.1(c)(10)). In addition, the Agency is not finalizing the proposed requirement that wastewater treatment units used to treat chlorinated aliphatic wastewaters comply with specific RCRA air emissions standards.

Today's decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units. As explained further below, in the case of chlorinated aliphatic wastewaters managed in surface impoundments, although the wastewaters are not listed hazardous wastes, sludges derived from EDC/VCM process wastewaters and generated in impoundments will meet the scope of the hazardous waste listing for EDC/VCM wastewater treatment sludges after the effective date of today's rule.

2. Response to Major Comments Received on Proposed Rule for Chlorinated Aliphatic Wastewaters

EPA received comments on a number of issues concerning the data and analyses EPA used to arrive at our listing decision for chlorinated aliphatic wastewaters. The most significant comments that we received may be divided generally into six categories: (1) Comments on EPA's waste management assumptions; (2) comments on the exposure scenarios we evaluated in our risk assessment; (3) comments on how we calculated exposure point concentrations in the risk assessment; (4) comments on EPA's exposure assessment; (5) comments on EPA's toxicity assessment for dioxin and chloroform; and (6) comments on how we characterized risks associated with dioxin and chloroform. These comments, and the Agency's responses to these comments, are summarized below. We have developed responses to all of the public comments received in response to the proposed rule. The verbatim comments and our responses to all comments are provided in Response to Public Comments; Final Listing Determination for Chlorinated Aliphatics Industry Wastes in the docket for today's rule.

a. Waste Management Assumptions

The majority of chlorinated aliphatic wastewaters is managed in on-site, tank-based wastewater treatment systems prior to direct discharge of the wastewaters in accordance with facility-specific NPDES permits or discharge to an off-site POTW. As explained in the

preamble to the proposed rule, two chlorinated aliphatic production facilities manage their wastewaters in underground injection control (UIC) wells. In addition, commenters provided information indicating that one facility pipes its chlorinated aliphatic wastewaters off-site for treatment in a wastewater treatment system that includes biological treatment in surface impoundments.

i. Why Did EPA Only Evaluate Air Releases From Tanks?

One commenter asserted that EPA did not consider releases from tanks other than air emissions from treatment tanks managing chlorinated aliphatics wastewaters. As the commenter pointed out, EPA assumed that the wastewater treatment system tanks are of sufficient integrity to prevent releases and that the tanks are equipped with overflow and spill controls that will prevent non-air releases of wastewaters, even though (as the commenter also points out) no overflow and spill controls are required for nonhazardous storage waste tanks, including tanks that manage wastewaters subsequently discharged either to Publicly Owned Treatment Works (POTWs) or surface waters. The commenter states that EPA's failure to consider non-air releases from wastewater treatment system tanks, which in the commenter's opinion are plausible mismanagement scenarios, violates EPA's criteria for listing determinations, which requires an assessment of ''plausible types of improper management.''

When EPA set out to assess risks from managing wastewaters in tank-based systems, we chose to model only air emissions because we determined that this was the greatest potential pathway of exposure for constituents from the tank systems (therefore causing the greatest potential risk), particularly since we knew from the RCRA Section 3007 Survey responses that the industry uses aerated biological treatment tanks, many of which are uncovered, or open to the atmosphere. In addition, survey responses indicated that the tanks are positioned aboveground and a majority of them are equipped with secondary containment. Therefore, EPA determined that any leaks or catastrophic releases from such tanks would be detected relatively quickly and corrective measures likely would be implemented prior to a release of significant quantity. In addition, these types of releases, if they were to occur, are not predictable or routine but rather would be the result of inordinate events or accidents such as upset conditions or catastrophic failures, which the Agency presumes would not be routine, frequent or plausible (mis)management. In sum, we continue to believe that air emissions from aerated biological treatment tanks is the predominate exposure pathway and that risks resulting from this pathway are significantly greater than any risk that may periodically arise from spills or leaks.

ii. Why Did EPA Not Evaluate Storage of Wastewater?

One commenter stated that EPA did not consider other air emissions from the storage of chlorinated aliphatic wastewaters prior to placing these materials in tanks. The commenter said that such analysis is not needed if EPA finalizes a ''standard'' listing mechanism for K173, but that EPA must undertake such an analysis if a concentration-based listing is adopted. EPA assumes that the commenter is describing wastewaters managed in tanks between the point the wastewater is first generated until it reaches the headworks of the wastewater treatment facility. (This is because under the proposed listing options, wastewater would not be tested to determine whether it exceeds the 1 ng/L dioxin trigger until it enters the first tank in the wastewater treatment system.) Although EPA is not finalizing the proposed chlorinated aliphatic wastewater listing in today's rule, we note that the RCRA Section 3007 questionnaire results indicate that only a few facilities manage wastewaters in tanks that are not a part of the wastewater treatment train. In all cases where a facility indicated having wastewater storage tanks that are not part of the wastewater treatment system the facility indicated that the tanks are covered. The fact that such tanks are covered would limit the potential for air releases. In our risk assessment, we chose to analyze air emissions from wastewater treatment tanks because, based upon information provided to the Agency in facility responses to the RCRA Section 3007 questionnaire, such tanks may be used to manage relatively large quantities of chlorinated aliphatic wastewaters, and often are not covered and are aerated. In view of our revised risk estimate for potential releases from these tanks, any potential risks from the covered, upstream tanks would not be substantial.

b. Exposure Scenarios Evaluated in EPA's Risk Assessment

EPA received comments from a number of parties that challenged EPA's basic methodology for establishing the exposure scenarios evaluated in the chlorinated aliphatic wastewater risk analyses. The commenters believed that EPA should have used a site (or facility)-specific approach for conducting the risk assessments. The commenters raised general concerns regarding EPA's approach, and also challenged specific aspects of EPA's analysis. These two issues are discussed separately below.

i. Evaluating Site-Specific Exposure Scenarios—General Comments

Commenters on the proposed rule stated that EPA should have used a site-specific approach to assessing risks from management of chlorinated aliphatic wastewaters, and presented general arguments why EPA should adopt a site-specific approach. Specifically, the commenters believed that EPA should have conducted the chlorinated aliphatics risk assessments using an approach similar to that used in the final combustion Maximum Achievable Control Technology (MACT) rulemaking under the Clean Air Act. For that rulemaking, EPA used facility-specific data in determining risks (64 FR 52828, September 30, 1999). The commenters contended that as a result of the public and peer review comments received on the risk assessment in the proposed combustion MACT, EPA modified its risk analysis to focus on the entire population of persons that are exposed to facility emissions rather than persons living on a few individual farms and residences. Some commenters recommended that EPA adopt a regulatory approach allowing generators themselves to determine the site-specific risk (using site-specific distances to the nearest receptor, wastewater concentrations, etc.) and subsequently the regulatory status of the wastes addressed under EPA's proposed rule.

Similarly, some commenters expressed general concern over EPA's use of ''assumptions,'' rather than site-specific data, in the risk assessment. The commenters believe that if EPA were challenged with evaluating hundreds of scenarios across the entire nation, then the use of assumptions from statistical sampling of databases or best judgment could be better understood. However, with the limited number of facilities and waste management units involved in this proposed rule making (23), the commenters believe that EPA could have spent more time gathering real, site-specific data to reduce the uncertainty in risk modeling. The commenters pointed to the limited set of waste sample data, the lack of site-specific information regarding waste

management units for the chlorinated aliphatics industry, and the regional databases used to obtain the parameter values necessary to model containment fate and transport as data elements that should have been more site-specific.

EPA acknowledges that we did not conduct site-specific risk assessments to support the chlorinated aliphatics wastewater listing determination, but rather evaluated plausible exposure scenarios that are based on a combination of national data, regional data, and data collected from the facilities themselves. In some cases we believe that only one specific management practice is plausible, and existing locations for that practice are not likely to change. For example, certain economic or natural resource factors may restrict the nature of wastes in terms of their constituent concentrations, their quantities, or the ways in which the wastes are managed. This generally is not the case for the chlorinated aliphatic chemicals production industry. EPA described the continued and projected growth of the chlorinated aliphatic chemicals industry in the Economics Background Document for the proposed rule, and documented evidence of the industry's historically dynamic nature (USEPA, 1999b).[4] Nevertheless, there is considerable uncertainty in predicting a relationship between industry growth and waste generation and management. We cannot foresee the effects that potential (and possibly simultaneous) changes in technology, facility expansion practices (that is, increasing production capacity at existing facilities versus building new facilities), and waste minimization activities may have on waste generation and management. We also cannot predict whether there will be an increase in global marketshare of off-shore (non-U.S.) chlorinated aliphatic chemical production. Consequently, we based our evaluation on general information describing current chlorinated aliphatic waste management and exposure scenarios. This is not to say we based the modeling entirely on assumptions or hypothetical values. Rather, we used the combination of site-specific information, and other types of information that we thought would effectively capture what we expected would remain relatively consistent for one industry while accounting for likely future variability. For example, we surveyed the potentially affected facilities to identify existing waste management practices, and then assumed that those same management practices will continue to be used by the industry in the future. Additionally, we identified the location of chlorinated aliphatics facilities, and assumed that in the future, facilities might locate in the same general geographic regions (for example, regions with the same meteorological conditions), and in areas with the same general land use patterns (for example, agricultural areas). Similarly, we assumed that, although the exact numbers and locations of facilities may change, the quantities of the wastes, as well as the types and concentrations of contaminants in the wastes, will be generally the same over the near to long term. Again, the specific mix of site-specific and more general information will vary from one listing rule to another and potentially from one waste to another within a given rulemaking, depending on how dynamic EPA expects future waste management practices to be.

By evaluating the data using the probabilistic and two-high end deterministic approaches discussed in the preamble to the proposed rule (64 FR 46483), EPA endeavors to avoid regulating wastes based on exposure scenarios that are unrealistic (that is, based on too many protective [high end] assumptions). However, in the case of the chlorinated aliphatics industry, we did not feel our information justified an assumption that there would always exist exactly 23 chlorinated aliphatics facilities at 23 specific locations that continue to generate the same quantities of wastewaters, with the same types and concentrations of contaminants, that are managed in aerated biological wastewater treatment tanks under a static set of operating conditions. Historically, EPA's policy under the listing program has been to conduct national-scale evaluations that consider the general characteristics of the wastes under review, and allow facilities to petition the Agency to have their wastes ''delisted'' if they believe that the wastes do not meet the criteria for hazardous waste listing.

EPA also notes that, in view of the Congressional mandate to make final listing determinations on seventeen waste categories in fifteen months, Congress does not appear to have anticipated that each of these listings efforts would involve a detailed, facility-by-facility analysis (RCRA 3001(e)).

ii. Evaluating Site-Specific Exposure Scenarios—Specific Comments

Commenters on the proposed rule raised objections to three specific aspects of the exposure scenarios on which EPA's risk assessments for wastewaters are based. The following discussion describes those comments and EPA's response.

A number of commenters noted that EPA's high end human health risk analyses are based on dioxin exposures to farmers who live at the same location within 300 meters (0.18 miles) of a chlorinated aliphatics facility for 48.3 years or more, who raise fruits, exposed vegetables, root vegetables, beef cattle, and dairy cattle within this 0.18 mile range, and whose diet consists of approximately 42 percent home-grown exposed vegetables, 17 percent home-grown root vegetables, 33 percent home-grown fruits, 49 percent home-produced beef, and 25 percent home-produced dairy.[5] Some commenters questioned why their operations would be regulated under EPA's proposed rule, contending that it does not make sense to regulate a waste stream or to require controls and expenditures to protect a type of individual that will not be present. Many of the commenters claimed that they were not aware of any farmers living within 0.18 miles of a chlorinated aliphatics facility that met all these criteria, and found it difficult to believe that such a farmer would grow fruit trees and vegetables, and raise beef and dairy cattle, all on the same plot of land. Moreover, the commenters maintained that in the south Texas area where several EDC/VCM manufacturing facilities are located, dairy cattle production is non-existent due to the climate. One commenter that represents facilities in Louisiana stated that of the nine companies that they represent, only at two facilities is there farmland within 300 meters of the facility boundary (not 300 meters from the wastewater treatment tanks). The commenters stated that beef cattle are raised on one of the two farms, and that beef cattle and sugar cane are raised on the other farm.

[4] USEPA. 1999b. Economics Background Document, Proposal by the USEPA To List Wastewaters and Wastewater Sludges from Chlorinated Aliphatic Chemical Manufacturing Plants, as RCRA Hazardous Wastecodes K173, K174, K175: Industry Profile and Estimation of Industry Regulatory Compliance Costs. Office of Solid Waste. 30 July.

[5] The public comments suggest that the commenters believe that EPA assumed that the farmer consumes 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 that the farmer grows. EPA assumes that the commenters meant to take issue with the EPA's assumption that 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 that the farmer consumes are home-produced (i.e., the rest of the farmer's diet would be obtained from other sources, such as a grocery store).

In response, EPA notes that exposure duration was one of the two high end parameters in our proposed high end dioxin risk estimate for the farmer, and that the value of 48.3 years is the 90th percentile exposure duration for households in the ''farm'' housing category as presented in Table 15–164 of the Exposure Factors Handbook (USEPA, 1997 [6]). Moreover, the information provided in the public comments confirms that an exposure scenario in which a farmer raises beef cattle on a farm located within 300 meters of a chlorinated aliphatics facility (and presumably a wastewater treatment tank located near the facility boundary) is plausible. Although the commenters clearly disagree that a farmer also might produce fruits and vegetables on this farm, these concerns are unwarranted. Table 5–3 of the Risk Assessment Technical Background Document (USEPA, 1999a) [7] shows that for the adult farmer, 99.3 percent of the high end risk from chlorinated aliphatic wastewaters was due to ingestion of beef and dairy products and only 0.7 percent was due to ingestion of home grown fruits and vegetables. As a result, even though EPA believes it is plausible that a subsistence or hobby farmer would raise fruits and vegetables for home consumption, the validity of EPA's risk estimate depends almost entirely on the validity of our assumption that a farmer might consume both beef and dairy products from cattle raised on a farm located in the vicinity of a chlorinated aliphatics production facility. To evaluate the commenters' concerns regarding dairy cattle production in the vicinity of chlorinated aliphatics facilities, EPA referred to public data on agricultural production in the regions surrounding chlorinated aliphatics production facilities that are available from the Agricultural Census of the United States (see reference for *http://govinfo.library.orst.edu* that is included in the docket for the proposed rule). The census data demonstrate that, in fact, of the 23 chlorinated aliphatic facilities that manage wastewaters, 21 facilities, including all of the facilities in the south Texas area, are located in counties where dairy cattle were reported to have been raised in 1997 (all of the facilities are located in counties where beef cattle were reported to have been raised in 1997). EPA believes that an individual who raises cattle to support a subsistence lifestyle might reasonably consume both dairy and beef products from his/her cattle.

Some commenters also challenged EPA's assumptions regarding the percentages of beef and dairy products consumed by the farmer that are home produced (that is, assumed to be from a contaminated source). Specifically, EPA assumed that 25.4 percent of the dairy products a farmer consumes are home produced, and that 48.5 percent of the beef products a farmer consumes are home-produced. The commenters asserted that the percentages EPA used apply to a relatively small fraction of the surveyed population who farm, and as such are overly conservative by a factor of 21.2 for dairy,[8] and a factor of 12.7 for beef,[9] if applied to the general population (USEPA, 1997). The commenters held the opinion that the percentages used by EPA overstate the upper end homegrown beef and dairy consumption markedly. However, one of the same commenters acknowledged that the commenter was unable to confirm alternate values that EPA should have used for percentage of beef and dairy consumed by the farmer that is home grown. One peer reviewer asked where EPA obtained the values for the percentages of food eaten by the farmer (EPA provided the source of the values in the preamble to the proposed rule), but did not indicate whether he believed the percentages were right or wrong.

EPA's estimates of the portion (percentage or fraction) of a farmer's diet that is home-produced are presented in EPA's Exposure Factors Handbook (USEPA, 1997), and are based on the U.S. Department of Agriculture's 1987–1988 Nationwide Food Consumption Survey (NFCS).[10] We did not use the percentages that reflect the consumption of home-produced foods by the general population in our risk assessment, as suggested by the commenters, because EPA's objective was to evaluate risks to farmers, not members of the general population, who consume home-produced food items. As one would expect, the data in the Exposure Factors Handbook indicate that farm households consume more home-produced foods than do households in the general population. The percentages that correspond to the general population would be applied more appropriately to an evaluation of residential receptors.

One commenter claimed that in EPA's Combustion MACT rulemaking, EPA indicated that according to USDA information, only 40% of farmers who raise beef eat their own beef (64 FR 52998), and that the percentage of dairy farmers who consume home grown dairy products is only 40% in the Northeast, 20% in the Midwest, lower elsewhere in the country, and averages only 13% nationally (64 FR 52998). The commenter also noted that in the Combustion MACT rulemaking, EPA acknowledged that information on the number of farms that produce more than one food commodity (for example, beef and milk) is not available from the U.S. Census of Agriculture (64 FR 52828, see 53005–53006), and that in determining the risk to commercial farmers under the Combustion MACT rule, EPA stated: ''only the primary food commodity produced on the farm was assumed to be consumed by farm households (64 FR 52998).

It appears that the commenter somewhat misrepresented the data from the final MACT rule. Specifically, the **Federal Register** notice to which the commenter refers is very clear that while ''[o]nly the primary food commodity produced on the farm was assumed to be consumed by farm households,'' ''[a] wide variety of foods was assumed to be produced and consumed by households engaged in subsistence farming'' (64 FR 52999). In fact, under the subsistence farmer scenario evaluated for the MACT rulemaking, EPA assumed that 100 percent of the food that the farmer consumes is home-produced. This assumption clearly results in greater exposure than the assumptions used in EPA's analysis of the farmer scenario in the chlorinated aliphatics analysis. Moreover, the commenter misinterpreted data presented in the MACT rulemaking that describe the percentages of households that consume beef and dairy products in various parts of the country. The **Federal Register** notice to which the commenters refers states:

In particular, we re-analyzed data collected by USDA to estimate consumption of home-produced foods, such as meat, milk, poultry, fish, and eggs. Over half of farm households report consuming home-produced meats, including nearly 40 percent that report

[6] U.S. EPA. 1997. Exposure Factors Handbook, Volumes I, II, and III. EPA/600/P–95/002Fa, b, c. Office of Research and Development, Washington, D.C., August.

[7] U.S. EPA. 1999a. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Office of Solid Waste. July.

[8] The proportion of home-produced dairy consumed by ''households who farm'' (0.254) divided by the proportion of home-produced dairy consumed by persons in the general population (0.012).

[9] The proportion of home-produced beef consumed by ''households who farm'' (0.485) divided by the proportion of home-produced beef consumed by persons in the general population (0.038).

[10] The 1987–1988 NFCS data on intake of home-produced foods are included for use in the recent (1997) Exposure Factors Handbook (U.S.EPA, 1997), which has been reviewed by EPA's Science Advisory Board (SAB) as well as numerous other external reviewers.

consumption of home-produced beef. In the Northeast, nearly 40 percent of farm households report consuming home-produced dairy products, and in the Midwest, nearly 20 percent do. The percentage is lower elsewhere, averaging about 13 percent nationally.

The data cited by EPA pertains to the number of all farm households that consume home-produced beef and dairy products. The commenters incorrectly assumed that the data applied specifically to households engaged in raising beef cattle and households engaged in raising dairy cows, respectively. EPA expects that the consumption of home-produced beef and dairy products would be much greater for households engaged in production of these commodities compared to the consumption for all farm households.

c. Calculation of Contaminant Concentrations at the Point of Human Exposure (Contaminant Fate and Transport Modeling)

EPA received comments questioning the way that we estimated emissions from aerated biological wastewater treatment tanks, and the way that we estimated the concentrations of dioxins in beef and dairy products. These comments included concerns about how CHEMDAT8 evaluates dioxins that are sorbed onto solids in wastewaters, and about how EPA estimated the amount of solids influent to aerated biological wastewater treatment tanks. Commenters also took issue with the Agency's assumptions about the diet of dairy and beef cattle and the productivity of the modeled farm. Each of these assumptions significantly affects our calculation of contaminant concentrations to which human receptors are exposed.

i. EPA Did Not Correctly Consider Sorption of Dioxin Onto Solids and Solids Removal From Wastewater

To evaluate the human health risks posed by dioxins in chlorinated aliphatic wastewaters, EPA modeled air emissions from aerated biological wastewater treatment tanks. We conducted the emissions modeling assuming that the concentrations of dioxins in wastewaters flowing to aerated biological treatment tanks were equivalent to the concentrations of dioxins in certain wastewater samples we collected. For the proposal, we constrained (''capped'') the influent concentrations of four congeners in the wastewaters at their aqueous solubility concentrations to account for the fact that dioxins are strongly hydrophobic and are expected to be sorbed to solids preferentially in the wastewater influent, thus are unlikely to exist in the dissolved phase in excess of their solubility limits.

Commenters on the proposed rule expressed a number of concerns regarding the way that EPA evaluated the solids fraction of chlorinated aliphatics wastewaters. The commenters' primary concern was that EPA did not appropriately consider that most dioxins in chlorinated aliphatics facility wastewaters will be sorbed onto solids in the wastewaters even when the dioxin congener concentrations in wastewaters are less than their solubility limits. Certain commenters contended that in EDC/VCM production facilities that use fluidized bed oxychlorination processes, attrited catalyst fines (small particles that are 1 to 20 micrometers in size) that exit the facility process via the wastewater treatment system have very high surface area (approximately > 50 m2/g) and thus strongly sorb dioxins that are present in the wastewaters. The commenters asserted that EPA failed to account for the fact that almost all of the dioxins in wastewaters are sorbed to solids and are removed in primary clarifiers prior to aeration. Moreover, the commenters believed that EPA's model for estimating emissions from wastewater treatment tanks (CHEMDAT8) does not correctly model sorption. One commenter stated that CHEMDAT8 takes into account adsorption onto biomass solids, but claimed that CHEMDAT8 does not adequately address the fact that most dioxin is already sorbed onto solids (and not available for volatilization) when it enters an aerated tank. Commenters submitted various analyses and data to substantiate their claims, and contended that EPA had overestimated the concentration of dioxins available for volatilization by at least an order of magnitude.

Although EPA agrees that the primary removal mechanism of dioxins in wastewater treatment tanks will be through the sorption of dioxins onto solids (see p. 3–2 of EPA's 1999 Risk Assessment Technical Background Document, USEPA 1999a), EPA does not agree with the commenters' concerns that CHEMDAT8 fails to correctly account for sorption. CHEMDAT8 does in fact model sorption as a reversible, linear, equilibrium partitioning process, the same process that the commenters believed should be considered to account for the sorption of dioxins onto solids in wastewater. CHEMDAT8 is designed to evaluate the contaminant loss rates for the competing removal mechanisms of volatilization, biodegradation, sorption and hydrolysis based on the total contaminant load influent to the system (whether associated with the dissolved or solid phase). The contaminant loss rate due to sorption is based on the equilibrium solids partitioning coefficient and the rate at which solids enter or are generated within the system. Thus, in estimating the amount of solids available to sorb dioxins, CHEMDAT8 considers total suspended solids (TSS) in the influent stream as well as new biomass growth. It does not matter how dioxin is partitioned onto solids when the wastewater enters the tank, because the model repartitions the dioxins inside the tank according to the model's equilibrium partitioning relationship and the relative rates of the competing removal mechanisms. Consequently, in our analyses we evaluated the total contaminant load in the tank influent, regardless of whether the contaminants were associated with the dissolved or solid phase. In cases where solids are present in the influent, limiting a CHEMDAT8 analysis to dissolved phase wastewater influent concentrations might seriously under-represent the total contaminant load to the tank and result in greatly underestimating emissions, especially for sorptive chemicals like dioxins. Because CHEMDAT8 considers partitioning and removal by sorption within the tank, limiting the mass of dioxin influent to the system (by limiting the influent concentration to the dissolved phase concentration) may result in greatly underestimating emissions because only the contaminant mass in the dissolved phase would be partitioned in the tank, rather than the total contaminant mass associated with the influent's dissolved plus solid wastewater phases.

In contrast, EPA agrees with the commenters concerns that we failed to accurately account for the fact that in aerated biological wastewater treatment systems, at least some solids removal generally will occur between the headworks of the wastewater treatment system and the influent to an aerated biological treatment tank (we addressed risks from the management of solids separately in this listing determination). In the preamble to the proposed rule, EPA specifically stated that we selected wastewater data for evaluation that we believed represented the concentrations of contaminants in wastewaters at the influent (headworks) of treatment systems that are used to manage only wastewaters from the production of chlorinated aliphatic chemicals (''dedicated'' chlorinated aliphatics wastewater samples; 64 FR 46483). In

retrospect, our assumption that the same data that represent contaminant concentrations at the headworks of wastewater treatment systems could represent contaminant concentrations at the influent to aerated biological wastewater treatment tanks was somewhat flawed. The Agency reviewed information previously provided to us in industry survey responses and determined that of the eleven facilities that employ aerated biological processes to treat their wastewaters, nine employ primary clarification or other processes that have the effect of removing solids from wastewaters prior to their discharge to aerated biological treatment tanks. (One of these nine facilities is the facility from which we collected the ''high end'' wastewater sample used in the risk analysis that served as the basis for our proposed listing decision.) The remaining two facilities perform wastewater equalization in tanks prior to aerated biological treatment. One of these two facilities also employs wastewater pH adjustment with resultant precipitation of metal hydroxides prior to aerated biological treatment. Both of these processes are expected to result in at least some solids removal from the wastestream. Moreover, EPA does not anticipate that treatment of the wastewaters in units such as primary clarifiers and equalization basins would result in dioxin air emissions greater than those that we originally predicted from aerated biological treatment tanks, because primary clarifiers are, by design, quiescent units (Metcalf and Eddy, 1991,[11] p. 472), and we have no information that leads us to believe that the equalization tanks in use by the facilities are agitated.

To model the aerated biological treatment tanks correctly, that is, to determine what the appropriate influent concentration to the biological treatment tank should be, would have required that EPA model the wastewater treatment train from the point where wastewater enters the headworks of the treatment system to the point where the wastewater enters the aerated biological tank. Metcalf and Eddy (1991, p. 473) state that ''efficiently designed and operated primary sedimentation tanks should remove from 50 to 70 percent of the suspended solids * * * '' from wastewater. Assuming this level of solids removal from chlorinated aliphatics wastewaters prior to biological treatment we estimate that the high end deterministic risk estimate for the adult farmer reported in the proposal would be reduced by a factor ranging from approximately 0.67 (70 percent removal of solids) to 0.94 (50 percent removal of solids) (USEPA, 2000b).[12] A complete description of our analysis is provided in the Addendum to the 1999 Risk Assessment Technical Background Document (USEPA, 2000).

ii. EPA Incorrectly Evaluated the Contribution of Feed to Dioxin Levels in Dairy and Beef

To support the chlorinated aliphatics wastewater listing determination we estimated risks to a farmer who ingests beef and dairy products derived from cattle raised on a farmer's pastureland. EPA assumed that the beef and dairy cattle consume home-grown forage, grain, and silage, and incidentally ingest pasture soil. We assumed that beef cattle consume different quantities of the various food items (and pasture soil) than do dairy cattle. We also assumed that 100% of the cattle's feed is contaminated by releases from the wastes we evaluated, that is, that cattle are not provided feed from other (uncontaminated) sources.

The commenters believed that EPA should have considered that a cow's consumption of various food sources varies according to the animal's life stage and intended use. The commenters contended that these considerations influence both a cow's exposure and the potential translocation of dioxin to meat or milk. As an example, the commenters pointed out that beef cattle may be raised for part of their lives on pasture, but typically are raised on grain prior to slaughter. The commenters noted that, for instance, the beef cow nurses and pastures for approximately 180 days, pastures exclusively for 55 days, and subsists on a grain only diet for the final 130 days of its life (Stevens and Gerbec, 1988). The commenters asserted that EPA's risk assessment should have considered contaminant losses from a beef cow's tissue in the time period between the cow's consumption of contaminated feed and the cow's slaughter. The commenters also presented alternate information that they said could be considered in EPA's evaluation of risk. First, EPA assumed that dairy cattle consume 13.2 kg/day of forage, 4.1 kg/day of silage, 3 kg/day of grain, and 0.4 kg/day of soil, based on data cited by Rice (1994)[13]. In contrast, the commenters presented data from Stevens and Gerbec (1988) [14] who reported dairy cattle consumption rates of 6.8 kg/day of forage, 16.3 kg/day of silage, 4.5 kg/day of grain, and 0.14 kg/day of soil. Second, EPA assumed that beef cattle consume 8.8 kg/day of forage, 2.5 kg/day of silage, 0.47 kg/day of grain, and 0.5 kg/day of soil (Rice, 1994). The commenters contended that during the nursing phase the beef cow receives practically all of its daily dioxin dose through the mother's milk and this dose has been (and could be) calculated for nursing cattle (Stevens and Gerbec, 1988). The commenters continued that EPA should assume that during the pasture phase of its life the beef cow consumes 13.6 kg/day of feed: 10.2 kg/day of forage, 3.4 kg of silage, and 0.05 kg/day of soil. The commenters argued that during the cow's fattening stage of growth prior to its slaughter, during which the beef cow gains as much as 60 to 70% of its body weight, the cow's diet consists entirely of grain. The commenters suggested that EPA needs to take into account the impact of this body weight gain and consider how dioxin half-life influences the concentration of dioxin residuals in the meat.

The commenters also asserted that EPA's assumption that all of a cow's feed is contaminated seemed unrealistic. The commenters believed that such an assumption implies that a farm not only has both a dairy and beef cattle operation, but raises grain and silage (in addition to crops for human consumption) while still maintaining enough pasture to graze the animals. They noted that the same issue was raised by the peer reviewers who found some of the assumptions on productivity of the theoretical farmer unrealistically high and suggested that productivity necessary to maintain such a farm be researched and used to adjust EPA's assumptions accordingly. The commenters reasoned that since grain and silage often are purchased elsewhere, it would be more appropriate to assume that less than 100% of the cattle's feed is contaminated. They believed that fixing the percentage of contaminated feed consumed by the cattle at 100% is not a central tendency assumption, and fails to reflect the lack of certainty in this parameter. Therefore, they recommended that EPA assume

[11] Metcalf & Eddy, Inc. 1991. Wastewater Engineering: Treatment, Disposal, and Reuse. Revised by G. Tchobanoglous and F. Burton. Irwin McGraw-Hill, Boston. 1334 pp.

[12] 12 U.S. EPA. 2000b. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, Addendum. Office of Solid Waste. September.

[13] Rice, G. 1994. Quantity of Plants and Soil Consumed by Animal. Draft Working Papers. Office of Research and Development. U.S. Environmental Protection Agency, Washington D.C.

[14] Stevens, J.B. and Gerbec, E.N. 1988. Dioxin in the agricultural food chain. Risk Analysis. 8(3):329–335.

that only 50% of the feed is contaminated in the deterministic assessment, and that a uniform distribution of values be adopted for the Monte Carlo assessment, with percentages ranging from 0 to 100 percent.

To understand EPA's response to these comments, it is important to recall two pieces of information presented in EPA's Risk Assessment Technical Background Document for the proposed rule. First, as discussed previously in Section VI.A.2.b.ii, the risks that EPA estimated for the farmer are due almost exclusively to the farmer's ingestion of beef and dairy products (Table 5–3; USEPA, 1999a). Second, the dioxins in the beef and dairy products result almost entirely from the cattle's consumption of forage that is contaminated by air emissions from the modeled wastewater treatment tank—negligible levels of dioxins are contributed to cattle as a result of the cattle's ingestion of grain, silage, or soil (Appendix H.1, Table H.1–1a; USEPA, 1999a). Consequently, all that is required for the adult farmer to realize the risk that EPA presented in the proposed rule is that the farmer consume beef and dairy products derived from cattle that consume forage from the farmer's pastureland/field. That is, it is not necessary that the farmer consume home-grown fruits and vegetables, or that the farmer produce grain or silage for use as cattle feed. Therefore, in responding to the concerns of the commenters, EPA focused primarily on the technical validity and plausibility of our assumptions regarding the (1) consumption rates of forage by beef and dairy cattle and (2) the percentage of the forage that cattle consume that is contaminated.

EPA disagrees with the commenters' alternate recommendations regarding animal feeding practices. Although the feeding practices that the commenters describe, particularly those for beef cattle, may be applicable to commercial farming operations, EPA does not believe that such practices apply to hobby or subsistence farming. As noted by Rice (1994), a subsistence farmer will tend to feed his/her cattle an ''unsupplemented'' diet, meaning that the cattle will primarily feed on forage (because the cattle are permitted to graze more in the pasture), and will not be fattened at a feedlot prior to slaughter. Rice (1994) explains that in the southern part of the country (where most of the chlorinated aliphatics facilities are located), cattle will consume pasture as their major source of roughage the entire year (except in drought). Consequently, we believe that our assumptions regarding cattle ingestion of forage under a subsistence/hobby farming scenario are reasonable. We used the assumptions presented by Rice (1994) in other rulemakings [15] and have recommended that these assumptions be used in estimating risks under other hazardous waste programs (USEPA, 1998 [16]). Furthermore, the feed ingestion rate for dairy cows presented by the commenters is an average ingestion rate for a dairy cow in Minnesota (Stevens and Gerbec, 1988). In contrast, EPA's data for the intake rates of forage, grain, and silage for dairy cows are based either on data from the South Carolina-Georgia region (see Boone et al., 1981 [17]) or on more general data (Shor and Fields, 1980; [18] NAS, 1987; [19] and Boone et al., 1981). Chlorinated aliphatics facilities are located primarily in Texas and Louisiana, which we believe are probably more similar to South Carolina-Georgia than Minnesota in terms of cattle feeding practices.

With regard to EPA's assumptions for the percent of the cattle's feed derived from a contaminated source, EPA believes that it is appropriate to assume that a hobby or subsistence farmer is not supplying forage to his/her cattle from an outside source, such that 100 percent of the forage that the cattle consumes will be from the farmer's pasture or field (in our risk assessment, a contaminated source). This assumption is consistent with the assumptions made for both the subsistence and commercial farmers in the combustion MACT final rulemaking, as well as other EPA rulemakings and guidance.[20] However, in response to the commenters' concerns, we reviewed our methodology for estimating the concentrations of dioxins in forage to ensure that we were adequately considering the size of the contaminated source versus its expected productivity. In the proposed rule we explained that in evaluating the air pathway we always assume that the cattle are located along the centerline of the area most greatly impacted by air releases from the waste management units (64 FR 46486). We said that the air concentrations within about a 100-meter lateral distance from this point do not vary appreciably, and stated specifically in our Risk Assessment Technical Background Document (Addendum; USEPA, 1999a) that the concentrations vary about 20% within 200 meters of the point of maximum concentration. In the course of our reevaluation of these data in response to public comments, we concluded that we should have considered how the concentrations of dioxins in air, therefore in forage, vary over a wider aerial extent that would be more consistent with the area of a pasture. We concluded that a more reasonable approach would be to consider that the size of the pasture that is used to support the cattle is approximately 275 meters by 275 meters (75,625 m^2, approximately 19 acres). We believe a field of this size would be large enough to support sufficient cattle to sustain the family of a subsistence farmer (USEPA, 2000b). We used the results of the air modeling we conducted for the proposed rulemaking to determine the approximate difference between the air concentration that we used to calculate the proposed risk estimate (the air concentration corresponding to a point located 300m from the modeled wastewater treatment tank) and the average air concentration at a 75,625 m^2 field located 300m from the modeled wastewater treatment tank. In fact, EPA determined that more reasonably considering the area that is affected by the emissions from the modeled wastewater treatment tank would reduce the risk estimate on which our proposed rule was based, modifying the risk estimate (2×10^{-5}) by a factor of 0.50 (USEPA, 2000b).

[15] We used the assumptions of Rice (1994) in the risk assessment to support the final combustion MACT Rulemaking (64 FR 52828, September 30, 1999). In addition, we used some of the same assumptions in the Proposed HWIR Rule (November 19, 1999 **Federal Register**; 64 FR 63382) and the Petroleum Refining Residuals Final Listing (August 6, 1998 **Federal Register**; 63 FR 42210).

[16] USEPA. 1998. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Peer Review Draft. Office of Solid Waste and Emergency Response. EPA530–D–98–001A. July.

[17] Boone, F.W., Y.C. Ng, and J.M. Palms. 1981. Terrestrial Pathways of Radionuclide Particulates. Health Physics, vol 41, no. 5, pp. 735–747. November.

[18] Shor, R.W. and D.E. Fields. 1980. ''Agricultural Factors Affecting the Radionuclide Foodchain Pathway: Green Forage Consumption of Dairy Cows.'' Health Physics. vol. 39, pp. 325–332.

[19] NAS. 1987. Predicting Feed Intake of Food-Producing Animals. National Research Council, Committee on Animal Nutrition. National Academy Press, Washington, D.C.

[20] For example:

USEPA. 1998. Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Peer Review Draft. Office of Solid Waste and Emergency Response. EPA530–D–98–001A. July.

USEPA. 1998. Methodology for Assessing Health Risks Associated with Multiple Pathways of Exposure to Combustor Emissions. National Center for Environmental Assessment. EPA600/R–98/137.

Proposed HWIR Rule (November 19, 1999 **Federal Register**; 64 FR 63382)

Final Petroleum Listing Rule (August 6, 1998 **Federal Register**; 63 FR 42210)

d. Exposure Assessment—Cooking and Post-cooking Food Losses

Commenters contended that the equations in the risk assessment used to characterize exposure to chemicals from the consumption of beef do not appear to account for loss of chemicals due to food preparation, cooking, and consumption practices. The commenters pointed out that The Exposure Factors Handbook (''the Handbook;'' USEPA, 1997; referenced in the preamble to the proposed rule) recommends that these losses be considered, and provides estimates for percent weight losses from preparation of various meats from cooking and post cooking actions. Beef-specific loss estimates range from 11%–42% (mean = 27%) due to cooking and 10%–46% (mean = 24%) due to post cooking actions. Therefore, the cancer risk estimates associated with the beef ingestion pathway should be adjusted by a factor of 0.55 (0.73×0.76).[21]

EPA agrees that the intake rates that we used for the adult farmer (and certain child of farmer age cohorts) should have incorporated loss of beef due to cooking and post-cooking activities. The Handbook explains that the intake rates it provides for home-produced food items do not reflect actual food consumption (intake), but instead were derived from the amount of household food consumption in an economic sense, that is, they are the measure of the weight of food brought into the household that has been consumed (used up) in some manner. The Handbook explains that in addition to food being consumed by individuals, food may be used up by spoiling, by being discarded (for example, inedible parts), through cooking processes, etc. The Handbook provides estimated preparation losses for beef that include cooking losses (which include dripping and volatile losses) and post-cooking losses (which include cutting, bones, excess fat, scraps, and juices.) The authors of the Handbook averaged these losses across all cuts and cooking methods to obtain a mean net cooking loss and a mean net post-cooking loss for beef. The Handbook explains that the preparation loss factors presented ''are intended to convert intake rates based on 'household consumption' to rates reflective of what individuals actually consume. However, these factors do not include losses to spoilage, feeding to pets, food thrown away, etc.'' EPA acknowledges that considering the mean cooking and post-cooking losses for beef (45%) as presented by the commenters would result in reducing the risk estimate, modifying the total (beef plus dairy, see section VI.A.3) high end deterministic dioxin risk estimate for the adult farmer (2E–05) by a factor of 0.78.

e. Toxicity Assessment

The proposed rule presented an assessment of the toxicity of dioxins and chloroform, the constituents of concern in chlorinated aliphatics wastewaters. Commenters on the proposed rule challenged data and analyses EPA relied upon to characterize the toxicity of the dioxins and chloroform. First, the commenters believed that EPA's use of draft documents under review was inappropriate for obtaining toxicity information for dioxins. Second, the commenters contended that EPA should have used a different cancer slope factor to calculate risks for two of the hexachlorodibenzo-p-dioxin (H_XCDD) congeners. Third, the commenters believed that EPA overestimated certain toxicity equivalency factors (TEFs, described below) that we used in our risk analysis. Lastly, commenters on the proposed rule challenged two of the assumptions inherent in the development of the toxicity benchmarks that we used to evaluate dioxins and chloroform. These two assumptions are as follows:

- To develop cancer benchmarks using animal studies, scientists often extrapolate dose-response data derived from the animal studies to lower levels that are within the range of human exposure. EPA historically has extrapolated response data in the low-dose range using a linear approach called the linearized multistage (LMS) model. However, in 1996, EPA published the Proposed Guidelines for Carcinogen Risk Assessment (hereafter referred to as the ''1996 Guidelines;'' USEPA, 1996 [22]) that provided new recommendations for evaluating responses in the low-dose range when biologically-based or case-specific models are not available. While still recommending a linear extrapolation (a straight line extrapolation) as a default procedure for evaluating low-dose response, the 1996 Guidelines also suggest that extrapolation in the low-dose range can be performed using a nonlinear approach, when the data on the mode of action for the contaminant are sufficient to support such an approach. Commenters on the proposed rule contended that, for 2,3,7,8-TCDD (''TCDD'') and chloroform, a nonlinear approach is more appropriate for extrapolating response data in the low-dose range than the LMS approach used by EPA.
- To calculate human equivalent doses from animal doses used in toxicity studies, scientists typically scale animal doses based on the ratio of animal and human body weights. The 1996 Guidelines recommend that the default approach is to scale daily applied doses experienced for a lifetime in proportion to body weight raised to the ¾ power. This recommendation is a change from EPA's previous recommendation to scale doses in proportion to body weight raised to the ⅔ power.

Commenters on the proposed rule believed that EPA should account for this revised guidance in our risk assessments for dioxin and chloroform.

i. Assessment of the Toxicity of Dioxins and Furans

EPA used a cancer slope factor of 156,000 $(mg/kg\text{-}day)^{-1}$ for TCDD to calculate cancer risk from exposure to dioxins and furans in chlorinated aliphatics wastes. The cancer slope factor is a measure of the relative potency of carcinogens. That is, the higher the cancer slope factor, the more potent the carcinogen. The toxicity of each of the 17 dioxin and furan congeners with TCDD-like toxicity is expressed in terms of TEFs. TEFs are estimates of the toxicity of specific dioxin and furan congeners relative to the toxicity of TCDD, which is assigned a TEF of 1. The sections that follow present public comments on the slope factor and TEFs that EPA used to evaluate dioxins and furans, and provide the Agency's response to those comments.

TCDD Cancer Slope Factor and Health Effects

The existing cancer slope factor for TCDD is based on human equivalent doses calculated from laboratory animal data by scaling doses to body weight raised to the ⅔ power. Commenters maintained that this practice is obsolete, and does not reflect a change in EPA policy recommending that doses be scaled to body weight raised to the ¾ power. The commenters calculated that compared to a cancer slope factor that is based on scaling doses to body weight raised to the ¾ power, the existing cancer slope factor overestimates cancer risk from dioxin-like compounds by at least 35% (assuming a linear dose-response), and as a result, all of EPA's cancer risk estimates for dioxin-like compounds should be adjusted by at least a factor of 0.65. Commenters also claimed that the existing slope factor for TCDD does not take into account mechanistic information suggesting there is a threshold for TCDD

[21] The value 0.55 is calculated as follows: If 27 percent of the mass of meat is lost during cooking, then 73 percent of the meat remains. Of the remaining 73 percent, 24 percent more is lost after cooking (76 percent is retained). As a result, the mass of meat *remaining* after cooking and post-cooking activities is 76 percent of 73 percent, or 55 percent of the original mass. Therefore, the amount of meat *lost* through cooking and post-cooking activities is 45 percent.

[22] USEPA. 1996. Proposed Guidelines for Carcinogen Risk Assessment. 61 FR 17960.

carcinogenesis. The commenters noted that this point is emphasized in a recent letter to the editor of Risk Analysis, written and signed by nearly twenty of the world's leading pharmacologists (Byrd et al., 1998 [23]) which states: ''A dose-response assessment for dioxin based on receptor binding would predict a nonlinear dose-response relationship with a threshold for tumor induction. A nonlinear relationship is more consistent with the available chronic animal bioassays and human epidemiology studies.'' The commenters contended that, given this information, the cancer risk posed by all of the dioxin-like dioxin and furans may well be zero for all pathways considered in EPA's risk assessment.

Commenters also took issue with EPA's use of the Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds issued by EPA in 1994. These documents have been reviewed by the EPA Science Advisory Board (SAB), but have not been finalized. Some commenters noted that the SAB made substantial comments on the 1994 draft documents that are directly relevant to the risk assessment for the Chlorinated Aliphatics Listing Determination, and, because the SAB comments have not yet been incorporated in a final document, it is premature and incorrect to use the draft in this current rulemaking. The commenters noted that the front cover of the draft chapters state: ''Review Draft (Do not Cite or Quote)'' and

Notice: This document is a preliminary draft. It has not been formally released by EPA and should not at this stage be construed to represent Agency Policy. It is being circulated for comment on its technical accuracy and policy implications.

In addition, the commenters pointed out that page 5–33 of EPA's Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, July 30, 1999, states: ''Most of the information in this summary is from this draft document and is subject to change, pending release of the final document.'' Thus, the commenters believe that conclusions made concerning dioxin in the risk assessment for chlorinated aliphatics wastes are based on a document that is preliminary and possibly incorrect.

In contrast to the comments above, one commenter strongly supported the proposal to list chlorinated aliphatics wastewaters because of significant risks posed by dioxins, and cited the 1994 draft Health Assessment Document for 2,3,7,8-TCDD and Related Compounds that was challenged by other commenters. The commenter asserted that dioxins are a probable human carcinogen and that, in animal testing, TCDD is one of the most potent carcinogens ever evaluated. The commenter noted that noncarcinogenic effects resulting from TCDD exposure also have been reported. Specifically, some studies suggest evidence of immunotoxicity, such as alteration in lymphocyte populations, cell surface markers or lymphocyte proliferative response. There also is evidence of reproductive and developmental effects from exposure to dioxins. The commenter pointed out that studies discussed in EPA's draft Dioxin Reassessment provide evidence of further health impacts.

EPA acknowledges the commenters' concerns regarding the use of a draft document to support our toxicity assessment for dioxin-like compounds. In the preamble to the proposed rule, and in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination (USEPA, 1999a), we presented a summary of the health effects believed to be associated with exposure to dioxins. Although the source of our information concerning dioxin health effects was the 1994 draft health assessment document challenged by commenters, the health effects we presented at the time of proposal continue to reflect our understanding of the health affects associated with exposure to dioxins. A December 1998 toxicological profile for chlorinated dibenzo-p-dioxins published by the Agency for Toxic Substances and Disease Registry (ATSDR, 1998 [24]) supports our appraisal of the adverse health effects associated with dioxin exposure. Our reassessment of dioxin risks is still ongoing and we are not relying on draft findings for this final listing determination.

As discussed above, the Agency also received comments on the value of the TCDD cancer slope factor that we used to evaluate cancer risk due to dioxins. The cancer slope factor that we used in our proposed chlorinated aliphatics risk analyses, 156,000 $(mg/kg\text{-}day)^{-1}$, is cited in a final Agency report published in 1985, [25] and is comparable to the TCDD slope factor published in the Health Effects Assessment Summary Tables (HEAST; USEPA, 1997), 150,000 $(mg/kg\text{-}day)^{-1}$ [26]. We understand that the 1996 Proposed Guidelines for Carcinogen Risk Assessment recommends the body weight scaling factor approach noted by the commenters, and provides guidance for considering nonlinear contaminant dose-response relationships in developing cancer slope factors. EPA anticipates that we will consider these recommendations of the 1996 Guidelines, as well as other relevant recommendations of the 1996 Guidelines, in the course of future development or reevaluation of contaminant cancer slope factors. However, given that the Agency has not completed its comprehensive reassessment of TCDD carcinogenicity and toxicity, the Agency has decided to use the 1985 cancer slope factor for TCDD (USEPA, 1985) for this rulemaking. Moreover, decreasing the slope factor for TCDD as recommended by commenters would not have any impact on our ultimate listing decisions for chlorinated aliphatics wastewaters, EDC/VCM wastewater treatment sludges, or methyl chloride wastewater treatment sludges. Our decision not to list chlorinated aliphatic wastewaters is supported by other factors that decrease our proposed risk estimate (section VI.A.3), and reducing the slope factor as recommended by the commenters would not reduce our risk estimates enough to alter our listing decisions for the EDC/VCM wastewater treatment sludges (section VI.B.2.b.iv). Nevertheless, EPA may choose to reevaluate today's listing decisions in the future, pending the final outcome of the Agency's ongoing reevaluation of TCDD toxicity.

[23] Byrd III, D.M., Allen, D.O., Beamer, R.L., et al. 1998. Letter to the Editor: The dose-response model for dioxin. Risk Analysis. 18(1):1–2.

[24] ATSDR. 1998. Toxicological Profile for Chlorinated Dibenzo-p-Dioxins (Update). U.S. Department of Health and Human Services. December.

[25] USEPA. 1985. Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins. Office of Health and Environmental Assessment. EPA/600/8–84/014F. September.

[26] The cancer slope factor for TCDD that we used to calculate the cancer risk resulting from exposure to dioxins in chlorinated aliphatics wastewaters, as well as EDC/VCM wastewater treatment sludges (see section VI.B) was 156,000 $(mg/kg\text{-}day)^{-1}$(USEPA, 1985). We incorrectly cited HEAST as the source of our slope factor in Appendix C of the Risk Assessment Technical Background Document (USEPA, 1999a). A risk estimate calculated using the slope factor presented in HEAST would be only a factor of 0.96 (150,000/156,000) times a risk estimate calculated based on the slope factor presented in the 1985 document. This difference would have no discernable impact on our risk estimates (use of either would have resulted in the high end risk estimate for the adult farmer, 2E–05, that we presented in the proposed rule).

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

Use of the Cancer Slope Factor for HxCDD

EPA's Integrated Risk Information System (IRIS) database includes a cancer slope factor of 6,200 (mg/kg-day)$^{-1}$ for HxCDD mixtures. Commenters believed it was curious that EPA did not choose to use this slope factor for any of the HxCDDs or hexachlorinated dibenzofurans (HxCDFs) evaluated in the chlorinated aliphatics risk assessment. Instead, EPA used the TCDD cancer slope factor of 156,000 (mg/kg-day)$^{-1}$ and a TEF value of 0.1, yielding an effective cancer slope factor of 15,600 (mg/kg-day)$^{-1}$, to evaluate all dioxin-like HxCDDs and HxCDFs. Commenters argued that the risk assessment for HxCDDs and HxCDFs would be greatly improved if it were based on the value of 6,200 (mg/kg-day)$^{-1}$ because (1) The cancer slope factor for HxCDD mixtures is verified on USEPA's IRIS database, whereas the value for TCDD is not, and (2) the slope factor for HxCDD mixtures is based on exposure to a mixture of congeners, whereas the value for TCDD is based on exposure to a single congener. The commenters believe that the slope factor for HxCDD mixtures replaces the TEF approach, which was created as an interim approach in the absence of chemical-specific data, with one that is based on chemical-specific dose-response data for this family of congeners. The commenters assert that in using the cancer slope factor for HxCDD mixtures, the inherent uncertainties associated with the application of the TEF approach would be eliminated. For these reasons, the commenters recommended that all cancer risk estimates for HxCDDs and HxCDFs be adjusted by a factor of 0.40 (6,200/15,600). Additionally, since the slope factor of 6,200 (mg/kg-day)$^{-1}$ is based on scaling doses using body weight raised to the ⅔ power, the commenters believed that the slope factor should be reduced further to account for the Agency's more recent recommendation that doses be scaled to body weight raised to the ¾ power, resulting in a net adjustment factor of 0.26 for HxCDD and HxCDF risk estimates.

EPA disagrees with the commenters' suggestion that the slope factor for HxCDD mixtures that is presented in IRIS is applicable to all dioxin-like HxCDDs and HxCDFs. The slope factor presented in IRIS clearly is based on studies of only the 1,2,3,6,7,8- and 1,2,3,7,8,9- congeners of HxCDD, thus these are the congeners to which the slope factor would apply if EPA chose to use it in the chlorinated aliphatics risk analyses. Although the commenters suggested that use of the IRIS slope factor would have an impact on the results of the risk analysis, particularly if the slope factor is adjusted using a revised scaling factor, EPA strongly disagrees. Upon review of the congener-specific risk estimates provided in the Risk Assessment Technical Background Document for the proposed rule (USEPA, 1999a) it is clear that eliminating the 1,2,3,6,7,8- and 1,2,3,7,8,9- congeners of HxCDD from the risk analysis *completely* would have the impact of modifying the high end risk estimate for the adult farmer only by a factor of 0.96.

Use of the WHO TEFs

Commenters contended that a hidden area of conservatism in EPA's risk assessment lay in the fact that the TEF values for many congeners, including 2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF (the congeners that are the primary contributors to EPA's risk estimates), do not reflect central tendency values, but are instead upper bound values. Using the World Health Organization's (WHO's) database of Relative Potency (REP) estimates for these two congeners, the commenters determined that the TEF value of 0.5 for 2,3,4,7,8-PeCDF is equivalent to the 81st percentile of REP estimates obtained from 59 in vivo studies, and that the geometric mean from these 59 studies corresponds to a value of 0.19. Similarly, the commenters determined that the TEF value of 0.1 for 1,2,3,4,7,8-HxCDF is equivalent to the 93rd percentile of REP estimates obtained from 10 in vivo studies for this congener, and that the geometric mean from these 10 studies corresponds to a value of 0.041. The commenters asserted that EPA's risk estimates for dioxin should be adjusted downward to correct for EPA's use of upper-bound TEF values. Curiously, one of the same commenters who opposed the manner in which the WHO–TEFs were developed, also applauded the use of the WHO–TEFs: ''Thus, [the commenter] fully supports EPA's shift from I–TEF to WHO–TEF. This replacement by WHO–TEF needs to be adopted promptly by all EPA programs to avoid unnecessary confusion among the general public'' and ''[the commenter] commends EPA for several good policy decisions in this proposal. Specifically [the commenter] supports EPA's adoption of the WHO–TEF * * *.''

In response, EPA points out that the TEF values are based on all available studies. These studies were conducted under a variety of exposure scenarios, including chronic, subchronic, short-term and acute, and examining a broad spectrum of endpoints including biochemical, developmental, immunotoxicological, neurological, carcinogenic and teratogenic. Whereas the resulting range of in vitro/in vivo REP values for a particular congener may span 3–4 orders of magnitude, final selection of a TEF value gave greater weight to REPs from repeat dose in vivo experiments (chronic > subchronic > subacute > acute). Furthermore, studies examining toxic effects were given greater weight than studies examining biochemical effects. This weighting scheme and the use of professional judgment are designed to give more weight to studies that provide exposure scenarios similar to humans and for studies examining effects of concern.

As pointed out by the commenter, the range of the REPs for a particular chemical can vary across studies. However, the commenters' proposed use of the geometric mean or Monte Carlo simulations is cause for concern. The variability in the REPs for a particular chemical can be due to several factors. As with any other determination, there is variability in the measurement which can be due to either inter-laboratory variability and variability in the actual measurement (that is, experimental variability in determining ethoxyresorufin O-deethylase [EROD] activity). Another source of variability could be due to species or endpoint differences in the REP of a chemical. Finally, the REP of a chemical can be due to differences in study design, for example, in vitro studies vs. in vivo studies, or short-term vs. long term in vivo studies. The use of expert judgment and the weighting scheme described above allows for consideration of the important biological factors regulating the relative potency of a chemical. Use of the geometric mean ignores this biological information.

More importantly, the information presented by the commenters is not representative of the actual data available on TEFs and how this information is used. Of all the chemicals included in the TEF methodology, only 5 of these chemicals account for over 80% of the TCDD equivalents in human tissues, 2,3,7,8-TCDD, 1,2,3,7,8-PeCDD, 1,2,3,6,7,8-HxCDD, 2,3,4,7,8-PeCDF and PCB 126. The TEF values for, PCB 126, 1,2,3,7,8-pentachlorodibenzo-p-dioxin, and 2,3,4,7,8-pentachlorodibenzofuran, are similar to the mean of the relative potencies of these chemicals from in vivo studies and in some cases they are lower than the mean of the relative potencies. Chemicals for which there is limited data tend to have TEFs assigned that are conservative estimates of the

relative potencies specifically because of the limited data.

Another short-coming of the proposed statistical method for determining the TEF is the lack of a weighting scheme. In assigning a TEF value for a particular congener, all available data comparing the relative potency of a chemical to TCDD or PCB 126 are considered. The expert panel examines these data sets and places more emphasis on studies which examine toxic responses following chronic or subchronic exposures. The proposed alternative approach, in which the TEF is assigned based in the mean of the relative potency values, ignores the weighting scheme and places a relative potency for biochemical alterations in vitro equal to that for relative potencies based on toxic responses following subchronic exposures in vivo. While the statistical approach recommended by the commenters provides an estimate of the variability, it ignores biological phenomena that influence the relative potencies of these chemicals. In contrast, the use of expert opinion provides a TEF that is based on endpoints of concern and considers biological factors that influence the relative potency of these chemicals. In the development of the TEF methodology, the use of expert opinion to provide an estimate of the variability of the TEF has not been applied. However, the data base that the expert panel uses to derive the TEF is available from the WHO and does present the range of relative potencies.

Finally, the commenter describes the present TEFs as overly conservative based on comparison to the geometric mean of the REPs. It is unclear what the commenter means by ''overly conservative.'' The true relative potency of these chemicals in humans is uncertain. Because the true value is uncertain, it is difficult to determine if the TEF values are over estimates of the potency or if they underestimate the true potency of these chemicals. For the chemicals described, 2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF, the TEF is based on giving greater consideration to studies using the most relevant dosing regimen and examining toxic endpoints. Use of the geometric mean down plays the importance of the more relevant studies and provides greater weight to acute and in vitro studies.

ii. Chloroform

One commenter claimed that, as was the case for TCDD, EPA's unit risk of 2.3×10^{-5} $(ug/m^3)^{-1}$ for chloroform was calculated using the outdated practice of scaling dose in proportion to body weight raised to the ⅔ power, rather than to the ¾ power, as recommended in the 1996 Guidelines (USEPA, 1996). The commenter believed that, as a result, the cancer risks attributable to chloroform should be adjusted by a factor of 0.52 (calculated in the same manner as discussed for TCDD in section VI.A.2.e.i). Another commenter asserted that, in evaluating cancer risks due to chloroform exposure, EPA failed to consider the EPA Office of Water's (OW) reanalysis of chloroform carcinogenicity. The commenter noted that EPA's December 16, 1998 rulemaking on disinfection byproducts firmly rejected the LMS approach for assessing cancer risks from chloroform exposure. The commenter contended that in the preamble for OW's rulemaking, EPA concluded specifically that ''the nonlinear cancer extrapolation approach is the most appropriate means'' to assess cancer risks from chloroform (63 FR 69400). The commenter contended that using the nonlinear approach, exposures to chloroform of 0.3 mg/L are considered to pose no cancer risk. The commenter believed that, therefore, the 0.2 mg/L central tendency concentration for chloroform in chlorinated aliphatics wastewater poses no cancer risk.

In contrast, a third commenter strongly supported the proposal to list chlorinated aliphatics wastewaters because of the significant risks posed by the hazardous constituents in the waste, including chloroform. The commenter pointed out that health risks from chloroform are well documented, and noted that chloroform is a recognized human carcinogen, as well as ''a suspected toxicant of the following human health systems: cardiovascular or blood toxicant; developmental toxicant; endocrine toxicant; gastrointestinal or liver toxicant; kidney toxicant; neurotoxicant; reproductive toxicant; and respiratory toxicant.'' The commenter noted that chloroform is ''more hazardous than most chemicals in 11 out of 14 ranking systems and is ranked as one of the most hazardous compounds (worst 10%) to ecosystems and human health.'' (The commenter referenced ''EDF's Scorecard, www.scorecard.org, on chloroform. Scorecard incorporates governmental and other authoritative information on chemicals, including their known and suspected health effects.'') The commenter believed that EPA is clearly justified in listing chlorinated aliphatics wastewaters.

While EPA acknowledges the concerns of the commenter who highlighted chloroform's adverse health effects, EPA agrees with the commenter who, based on evaluations conducted by OW, challenged our assessment of chloroform carcinogenicity at low doses. Based on mode of action considerations, EPA's Science Advisory Board (SAB), WHO, the Society of Toxicology, and EPA all strongly endorse the nonlinear approach for assessing risks from chloroform. Although OW conducted its evaluation of chloroform carcinogenicity for oral exposure, the nonlinear approach for low-dose extrapolation cited by the commenter would apply to inhalation exposure to chloroform as well, since chloroform's mode of action is understood to be the same for both ingestion and inhalation exposures. Specifically, tumorgenesis for both ingestion and inhalation exposures is induced through cytotoxicity (cell death) produced by the oxidative generation of highly reactive metabolites (phosgene and hydrochloric acid), followed by regenerative cell proliferation (63 FR 15685). As explained in EPA OW's March 31, 1998, and December 16, 1998, **Federal Register** notices pertaining to chloroform (63 FR 15673 and 63 FR 69389, respectively), EPA now believes that ''based on the current evidence for the mode of action by which chloroform may cause tumorgenesis, * * * a nonlinear approach is more appropriate for extrapolating low dose cancer risk rather than the low dose linear approach * * *'' (63 FR 15685). In fact, OW determined that given chloroform's mode of carcinogenic action, liver toxicity (a noncancer health effect) actually ''is a more sensitive effect of chloroform than the induction of tumors'' and that protecting against liver toxicity ''should be protective against carcinogenicity given that the putative mode of action understanding for chloroform involves cytotoxicity as a key event preceding tumor development'' (63 FR 15686).

Given the recent evaluations conducted by OW that conclude that protecting against chloroform's noncancer health effects protects against excess cancer risk, EPA now believes that the noncancer health effects resulting from inhalation of chloroform would precede the development of cancer and would occur at lower doses than tumor (cancer) development. Although EPA has not finalized a noncancer health benchmark for inhalation exposure (a reference concentration, RfC), the Agency for Toxic Substances and Disease Registry (ATSDR) has developed a Minimal Risk Level (MRL) for inhalation exposure to chloroform. An MRL is ''an estimate of the daily human exposure to a hazardous substance that is likely to be

without appreciable risk of adverse noncancer health effects over a specified duration of exposure [acute, intermediate, or chronic]'' (http://www.atsdr.cdc.gov/mrls.html). To evaluate the noncancer hazard associated with exposure to chloroform in air, we compared the concentration of chloroform that we predicted to occur at a high end receptor's point of exposure to the ATSDR MRLs for inhalation exposure to chloroform. The high end chloroform exposure point concentration in air for chlorinated aliphatics wastewaters, approximately 0.0001 ppm (0.74 ug/m^3), is more than two orders of magnitude below the chronic inhalation MRL for chloroform, 0.02 ppm (the chronic MRL is more protective than either the acute or intermediate MRLs), indicating that there is no concern for adverse noncancer health effects, or, therefore, significant increased risk of cancer, resulting from inhalation exposure to chloroform derived from chlorinated aliphatics wastewaters.

In response to the commenter who disagreed with EPA's use of a slope factor based on animal data that had been adjusted to human equivalent doses using body weight raised to the ⅔ power, EPA notes that in OW's comprehensive reevaluation of chloroform carcinogenicity, EPA adjusted the animal data to equivalent human doses using body weight raised to the ¾ power (63 FR 15686), as recommended in EPA's 1996 Guidelines (USEPA, 1996).

f. Noncancer Dioxin Risks for Adults and Nursing Infants

One commenter asserted that EPA should have considered dioxin noncancer endpoints for adults and for nursing infants in developing a dioxin concentration limit that triggers air emission control requirements for wastewater tanks. The commenter explained that a trigger level based on noncancer endpoints may be higher than the cancer-based trigger level, but that EPA should not assume that is the case. The commenter said that EPA should approximate and consider a trigger level for noncancer endpoints.

First, we note that the lead option proposed by EPA was a 'standard' listing for chlorinated aliphatic wastewaters, (*i.e.,* listed regardless of dioxin concentration) with the dioxin trigger level proposed as an attempt to provide a means to implement tank cover requirements more appropriate to the potential risk, particularly because our data indicated that dioxin levels varied among generators (64 FR at 46503). However, as discussed in section VI.A.3 of today's preamble we have made a decision not to list chlorinated aliphatics wastewaters based on revised estimates of cancer risk. EPA also does not believe there is reason for listing chlorinated aliphatics wastewaters based on dioxin noncancer effects, as discussed further below. Although the proposed wastewater trigger level to implement tank cover requirements is moot because we are not finalizing the listing as proposed, we do not believe any increased risk of adverse noncancer effects due to dioxin in chlorinated aliphatic wastewaters is of concern in any event.

Typically, EPA calculates a hazard quotient (HQ) to assess the noncancer health effects resulting from contaminant exposure. For oral exposures, the HQ is the ratio of an individual's average daily contaminant dose to the reference dose (RfD [27]) for the contaminant. EPA has not established RfDs for any of the dioxin or furan congeners (USEPA, 1994 [28]). EPA is awaiting the finalization of the Draft Reassessment before formalizing an approach to evaluating noncancer risks from dioxin. In recent years EPA's Office of Solid Waste and Emergency Response (OSWER) has calculated a modified margin of incremental exposure (MOIE) to dioxin on a case-by-case basis (for example, see 64 FR 52828, September 30, 1999). The MOIE is a tool for evaluating the potential for the occurrence of noncancer health effects due to dioxin. The margin of incremental exposure is an expression of the additional (increment of) exposure to dioxin that an individual receives in excess of background exposure to dioxin. Using this approach, we compare the estimated average daily dose attributable to chlorinated aliphatic wastewaters to background exposures in the general population. As a measure of risk, the MOIE presupposes that if exposures are small relative to background, then risks from these exposures are likely to have limited significance for human health. While the MOIE analysis is not specific to any particular health endpoint, it does allow direct comparison of exposures related to chlorinated aliphatics wastewaters to background dioxin exposure experienced by the general population. Using the high end exposure estimates developed for the proposed rule, the high end margin of incremental exposure due to chlorinated aliphatic wastewaters would be 0.17 for an adult farmer and 0.19 for the breast-feeding infant of an adult farmer. However, we estimate that exposures attributable to chlorinated aliphatics wastewaters are actually lower than we originally presented in the proposed rule, due to our reevaluation of our air dispersion modeling results, beef intake rates, and air emissions modeling assumptions (see section VI.A.3). Therefore, we project that the actual high end margin of incremental exposure for both the adult farmer and breast-feeding infant of the adult farmer is less than 0.1, that is, an order of magnitude or more lower than any risk that may be attributable to background exposures (USEPA, 2000b).

3. Rationale for the Final Listing Determination: Summary of the Impact of Public Comments on the Proposed Listing Determination for Chlorinated Aliphatic Wastewaters

As discussed above, public commenters presented arguments that EPA's high end deterministic risk estimate for the adult farmer was in error and overestimated potential risks to human health and the environment. After reviewing and carefully considering all information provided by commenters, we re-evaluated our risk assessment results for air releases of dioxins and chloroform from chlorinated aliphatics wastewaters managed in aerated biological treatment tanks. Based on information provided by commenters, we decided it was appropriate to adjust our risk assessment results to account for cooking and post-cooking losses for beef, a more realistic size of the pasture supporting cattle indirectly exposed to dioxin emissions, and the potential for solids removal prior to wastewater treatment in aerated biological treatment tanks. After calculating these adjustments to our proposed risk assessment results, EPA found that accounting for cooking and post-cooking losses for beef would modify the high end risk estimate for the adult farmer by a factor of 0.78, and accounting for a more reasonable pasture size would modify the risk estimate by a factor of 0.50, resulting in an overall risk estimate of 7E–06. This risk estimate does not consider the impact of

[27] In the preamble to the proposed rule, in an effort to present the concept of RfDs and RfCs in plain language, we incorrectly characterized RfDs and RfCs as levels that EPA considers ''acceptable.'' RfDs and RfCs are not by themselves action levels; they do not establish acceptable exposures, nor do they establish danger levels. RfCs and RfDs are used as tools in establishing concern for non-cancer effects resulting from exposure to contaminants, and they serve as a common reference point from which risk managers can make decisions regarding estimates of exposure.

[28] United States Environmental Protection Agency (USEPA). 1994. Health Assessment for 2,3,7,8-TCDD and Related Compounds. Public Review Draft. Office of Research and Development. EPA/600/EP–92/001a–c. September.

assuming solids removal from the wastewater, which could reduce risk to an even greater extent, reasonably by an additional factor of 0.67 to 0.94, such that our final risk estimate could be as low as 4E–06. Moreover, our proposed estimate of risk due to emissions of chloroform, which we previously believed would be additive to our dioxin risk estimate, is no longer valid given recent Agency information regarding chloroform's mode of action. Specifically, there is no concern for adverse noncancer health effects resulting from inhalation exposure to chloroform derived from chlorinated aliphatics wastewaters, therefore, there is no concern for increased risk of cancer. Furthermore, the noncancer health effects due to dioxin that we characterized in response to comments presented above also would be affected by the adjustments to our analysis, and would be even less than projected.

Thus, EPA believes that the risk from this waste is well below 1×10^{-5}. We acknowledge that there is some uncertainty associated with the analyses we have conducted in response to the three comments we found persuasive—for example, we do not have data to support specific conclusions with respect to the percentage of solids removed from wastewater by prior to biological treatment. Nonetheless, we have been conservative in accounting for the factors raised by the comments and believe the risk is unlikely to be higher than our revised estimates. In addition, we note that the risk level presented for these wastewaters in the proposal (2×10^{-5} as marginal. As we have explained, we make listing determinations based on a weight-of-the-evidence approach, and the result of a decision is not dictated by whether the risk calculated for a waste is slightly more or less than 1×10^{-5}. So, even aside from the specific revised risk numbers we have calculated, we would decide not to list this waste based on the determination that the already marginal risk level presented in the proposal clearly overstates the actual risk associated with the waste, and that the actual risk is almost certainly considerably below the 1×10^{-5} level.

Therefore, the Agency concludes that potential air releases from wastewaters managed in biological treatment tanks do not present significant risk to human health and the environment and do not support listing chlorinated aliphatic wastewaters as hazardous wastes. After carefully reviewing our analyses and making necessary adjustments to our risk estimates based upon arguments and information presented in public comments, we estimate that air releases from the management of chlorinated aliphatic wastewaters would result in high end cancer risk risks less than 1×10^{-5}. The Agency therefore is finalizing a decision to not list chlorinated aliphatic wastewaters as hazardous waste.

4. Waste Management Practices / Scope of Listing Determination for Chlorinated Aliphatic Wastewaters

EPA believes that the rulemaking record for this rule supports a decision not to list chlorinated aliphatic wastewaters based on the typical management scenario of biological treatment in tanks. As mentioned above, and explained in more detail in Listing Background Document for the Chlorinated Aliphatics Listing Determination (USEPA, 1999c),[29] the majority of chlorinated aliphatic manufacturing facilities manage their wastewaters in tank-based wastewater treatment systems and either directly discharge treated wastewaters under NPDES permits, or discharge the wastewaters to POTWs. However, the Agency is aware that two facilities treat their chlorinated aliphatic wastewaters on-site and dispose of the wastewaters in on-site UIC wells. In addition, the Agency learned from public comments, that one facility pipes its wastewaters off-site to a nearby chemical manufacturing facility that commingles the chlorinated aliphatic wastewaters with other wastewaters, and treats the combined wastewaters in a wastewater treatment system that includes surface impoundments.

a. Wastewaters Managed in Underground Injection Control (UIC) Wells

With respect to the two facilities that manage their chlorinated aliphatic wastewaters in on-site UIC wells, one of the facilities already manages its wastewaters as hazardous due to the fact that the wastewaters exhibit the toxicity characteristic. This facility manages its hazardous wastewaters in covered tanks, pipes the wastewater directly to a Class I hazardous UIC well and complies with RCRA and CAA (HON) air emissions requirements. Due the fact that this wastewater is being managed as a hazardous waste and in full compliance with RCRA subtitle C and applicable CAA requirements, we conclude that this wastestream does not present significant risk and we believe that our decision not to list these wastewaters as hazardous waste will have no potential adverse impact in terms of protecting human health and the environment.

In the case of the other chlorinated aliphatic production facility that manages its wastewaters by disposing of them in UIC wells, some of the facility's wastewaters were, until recently, defined as hazardous waste (*i.e.,* derived from previously listed hazardous waste) and disposed in a Class I hazardous UIC well and in compliance with a no-migration petition. Recently, the facility was granted a delisting for these wastewaters by the Region VI EPA Regional Administrator. Given that the Regional Administrator has evaluated these wastewaters and determined that the wastewaters, as generated, do not pose significant risks to human health and the environment and warrant the award of a delisting, we believe that our decision not to list chlorinated aliphatic wastewaters as hazardous waste is appropriate for this wastestream and this decision will result in no adverse impact to human health and the environment.

This facility also manages some of its chlorinated aliphatic wastewaters as non-hazardous waste and injects the wastewaters into a Class I non-hazardous UIC well. Although we did not model this management practice in our evaluation of potential risks from the management of chlorinated aliphatic wastewaters, we did examine the specific waste management requirements governing these wastewaters. Our evaluation of the specific management requirements applicable to these wastewaters included a comparison of the state requirements governing Class I non-hazardous UIC wells and those governing Class I hazardous UIC wells. We found that the requirements in Louisiana, where this facility is located, for Class I non-hazardous UIC wells are virtually identical to those governing Class I hazardous waste UIC wells. EPA staff confirmed this conclusion after consulting numerous sources, including a direct examination of the state regulations and discussions with state authorities and EPA Regional personnel. We also note that in our evaluation of these wastewaters, we determined that the levels of constituents in the wastewaters are equivalent to the levels for which the facility's other wastewaters were recently delisted. This indicates that these wastewaters will not pose risk when managed in Class I UIC wells at this specific facility. Given these conclusions, we think this practice is protective and believe that our decision not to list chlorinated

[29] U.S. EPA. 1999c. Listing Background Document for the Chlorinated Aliphatic Listing Determination (Proposed Rule). Office of Solid Waste. July.

aliphatic wastewaters will have no adverse impact on human health and the environment due to the management of this facility's wastewaters in non-hazardous UIC wells.

b. Wastewaters Managed in Surface Impoundments

At the time EPA published the proposed listing determination for chlorinated aliphatic production wastes, the Agency was not aware that any chlorinated aliphatic wastewaters were managed in surface impoundments. EPA noted in the preamble to the proposed rule that although information available to the Agency, at the time of the proposed rule, indicated that surface impoundments had been used in the past, available information indicated that chlorinated aliphatic wastewaters are not managed in surface impoundments today. However, as a result of public comments to the proposed rule, the Agency obtained information indicating that a single facility, which is not a chlorinated aliphatics manufacturing facility, accepts wastewaters from a chlorinated aliphatic manufacturer and treats the chlorinated aliphatic wastewater stream after commingling it with other wastewaters generated at the chemical manufacturing facility. The commingled wastewaters are treated in a wastewater treatment system that includes biological treatment in surface impoundments.

After receiving information indicating that one facility was managing chlorinated aliphatic wastewaters in surface impoundments, the Agency conducted additional research to determine if other chlorinated aliphatic wastewaters were being managed in impoundments. The results of this research are that the Agency could identify no other facilities managing chlorinated aliphatic wastewaters in surface impoundments.

As a result of comments received in response to the proposed rule indicating that one facility treats chlorinated aliphatic wastewaters in surface impoundments, EPA did a screening analysis of potential risks from these wastewaters when managed in an impoundment. That risk screening analysis was based on very conservative assumptions that result in an overestimate of risk, given that the Agency assumed there would be no dilution of the wastewater in the environment and that an individual would drink the wastewater directly from the impoundment. The screening analysis suggested that wastewaters might pose risks in impoundments under the very conservative (and unrealistic) assumptions used in the screening analysis (that is, it may not be safe to drink the wastewaters as generated in the impoundment). However, given the overly protective nature of that screening assessment, the ''screening analysis'' does not provide meaningful information about any risks actually associated with this waste management practice and, therefore, it does not provide a basis for listing the wastewaters as hazardous.

EPA has to make the best decision it can with the information and analysis it has at the time of its evaluation. EPA has decided at this time not to list as hazardous chlorinated aliphatic wastewaters, regardless of how the wastewaters are managed. We are finalizing this no list determination, given that the data and analysis before us, while indicating some potential for risks from the management of wastewaters in surface impoundments, does not warrant a decision to list these wastewaters as hazardous. Simply put, EPA was unable, in the time afforded under the consent decree, to perform a full risk assessment for this waste management practice and to subject that decision to public comment, and the screening assessment that EPA was able to do was indeterminate. Although EPA cannot rule out the possibility that this practice may present some risk to human health and the environment, EPA has fully assessed the risk presented by the predominant mode of waste management and made the determination that it does not present a substantial hazard. In fact, of the 23 chlorinated aliphatic manufacturing facilities that generate wastes effected by this rulemaking, only 3 facilities manage wastewaters in non-tank based systems. Under these circumstances, EPA has concluded that it is appropriate to make a final decision based on the information and analyses with respect to all the units and practices other than this impoundment.

This conclusion is based in part on our interpretation of our obligation under RCRA section 3001(e)(2). Under that provision, Congress required that EPA make final listing determinations for 17 different waste categories in 15 months. In view of the scope of the task and the tightness of the timeframe established, Congress could not have intended that EPA conduct an in-depth review of every unit managing any amount of waste within the categories. Rather, Congress must have intended that EPA make the best reasoned judgment it can based on analyses and information that are reasonably representative of the waste categories. In practice, EPA has gone well beyond this in its listing decisions and generally has tried to account for all the waste management practices and units of which it is aware. However, in this rulemaking, EPA was faced with the choice of continuing this practice—which would have meant diverting time from completing the rulemaking to attempt to negotiate a further extension of the consent decree—or completing the rulemaking on schedule. Although EPA could always perform more complete and rigorous analysis given more time on any rule, at some point it is appropriate to move toward finalizing a decision and cut off further analysis. In view of the length of time already devoted to this rulemaking and the number of extensions previously negotiated to the consent decree, and the fact that only one waste management unit was unaccounted for in our analysis, EPA decided to issue a final determination not to list aliphatics wastewaters without accounting for this unit.

EPA is not deferring a decision for chlorinated aliphatics wastewaters; it is making a final decision not to list the wastewaters. Of course, EPA can always consider additional information and analyses in the future and make further regulatory decisions based on that. In addition, should EPA learn that the management of waste at this impoundment presents a threat to human health and the environment, EPA could consider taking site-specific action to abate the threat without listing the waste, *e.g.,* an action under RCRA Section 7003.

B. Wastewater Treatment Sludges From the Production of EDC/VCM

EPA is listing as hazardous sludges generated from treating wastewaters associated with the manufacture of ethylene dichloride and vinyl chloride monomer. 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. EPA is finalizing a conditional listing for this waste, based upon the Agency's determination that the waste does not pose a substantial risk when disposed of in a landfill.

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: (i) they are disposed of in a subtitle C or non-hazardous 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.

1. Summary of the Agency's Listing Decision for EDC/VCM Wastewater Treatment Sludges

EPA evaluated potential risks from the management of wastewater treatment sludges generated by producers of ethylene dichloride (EDC) and vinyl chloride monomer (VCM). This waste grouping consists of all sludges generated from the treatment of EDC/VCM wastewaters, excluding sludge generated from the treatment of VCM-A wastewaters (discussed elsewhere in today's rule). EPA estimates, based upon 1996 data, that approximately 104,600 metric tons of wastewater treatment sludges are generated annually by facilities that produce EDC and/or VCM.

EDC/VCM wastewater treatment sludges are generated by 12 facilities. Most facilities manage these sludges by disposing of them either in a hazardous waste landfill or a non-hazardous waste landfill. However, one facility manages its EDC/VCM sludges in an on-site land treatment unit. To assess the potential human health risks associated with EDC/VCM sludges, EPA evaluated potential risks from managing this waste in an off-site non-hazardous waste (unlined) landfill and an on-site land treatment unit. The highest risk estimates were calculated for an adult farmer who ingests beef and dairy products containing dioxin derived from airborne releases and erosion/runoff from the land treatment unit. The proposed high end and central tendency risk results for the farmer exposed to dioxin from the land treatment unit were 2E–4 and 4E–6, respectively. The Agency also concluded in the proposal that the management of EDC/VCM wastewater treatment sludges in landfills does not present risks of sufficient concern to support a decision to list the sludges as hazardous waste when managed in this manner. 64 FR 46476; 64 FR 49052 (September 9, 1999 **Federal Register**).

Issues raised by commenters, and data provided in comments received in response to the proposed rule, caused the Agency to reevaluate the risk analyses that were the basis of our proposed risk estimates. After careful consideration of information provided by commenters, we lowered the estimated risk associated with the management of EDC/VCM sludges in a land treatment unit. While the Agency's proposed high-end deterministic risk estimate for the land treatment unit (2E–4) was at a level at which the Agency presumes a waste poses sufficient risk to be listed (i.e., 1E–4 or greater), the revised risk estimate (7E–5) falls within the range of risks where the Agency may decide to list the waste as hazardous (i.e., between 1E–4 and 1E–6), upon consideration of additional factors. 59 FR at 66077. More specifically, EPA has previously stated that where risk estimates are within the 1E–4 to 1E–6 range, there is a ''presumption of candidacy for either listing (risk >1E–5) or no listing (risk < 1E–5).'' 59 FR at 66077. Applying that approach in this instance, the risk estimate for the land treatment unit of 7E–5 is not only greater than 1E–5, it is in the upper end of the range between 1E–5 and 1E–4. Comments received on the Agency's proposed risk analysis for the landfill waste management scenario did not result in the Agency modifying the risk estimate for the landfill. High-end deterministic risk estimates for the landfill scenario were all well within the presumptive no-list range (*i.e.,* less than 1E–6) with the exception of arsenic, the groundwater risk for which was estimated at 3E–5. (The Agency's discussion of additional factors that led EPA to decide that the arsenic risk estimate alone did not support listing EDC/VCM wastewater treatment sludges managed in landfills is presented below in Section VI.B.2.b.v. of this preamble.)

The Agency is therefore listing as hazardous EDC/VCM wastewater treatment sludges (using a conditional listing approach as proposed) based upon EPA's consideration of the risk estimates and additional factors. The Agency's decision was influenced by the fact that dioxin has been heavily studied, and the dioxin concentrations and volumes of EDC/VCM sludge have been well characterized in EPA's study of this industry (and, along with the toxicity [30] of dioxin, were incorporated into the risk assessment). Additionally, there was evidence that the land application unit where these wastes are currently managed had releases of other constituents to the environment, which indicates that there may not be adequate coverage by other regulatory programs.[31] Because industrial solid waste land treatment is a plausible management scenario for these wastes, EPA is concerned about EDC/VCM sludges managed in this manner where dioxin (a chemical that is persistent over the long term) is the constituent of concern.

Finally, the EPA's concern is that not only is the application of dioxin-containing wastes in a land treatment unit plausible, it is in fact occurring. No commenter provided evidence that absent a decision to list the waste, there is other regulatory authority that would assure that the risks the Agency estimates for this practice would not continue, either at the facility currently utilizing this practice, or at a different facility.

The Agency concludes, based upon the estimated risk for dioxin of 7E–5, and after considering other relevant factors described above, that EDC/VCM wastewater treatment sludges pose a substantial hazard when managed in land treatment units. In addition, the Agency concludes that this waste does not pose a substantial hazard when managed in landfills. Based on these conclusions the Agency is promulgating a conditional listing for this waste. EPA is listing EDC/VCM wastewater treatment sludges as hazardous waste, unless the sludges are managed in landfills. The conditional listing promulgated today also requires that EDC/VCM wastewater treatment sludges not be placed on the land prior to disposal. In addition, generators must be able to demonstrate that the sludges are managed in accordance with the conditions for being excluded from the hazardous waste listing.

2. Response to Major Comments Received on Proposed Rule for EDC/VCM Wastewater Treatment Sludges

EPA received comments on a number of issues concerning the data and analyses EPA used to arrive at our listing decisions for EDC/VCM wastewater treatment sludges. In addition, one commenter asserted that many of the comments on EPA's analysis of dioxin risks from the management of chlorinated aliphatics

[30] Dioxin has the highest slope factor (an indicator of carcinogenic potency) of any chemical in the EPA IRIS database.

[31] See Appendix A.—Environmental Release Descriptions, in Hazardous Waste Characteristics Scoping Study U.S. EPA, November 15, 1996, pp. A–28 and A–29.

wastewaters (for example, comments relating to the dioxin cancer slope factor) also apply to EPA's analysis of dioxin risks from the management of EDC/VCM wastewater treatment sludges in a land treatment unit. The comments we received may be generally divided into nine categories: (1) Comments on EPA's waste management assumptions; (2) comments on the exposure scenarios we evaluated in our risk assessment; (3) comments on how we calculated exposure point concentrations in the risk assessment; (4) comments on EPA's exposure assessment; (5) comments on EPA's toxicity assessment for dioxin; (6) comments on how we characterized risks associated with arsenic; (7) comments on demonstrating compliance with the listing description; (8) comments on the status of EDC/VCM sludges that are managed in ways other than land treatment or landfilling; and (9) comments on whether or not a contingent management approach to the listing is appropriate. The comments, and the Agency's responses to these comments, are described below.

a. Waste Management Assumptions

Eleven facilities manage EDC/VCM wastewater treatment sludges by disposing of them either in a hazardous waste landfill or a non-hazardous waste landfill. One facility manages this waste in an on-site land treatment unit. As a result of public comment, the Agency has learned that one facility generates and manages EDC/VCM wastewater treatment sludges in surface impoundments.

In 1996, approximately 104,561 metric tons of wastewater treatment sludges were generated in wastewater treatment systems used to treat process wastewaters from the manufacture of EDC/VCM. Of this volume, approximately 6,574 metric tons is attributable to the production of EDC/VCM. The remaining sludge volumes are associated with the treatment of other process wastewaters that are commingled with EDC/VCM process wastewaters and treated in the same wastewater treatment system.

i. Waste Volumes

One commenter questioned whether EPA used the correct assumption with regard to waste volume in the risk assessment, given that the production of EDC/VCM may be increasing in the United States. The commenter cited information provided in the Agency's Economics Background Document for the proposed rule. The commenter asserted that had EPA assumed a larger waste volume, based upon increased future production capacity, the result would be an increase in the predicted level of risk associated with the management of EDC/VCM sludges in landfills. The same commenter questioned whether or not the Agency had accounted for the likelihood that EDC/VCM wastewater treatment sludges generated by different facilities may be co-disposed in the same landfill.

In response to the commenter's concerns regarding co-disposal of sludges, the Agency wishes to clarify that we did, in fact, account for co-disposal of EDC/VCM sludges where information provided in the RCRA 3007 questionnaire responses showed that multiple generators dispose of the sludges in the same off-site landfill. As documented in the Listing Background Document (USEPA, 1999c, USEPA, 2000e), the Agency accounted for two instances where sludges generated by two generators are disposed in the same landfill.[32] In both cases, the Agency used the combined sludge volume in assessing the quantities of sludges managed in off-site landfills.

In response to other concerns raised by the commenter, the Agency reviewed the sensitivity analyses for the landfill analyses that were presented in the July 1999 Risk Assessment Technical Background Document. Our conclusion is that predicted risk levels are not very sensitive to changes in waste volume. As shown in Table H.3.3 in Appendix H of the Risk Assessment Technical Background Document (USEPA 1999a), we found that increasing waste volume from the central tendency value of approximately 15,000 m^3 to the high end value of approximately 51,000 m^3 increases the maximum 9-year average receptor well concentration, thus risk, by only a factor of 1.6 in the 10,000 year time period that we modeled. This means that if waste volumes more than tripled, the risk estimate would be expected to increase by only a factor of 1.6 (that is, to 5E–05). Such an increase in production and waste generation, which results in a relatively small change in potential risk, would not cause the Agency to change its listing decision. The Agency also points out that there may be significant uncertainties in projecting changes in the volume of waste generated, based upon increased production capacity, due to uncertainties in the relationship between production rates and waste generation rates and the effects that technology changes, types of facility expansions (*i.e.,* increased production capacity at existing facilities versus building new facilities) and the impact of potential (and simultaneous) adoption of waste minimization activities.

ii. Interpretation of Analytical Results

A commenter questioned the Agency's use of analytical results from ''dedicated'' sludge samples in its risk analysis and the commenter indicated that some of the ''non-dedicated'' sludge samples appear to have higher dioxin concentrations than the dedicated samples. As explained in the preamble to the proposed rule (see 64 FR 46483), ''dedicated'' wastes are those wastes attributable only to the production of EDC/VCM and do not include wastes derived from the production of other chlorinated aliphatic wastes and commingled with EDC/VCM sludges. In our risk analysis, EPA used analytical information from samples of dedicated sludges only to isolate the risks from constituents attributed to those wastes generated from the production of the chlorinated aliphatic chemicals of concern to this listing determination. Given the commenter's concerns, the Agency did review the dioxin concentrations in the sludge samples not included in the risk analysis. The Agency found that on the basis of dioxin TEQs, the highest dioxin concentration in the ''non-dedicated'' samples (those not included in our analysis) was less than one fourth of the highest concentration of dioxins (on a TEQ basis) found in the samples used in the analysis. Therefore, had the Agency used the analytical results from the non-dedicated samples in its analysis, the use of the dioxin concentrations would not have caused an increase in the risk estimate.

A commenter also questioned EPA's use of TCLP analytical results to predict leachate concentrations of contaminants from landfill disposal of EDC/VCM wastewater treatment sludges. The commenter questioned why EPA's data showed that lead and chromium are not detected using the TCLP, given that these constituents were found in the total constituent analysis of the sludges. The commenter suggested that high iron content in the sludges may affect the concentration of lead predicted by the TCLP analysis, citing data in a previous EPA rulemaking (Phase IV Land Disposal Restrictions, or LDR, proposed rule) that suggests high iron content effects lead. EPA believes that the commenter is referring to an issue first raised in the Phase III LDR proposed rule and subsequently finalized in the Phase IV LDR final rule on May 26, 1998 (63 FR 28556). In the Phase IV LDR final rule, EPA determined that the addition

[32] See page 56 of ''Listing Background Document for the Chlorinated Aliphatics Listing Determination'' (USEPA, 1999c).

of iron filings to lead-containing hazardous wastes was not a legitimate form of treatment, and was in fact impermissible dilution, because the iron filings can interfere with the TCLP test used to determine whether the waste has been effectively treated (40 CFR 268.3(d)). The commenter stated that EPA should determine whether the non-detects for lead in the sludge samples are an artifact of the TCLP, and if so, that EPA should instead use partitioning equations rather than TCLP data in the landfill modeling.

In response, the Agency notes it has consistently relied on the results of TCLP leach tests in estimating the leaching potential of wastes for making listing determinations, although more recently this use in listing determinations has narrowed to evaluation of leaching potential of wastes actually or plausibly being managed in Municipal Solid Waste (MSW) landfills (see for example, 65 FR 55684, September 14, 2000 **Federal Register**). As presented elsewhere in today's preamble, the Agency modeled an unlined, MSW landfill for EDC/VCM sludges, which is not only plausible but is actually occurring as well (see section below on landfill controls).

In addition, after reviewing the information related to the LDR rulemakings referenced by the commenter, and the analytical data for the EDC/VCM sludge samples EPA used in the landfill analysis, EPA does not believe there would be potential risks from groundwater even if all of the lead leached out of the samples EPA used in the landfill modeling, therefore the screening analysis performed was quite adequate to conclude that no significant risks would be posed by the lead in the EDC/VCM sludges. For further information the reader is referred to the Response to Comments Document for today's rule.

iii. Landfill Controls

Two commenters questioned why EPA assumed, in its risk assessment for EDC/VCM sludges managed in landfills, that non-hazardous waste landfills are covered daily and have runoff and runon controls. The commenters stated that some states do not require industrial, non-hazardous waste, landfills to apply daily cover and/or install runon and runoff control systems. The Agency contacted state agency officials in states where generators of EDC/VCM wastewater treatment sludges are located and where landfills identified in the RCRA 3007 questionnaires as accepting EDC/VCM wastewater treatment sludges are located. Officials in each state indicated that either industrial landfills are required to have daily cover and runon/runoff controls, or in the case of one state, although state regulations do not require these controls, the controls are generally required and enforced through permits. In addition, EPA called the owner/operators of each of the landfills identified in the RCRA 3007 questionnaires as accepting EDC/VCM wastewater treatment sludges for disposal. In every case, the owner/operators indicated that daily cover is applied and that the facility is equipped with runon/runoff controls. In addition, all but one of the landfills contacted accepts municipal solid waste. Therefore, Federal and state regulations require these landfills to apply daily cover and be equipped with runon and runoff controls. In addition, we expect that state agencies will continue to require these technical standards in future. Given that all landfills currently accepting EDC/VCM wastewater treatment sludges currently are applying daily cover and are equipped with runon/runoff controls and given that state agencies in states where EDC/VCM sludges currently are generated and managed require these controls, the Agency concludes that the commenters' concerns are unfounded.

b. Risk Assessment Exposure Scenarios, Contaminant Fate and Transport Modeling, Exposure Assessment, and Toxicity Assessment

EPA received comments on several aspects of the landfill and land treatment unit risk assessments that we conducted to support the EDC/VCM wastewater treatment sludge listing determination. EPA received two specific comments concerning the exposure scenarios that we evaluated in the landfill risk assessment: 1) that we did not evaluate particulate emissions from landfills, and 2) that we failed to consider ''non-routine'' exposures. EPA also received a comment on the contaminant fate and transport modeling that was conducted for the groundwater pathway analysis under the landfill scenario. EPA uses contaminant fate and transport modeling to estimate the contaminant concentrations at the receptor's point of exposure. Commenters contended that we had not correctly evaluated groundwater pathway risk for the landfill because we assumed that leaching of the landfill did not begin until after landfill closure. Lastly, we received a general comment that we believe applies to several aspects of our land treatment unit risk assessment: the exposure scenarios evaluated, the contaminant fate and transport modeling, and the exposure and toxicity assessments. This comment asserted that ''much of the same type of over conservatism'' present in the risk assessment for the chlorinated aliphatic wastewaters also was present in the risk assessment for EDC/VCM sludges managed in a land treatment unit.

i. Particulate Emissions From Landfills

Based upon information provided in responses to the RCRA § 3007 questionnaires, EPA evaluated the risks associated with the management of EDC/VCM wastewater treatment sludges in unlined municipal landfills and in a land treatment unit. We determined that releases from landfills could occur through the release of vapor emissions to the air and through leaching of the waste into the subsurface. One commenter was concerned that EPA had not considered the risks due to exposure to particulate emissions from landfills in which EDC/VCM wastewater treatment sludges are disposed. The commenter acknowledged that the Agency did not evaluate particulate emissions because the Agency assumed that the moisture content of the waste would prevent the release of particulates. The commenter indicated that the assumption that sludges would have sufficient moisture content to prevent particulate emissions was ''not well founded, given possible climate and wind conditions (for example, location of a landfill in an arid climate with high wind).''

The Agency disagrees with the commenter. As explained in the proposed rule (64 FR 46484), data collected by the Agency in support of the listing determination indicate that the EDC/VCM sludges have a high moisture content. Samples analyzed by the Agency had moisture contents of between 41 and 74 percent, which should prevent generation and release of particulates to the air during the time between placement of the waste in the landfill and the application of daily cover (or the application of new waste). Moreover, based on the results of our risk analyses for the land treatment unit, we do not think that particulate emissions from landfills, even if they did occur, would present significant risk. Under the land treatment unit scenario, dioxins were the only contaminants for which we identified significant risks due to air releases, and only 8 percent of the dioxin risk was due to particle phase air releases, while 92 percent of the risk was due to vapor phase air releases (Table 5–8; USEPA, 1999a). Under the landfill scenario, the vapor pathway dioxin risk was estimated to be 4E–10 (Appendix H.3.1,

Table H.3–1c; USEPA, 1999a). Even though we did not calculate risks from particle emissions, we expect they would be even less than 4E–10, based on the relative risks from land treatment units.

ii. ''Non-Routine'' Exposures

One commenter claimed that virtually the entire risk modeling effort was confined to long-term chronic risk exposures, that is, primarily indirect exposures offsite of a management facility. The commenter believed that EPA ignored activities at the waste management unit itself, and therefore ignored risks to workers and others at the waste management facilities. The commenter believes EPA also should consider acute exposure risks through accidents and other ''non-routine'' waste management conditions. Examples of such conditions provided by the commenter include high winds (40—60 mph) on dry days, drought or arid conditions, heavy rainfall, and hurricanes. The commenter stated that heavy rainfall and hurricane conditions could cause substantial amounts of dioxin-laden solids to be moved over land and into streams if the wastes were disposed in an unbermed area. The commenter expressed concern that during windy and arid conditions, dioxin-laden particulates may be dispersed from the landfill and beyond the unit boundaries. The commenter argued that the analysis of non-routine exposures is appropriate because of the toxicity and persistence of dioxin relative to other contaminants.

The commenter was concerned that EPA did not evaluate acute exposure to dioxins under scenarios involving workers, extreme climatological events, or accidents. EPA agrees that it can be appropriate to assess acute exposure scenarios or accidents in certain cases. However, in the case of chlorinated aliphatic sludges, we did not believe that such scenarios merited explicit analysis because the sludges, which result from the treatment of wastewaters, do not contain the very high concentrations of dioxins that we believe would be necessary to result in estimates of significant acute risk or hazard. For example, the highest TCDD TEQ concentration reported for dedicated EDC/VCM wastewater treatment sludges, 0.907 ug TCDD TEQ/kg, is below EPA's Superfund soil action level of 1 ug TCDD TEQ/kg which was developed to be protective of direct long term exposure to dioxins in residential soils and therefore clearly would be protective of shorter term exposure (OSWER Directive 9200.4–26, April 13, 1998).

iii. Delay of Landfill Leaching Until After Closure

In evaluating releases to groundwater from the landfill used to manage EDC/VCM sludge, EPA made a simplifying assumption that contaminant leaching from the landfill does not occur until after the landfill closes (that is, after 30 years). As we explained in the proposed rule, we made this assumption because of the complexities associated with linking the output of our landfill partitioning equations and our groundwater model, EPACMTP (EPA's Composite Model for Leachate Migration with Transformation Products). Two of the public commenters and all three of the peer reviewers questioned the appropriateness of our assumption, suggesting that it would lead to an underestimate of risk. One commenter noted that during the period when the landfill is open and the waste is exposed directly to storm water, ''leachate migration of contaminants is at its highest level.''

In retrospect, we realize that we were not completely clear concerning how our landfill modeling approach considers the production of leachate over the life of the landfill. Because of the way our landfill model is constructed, the application of daily cover and a final cap only limits the release of air emissions from the landfill, daily cover and final cap do not limit the production of landfill leachate. This is because the infiltration rate that we use for the landfill during its active life is the same as the infiltration rate that we use for the landfill once it is closed—we assume that the infiltration through the daily cover and final cap is the same as the infiltration through the exposed waste. Our basis for assuming that the cap will not reduce infiltration is that we predict that over the long term a cap will fail, and will cease to function effectively. Consequently, the effect of delaying leaching of the landfill until after closure is only to ''offset'' the arrival of the peak contaminant concentration at the groundwater receptor well by 30 years. For the sole contaminant of concern for the landfill, arsenic, the peak arrival time was estimated to be 8800 years. Reducing this time estimate by 30 years is clearly insignificant.

iv. Overly Conservative Land Treatment Unit Risk Analysis

One commenter maintained that ''much of the same type of over conservatism'' that was present in the risk assessment for the chlorinated aliphatic wastewaters also was present in the risk assessment for EDC/VCM sludges managed in a land treatment unit. The commenter contended that ''[f]or the same reasons articulated'' for wastewaters, ''EPA should reevaluate and adjust risk assessment parameters as necessary before proposing to list such wastes, even under a land treatment scenario.''

Although the commenter was not specific regarding which aspects of their comments on the wastewater risk analysis they felt applied to the Agency's evaluation of EDC/VCM sludges managed under a land treatment unit scenario, we reviewed the risk assessment comments for wastewaters to determine which could be relevant to the land treatment unit analysis. The comments that we focused on are discussed below. Section VI.B.3 summarizes how the comments influence the proposed risk estimate for EDC/VCM sludges managed in a land treatment unit.

Cooking and Post-Cooking Losses for Beef

The commenter claimed that the intake rates that EPA used for beef should have been adjusted downward to account for cooking and post-cooking weight loss, as recommended in the Exposure Factors Handbook (USEPA, 1997). As was the case for wastewaters (see section VI.A.2.d.), EPA agrees that we should have accounted for cooking and post-cooking losses of beef in our exposure analysis for the land treatment unit.

Assessment of the Toxicity of Dioxins and Furans

In our evaluation of the comments on wastewaters, we disagreed with the commenter's claim that we should modify the cancer slope factor that we used for TCDD and that our TEFs represent upper-bound values. Our responses to these comments are provided in section VI.A.2.e.i. Although we also disagree with the commenter's assertions that we should use the IRIS slope factor for HxCDD mixtures in our risk assessment (see section VI.A.2.e.i.), eliminating the 1,2,3,6,7,8- and 1,2,3,7,8,9-congeners of HxCDD from the land treatment unit risk analysis *completely* would have the impact of modifying the high end risk estimate for the adult farmer only by a factor of 0.97, which would not significantly change the results of the risk analysis.

EPA Should Have Evaluated Site-Specific Exposure Scenarios

The commenter maintained that EPA should have used a site-specific approach to assessing risks from

management of chlorinated aliphatics wastewaters (see section VI.A.2.b). The commenter suggested that such an approach would recognize that EPA's assumption that a farmer lives at the same location within 300 meters of a chlorinated aliphatics facility for 48.3 years, and raises fruits, exposed vegetables, root vegetables, beef cattle, and dairy cattle within this distance, is unrealistic. In addition, the commenter challenged the amounts of home-produced beef, dairy products, vegetables, and fruits that EPA assumed were consumed by the farmer.

Although the Agency's response to these comments is presented in our discussion of chlorinated aliphatics wastewaters in section VI.A.2.b, there are a few additional points that we can make with regard to the exposure scenario we considered in our evaluation of the risk associated with management of EDC/VCM wastewater treatment sludges in a land treatment unit. Although our land treatment unit analysis was inherently more site-specific than our analysis of wastewaters (since only one facility uses a land treatment unit to manage EDC/VCM sludges), we do not believe, for the reasons presented in section VI.A.2.b.i, that it would have been appropriate to conduct facility-specific risk analyses for chlorinated aliphatics wastes.

In response to concerns regarding the likelihood that a farmer would raise fruits and vegetables for home consumption, in addition to producing beef and dairy products, EPA refers to Table 5–8 of the Risk Assessment Technical Background Document (USEPA, 1999a) that shows that only 4 percent of the high end risk for the adult farmer was due to ingestion of home grown fruits and vegetables. As was the case for wastewaters, even though EPA believes it is plausible that a subsistence or hobby farmer would raise fruits and vegetables for home consumption, the validity of EPA's risk estimate depends almost entirely on the validity of our assumption that a farmer might consume both beef and dairy products from cattle raised on a farm located near a chlorinated aliphatics production facility. While we responded to this comment in our previous discussion of wastewaters, EPA notes that even in the specific case of the facility where the existing land treatment unit is located, there is evidence of the potential close proximity of grazing cattle. First, the most recently available agricultural census data (1997) indicate that both beef and dairy cattle were reported as being raised in the parish in which the land treatment unit is located. Second, although the potential proximity of cattle farming operations to chlorinated aliphatics facilities was confirmed by commenters on the wastewater risk analysis, EPA notes that, in addition, a land use map depicts the location of the facility that operates the land treatment unit as adjacent to land described as cropland and pasture (USEPA, 2000b). In addition, in a 1994 aerial photograph of the facility (located in the docket for the final rule), areas adjacent to the facility are depicted as being used for agriculture. Third, a 1986 RCRA Facility Assessment (RFA) conducted at the facility at which the land treatment unit is located noted the following for a landfarm/land treatment area at the facility: ''* * * the State issued a violation to the facility for allowing cows to graze in this area.''

EPA Incorrectly Evaluated the Contribution of Feed to Dioxin Levels in Dairy and Beef

The commenter raised several issues related to how EPA evaluated the contribution of feed to dioxin levels in dairy and beef. The Agency's responses to most of these concerns are addressed in section VI.A.2.c.ii. As was the case for wastewaters, we reviewed our methodology for estimating the concentrations of dioxins in beef and dairy products. The dioxins in the beef and dairy products result primarily from the cattle's intake of forage and soil that are contaminated by air emissions and runoff/erosion from the modeled land treatment unit—minor levels of dioxins are contributed to cattle as a result of the cattle's ingestion of grain or silage (USEPA, 2000b). Consequently, all that is required for the adult farmer to realize the risk that EPA presented in the proposed rule is that the farmer consume beef and dairy products derived from cattle that consume forage and incidentally ingest soil from the farmer's pastureland/field. That is, it is not necessary that the farmer consume home-grown fruits and vegetables, or that the farmer produce grain or silage for use as cattle feed. As was the case for wastewaters, we felt that we likely should have considered how the concentrations of dioxins in air vary over a wider areal extent that would be more consistent with the area of a pasture where cattle graze. Similar to wastewaters, we calculated what the impact would be to the risk estimate if we accounted for a more reasonable pasture/field size (USEPA, 2000b). In addition, in response to comments from peer reviewers, we also reviewed the method by which we evaluated risk attributable to the runoff/erosion pathway to ensure that we appropriately characterized the dioxin concentrations in feed, thus the concentrations in dairy and beef. In subsequently evaluating the land treatment unit dioxin mass balance, we determined that, due to limitations of the available model, we overestimated the amount of dioxin-contaminated soil lost from the land treatment unit due to erosion over long durations (USEPA, 2000b). The revised risk estimate that considers these modifications is presented in section VI.B.3.

v. Characterization of Arsenic Risk Results

Several commenters were concerned that although EPA found risks from arsenic that are within its discretionary range for listing EDC/VCM wastewater treatment sludges, EPA did not include arsenic as a basis for the listing determination and the contingent management listing for EDC/VCM wastewater treatment sludges allows this waste to be managed in landfills despite our risk assessment results for arsenic.

EPA evaluated potential risks from arsenic resulting from both landfill management of EDC/VCM wastewater treatment sludges and management of the waste in a land treatment unit. In the case of the landfill scenario, risk assessment results showed a high-end risk from arsenic from a groundwater ingestion exposure pathway, to be 3E–05. However, this potential risk level is predicted to occur only after a very significant period of time. Our modeling results indicate that, after a period of 8,800 years, the disposal of EDC/VCM sludge in an *un*lined landfill would result in an increase in the concentration of arsenic in groundwater in a down gradient 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.

Given these predicted circumstances, we conclude that the risks from arsenic for the landfill scenario are not significant for several reasons. The predicted risks levels are associated with a peak arsenic concentration in a receptor well that is estimated to occur only after a very long period of time. In addition, the predicted high-end arsenic concentration at a receptor well (1.4 ppb) is very close to the median arsenic background concentration of 1.0 ppb found in groundwater in Texas and Louisiana.[33] The predicted high-end

[33] Focazio, M.J., Welch, A.H., Watkins, S.A., Helsel, D.R., and Horn, M.A., 1999, A Retrospective Analysis on the Occurrence of Arsenic in Ground-

Continued

arsenic concentration also is well below the current maximum contaminant level (MCL) allowed for arsenic in drinking water and below the revised MCL for arsenic recently-proposed by EPA's Office of Ground Water and Drinking Water. The current MCL for arsenic is 50 ppb, the revised MCL proposed by EPA is 5 ppb (65 FR 38888).

Given that the estimate of potential risk for arsenic is within the range of risk levels in which the Agency exercises discretion with regard to a listing decision (i.e., predicted risk levels are less that 1E–04), the Agency's established policy provides that it may take into account other factors affecting the potential risk associated with the waste in making its listing determination. The risk estimate for arsenic in EDC/VCM wastewater treatment sludges managed in landfills is the result of predicted concentrations of arsenic that are close to background levels, do not exceed the MCL in the modeled receptor well, and the result of a peak arsenic concentration in a receptor well that is predicted to occur only after a period of 8,800 years. Given that there are uncertainties associated with our risk estimates we do not think it makes sense to impose requirements now to address a marginal risk that may be realized so far in the future. In addition, even if the arsenic concentrations predicted to occur very far in the future were to occur now, these concentrations are not at levels of concern, given that the peak concentration of arsenic in groundwater is predicted to be below the current (and all recently proposed) MCL(s). Therefore, EPA concludes that EDC/VCM wastewater treatment sludges do not pose a significant risk due to the presence of arsenic when managed in landfills.

In the case of the potential risks associated with arsenic in EDC/VCM wastewater treatment sludges managed in a land treatment unit, we found that arsenic may present some risk from potential releases to groundwater from the land treatment unit. However, we conclude that the estimated level of potential risk is not significant for the very same reasons we concluded that the risk from arsenic in a landfill scenario is not significant (*i.e.,* predicted concentrations of arsenic in groundwater wells is close to background levels, and is the result of a peak arsenic concentration in a receptor well that is predicted to occur only after a long period of time). The Agency concludes that the risk posed from potential releases of arsenic in this wastestream does not warrant listing the waste as hazardous. However, in the case of the land treatment unit scenario, the Agency determined that the waste should be listed as a hazardous waste based upon the potential risks associated with dioxin concentrations found in the waste. The Agency therefore is listing 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 a land treatment unit.

vi. Regulatory Compliance Demonstration

Two commenters were concerned that the proposed conditional listing approach for EDC/VCM wastewater treatment sludges would be burdensome to generators due to commenters' view that the proposal required generators to document their ''intent'' to properly manage and dispose of the waste. In response, the Agency notes that we are not imposing any new paperwork requirements as part of the conditional listing. In the final listing determination, the Agency is requiring that generators and other handlers of EDC/VCM wastewater treatment sludges merely be able to demonstrate that past and on-going waste management practices are in compliance with the conditions of the contingent management listing approach. Our intent in describing potential types of records or contracts that could fulfill the demonstration requirement was merely to provide examples of appropriate demonstrations, and not to impose stringent or specific paperwork requirements. As explained above, the Agency is finalizing, as part of the listing description, a flexible performance standard similar to the documentation requirement provided in 40 CFR 261.2(f) for documenting claims that materials are not solid wastes, when managed in certain ways. Generators and other handlers of EDC/VCM wastewater treatment sludge that claim the waste is not a hazardous waste must merely demonstrate that the generator or handler has handled the waste or intends to handle the waste in compliance with the conditions of the conditional listing. One manner in which this demonstration may be made is by presenting a copy of a signed contract between the generator and a state-licensed landfill under which the landfill agrees to accept the EDC/VCM waste. Again, in cases where such a contract does not exist, other documentation of past and on-going disposal practices such as signed non-hazardous waste manifests, shipping papers, and/or invoices may provide an appropriate demonstration of proper management. The Agency points out that a generator's or handler's ability to demonstrate recent and/or on-going shipments of EDC/VCM wastewater treatment sludges to appropriate disposal facilities will serve as sufficient demonstration of their intent to continue such management practices for wastes being appropriately stored on-site (i.e., stored in a manner that does not involve direct placement of the waste on the land) prior to off-site disposal and not yet offered for off-site shipment.

vii. Status of EDC/VCM Sludges Managed by Methods Other Than Land Treatment and Landfilling

Incineration

Several commenters requested that EPA include incineration of EDC/VCM wastewater treatment sludges as a contingent management option for this waste. Commenters argued that incineration should be allowed to occur without the sludge falling within the scope of the listing description (*i.e.,* commenters requested that EPA allow the incineration of EDC/VCM wastewater treatment sludges as non-hazardous wastes).

The Agency disagrees with the commenters. First, the Agency notes that commenters provided no information indicating that incineration of presently non-hazardous EDC/VCM sludges is occurring and indicated only that they were considering the practice. Some commenters stated specifically that they currently do not incinerate presently non-hazardous EDC/VCM wastewater treatment sludges. Information available to the Agency during development of the proposed rule indicated that there were no facilities presently incinerating non-hazardous forms of the waste, and EPA did not evaluate potential risks from on-site or off-site incineration of EDC/VCM wastewater treatment sludges in non-hazardous waste incinerators. EPA bases listing determinations on an assessment of plausible (and worst-case) management scenarios. It is not practicable for EPA to evaluate every possible management scenario, and particularly not those management practices that are found not to be plausible (or are hypothetical). This is consistent with the Agency's mandate to evaluate determine whether or not to list wastes, and not management practices. EPA does carve out particular

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water Resources of the United States and Limitations in Drinking-Water-Supply Characterizations: U.S. Geological Survey Water-Resources Investigation Report 99–4279, 21 p.

waste management practices in certain circumstances (*e.g.*, here, where there is a widespread practice we have modeled fully), but we cannot possibly evaluate every practice, particularly hypothetical practices, that any commenter says they might employ.

Our policy with regard to hazardous waste listings is that in cases where we have identified one plausible management practice that presents a significant risk to human health and the environment (in this case, land treatment), the waste warrants being listed as a hazardous waste. However, since the Agency identified another plausible management approach (landfill), evaluated the risk from this management approach, and determined that the second management approach does not present a significant risk to human health and the environment, the Agency determined that it is appropriate to exclude the waste from the hazardous waste listing, when managed in this particular manner. Without evaluating potential risks from additional management approaches, the Agency cannot determine whether or not the waste, when managed in a different manner, warrants being excluded from the hazardous waste listing. Given that EDC/VCM wastewater treatment sludges currently are not managed in non-hazardous waste incinerators, we have not used the limited time and resources we have for the rulemaking to conduct an analysis of potential risks associated with this potential management practice. Therefore, we do not have a basis to exclude sludges managed in this manner from the listing description. Should the Agency receive information in the future indicating that non-hazardous waste incineration is occurring, the Agency may re-visit the decision to preclude the management of these sludges in non-hazardous waste incinerators. However, given that these sludges contain dioxin, EPA would want to carefully consider the potential risks of managing these wastes in non-hazardous waste incinerators, before concluding that this practice does not pose a risk.

The final rule, as promulgated in today's notice, provides that EDC/VCM wastewater treatment sludges are listed hazardous wastes, unless the sludges are disposed in a subtitle C landfill or a non-hazardous waste, state-licensed landfill and are not placed on the land prior to final disposal in a landfill. Under the conditional listing, the incineration of EDC/VCM wastewater treatment sludges in a non-hazardous waste incinerator and the disposal of the ash in a landfill does not meet the conditions of the listing. EDC/VCM wastewater treatment sludges destined for incineration are hazardous wastes (*i.e.*, are K174).

EDC/VCM Wastewater Treatment Sludges Derived From the Management of Chlorinated Aliphatic Wastewaters in Surface Impoundments

As mentioned above, at the time of the proposed rule EPA was not aware that any chlorinated aliphatic production facility was managing chlorinated aliphatic wastewaters in surface impoundments, or potentially generating EDC/VCM wastewater treatment sludges in surface impoundments. However, the Agency received information from public comments indicating that one chlorinated aliphatic manufacturing facility produces VCM and sends its process wastewaters to an adjacent facility, where the VCM wastewater is combined with other non-chlorinated aliphatic wastewaters for treatment in surface impoundments. The commenter described the type of treatment occurring in these impoundments to include biological treatment followed by clarification; therefore, we presume wastewater treatment sludges are generated in these impoundments. Because these wastewater treatment sludges are the result of treating wastewaters from the production of VCM, they will meet the definition of today's K174 hazardous waste listing on the effective date of today's rule.

The listing description for EDC/VCM wastewater treatment sludges finalized in today's rulemaking includes sludges that are placed on the land prior to final disposal in a landfill. EPA's long-standing policy under RCRA subtitle C is that wastes generated in surface impoundments are subject to regulation while actively managed in the impoundment (not just when the sludges are removed from the unit) (see 45 FR at 72024; 55 FR 39409; 55 FR 46380). Therefore, sludges resulting from treating wastewaters from the production of EDC/VCM after the effective date of today's rule, when actively managed in surface impoundments in which they are generated, fall within the scope of today's listing determination for EDC/VCM wastewater treatment sludges (K174).

With regard to the regulatory status of surface impoundments used to treat EDC/VCM wastewaters prior to the effective date of the today's rule, EPA has articulated in prior rulemakings certain circumstances where a surface impoundment, in which newly-regulated wastes were generated prior to the effective date of the listing, would not become subject to subtitle C management standards (see 55 FR 39410 and 55 FR 46380). In the November 2, 1990 rulemaking finalizing the hazardous waste listings for F037 and F038, EPA provided that in cases where wastes become defined as hazardous as a result of new listing determinations, if the wastes are removed from the impoundment prior to the effective date of the rule defining them as hazardous, then the impoundment does not become subject to Subtitle C.

In the **Federal Register** notice published on September 27, 1990, EPA clarified the regulatory status of surface impoundments containing sludges newly defined as hazardous that were deposited in an impoundment prior to the effective date of the rule defining the waste as hazardous, and where the impoundment ceased to receive hazardous wastes on or before the effective date of the rule. In that notice, EPA stated: If (1) the newly identified hazardous waste remains in the surface impoundment after the effective date of the rule, and (2) the impoundment does not receive or generate any other hazardous wastes after the effective date, and (3) the impoundment is the final disposal site for the waste, then the impoundment is not subject to RCRA subtitle C. Additionally, the Agency clarified that if newly-listed wastes are removed from an impoundment as part of a one-time removal, including a one-time removal after the date on which the waste becomes defined as hazardous, the impoundment will not be subject to RCRA subtitle C. The Agency also clarified in the September 27, 1990 rulemaking that EPA will not view the one-time removal of waste as part of a closure as changing the status of the surface impoundment (*i.e.*, subjecting the impoundment to RCRA subtitle C), as long as there is no ongoing management of the waste in the impoundment after the effective date of the hazardous waste listing.

Therefore, if a facility ceases to manage EDC/VCM process wastewater sludge in surface impoundments prior to the effective date of today's listing determination, and the facility undertakes a one-time removal of the newly-listed waste, the surface impoundment will not be subject to RCRA subtitle C. The sludges removed from an impoundment as part of a one-time removal after the effective date of today's listing (that were derived from the previously managed chlorinated aliphatic wastewaters), will be defined as K174, unless the waste meets the conditions for exclusion from the hazardous waste listing. If the sludge does meet these conditions (*i.e.*, it is

disposed in a subtitle C landfill or a non-hazardous waste landfill permitted or licensed by a state, and it is not placed on the land other than in such a landfill after it is removed from the impoundment), it will be exempt from the listing. After the one-time removal of sludge generated from the chlorinated aliphatic wastewaters, and as long as no additional chlorinated aliphatic wastewaters are managed in the impoundment, sludges generated in the impoundment will not meet the listing description for K174. In other words, the impoundment would not become regulated. In addition, sludges removed in subsequent removals (*e.g.*, as part of routine maintenance activities) will not be considered EDC/VCM wastewater treatment sludge (K174), as long as chlorinated aliphatic wastewaters were not managed in the impoundment after the effective date of the rule.

The above discussion pertains to facilities that choose to continue operating their surface impoundments as non-hazardous waste units after the effective date of today's rule. However, a facility could choose to continue to manage chlorinated aliphatic wastewaters in surface impoundments after the effective date of today's rule. In this case, the sludge generated in the impoundments will meet the K174 listing description and the surface impoundments will become subject to RCRA subtitle C. Any newly listed EDC/VCM wastewater treatment sludges that are managed in a newly regulated surface impoundment (i.e., an impoundment that becomes subject to RCRA regulation as a result of the new waste listing) may continue to be managed in the impoundment for up to four years, provided that the impoundment is in compliance with the groundwater monitoring requirements of 40 CFR part 265, Subpart F within 12 months after promulgation of the new waste listing (40 CFR part 268.14).[34] Surface impoundments also may continue to treat wastes that do not meet LDR treatment standards if the surface impoundments are in compliance with 40 CFR 268.4 (the surface impoundment exemption), or if facilities obtain no-migration variances for the units (40 CFR 268.6, 264.221(b), 265.221(c)). Under the surface impoundment exemption, owners or operators must follow specific sampling and testing, removal, subsequent management, and recordkeeping requirements. Some impoundments may be granted a delay of closure (see 40 CFR 265.113 and 40 CFR 264.113) and thus will be allowed to remain in operation, providing that hazardous waste is removed and the impoundment is used for non-hazardous wastes (see section VIII.B for a discussion of permitting requirements and compliance dates applicable to the management of newly-listed wastes). Facilities that currently manage EDC/VCM wastewater treatment sludges in surface impoundments must meet the terms of these regulations or discontinue their use for the management of these sludges prior to the effective date of the listing and land disposal restrictions.

viii. Contingent Management Approach

A few commenters asserted that a contingent management approach to listing EDC/VCM wastewater treatment sludges is not appropriate. Commenters pointed out that such an approach would allow the waste to be land disposed without treatment in compliance with the land disposal restrictions requirements. One commenter stated that RCRA does not provide EPA with the statutory authority to list a waste as hazardous on the basis of how the waste is or is not managed. Another commenter stated that the management process should not decide whether a waste is hazardous or not. The commenter further stated that waste management practices only should ensure that the waste is properly treated.

Given the Agency's finding (discussed in Section VI.B.1. of this preamble) that the predominant approach for managing EDC/VCM wastewater treatment sludges does not pose a substantial hazard to human health and the environment, we see no reason to include sludges managed in this manner in the scope of the hazardous waste listing. In fact, the Agency knows of only two facilities that manage these sludges in a manner other than landfilling. It does not make sense to list the bulk of EDC/VCM wastewater treatment sludges managed safely in landfills based upon the management approaches used by two facilities. On the other hand, we do not believe that it is appropriate to promulgate a no-list determination, given the Agency's finding (discussed in Section VI.B.1. of this preamble) that EDC/VCM sludges pose a substantial hazard to human health and the environment when managed in a land treatment unit. Therefore, the Agency is promulgating a contingent management listing to ensure that EDC/VCM wastewater treatment sludges are managed only in a manner that EPA has shown does not pose a substantial hazard to human health and the environment.

Because the Agency has made a finding that the waste does not pose a substantial hazard to human health and the environment if disposed in a landfill, without being treated prior to disposal, we do not agree with commenters' regarding the necessity of imposing treatment requirements under RCRA subtitle C. Our finding that treatment is not necessary to insure protection of human health and the environment is a major factor supporting the contingent management approach. In addition, the land disposal restrictions apply to hazardous wastes only. Since the Agency has determined that EDC/VCM wastewater treatment sludges, when managed in a landfill, are not hazardous wastes, the treatment standards are not necessary to ensure protection of human health and the environment.

A contingent management listing approach is within EPA's statutory authority. Section 3001(a) requires the Administrator to promulgate criteria for identifying and listing wastes that ''should'' be subject to the requirements of RCRA. The word ''should'' in section 3001(a) calls for an exercise of judgment and, therefore, confers discretion upon EPA to determine whether listing is warranted. RCRA sections 3002, 3003 and 3004 direct the Agency to issue regulations ''necessary to protect human health and the environment.'' Accordingly, the decision whether a waste should be regulated under RCRA turns upon EPA's assessment of whether such regulation is necessary to protect human health and the environment. Because a hazardous waste is by definition a solid waste that poses ''a substantial threat to human health and the environment when improperly treated, stored, transported, or disposed of, or otherwise managed,'' (RCRA section 1004(5)) EPA concludes that where a waste might pose a hazard only under limited management scenarios, and other regulatory programs already address such scenarios, the Agency is not required to list a waste as hazardous.

The Agency's decision with regard to whether a waste should be regulated under subtitle C turns upon EPA's assessment of whether RCRA regulation is necessary to protect human health and the environment. In particular, in *Military Toxics Project* v. *EPA*, 146 F.3d 948 (D.C. Cir. 1998) the court found that, if EPA concludes that a waste might pose a hazard only under limited management scenarios, EPA can reasonably and permissibly determine that the waste should be regulated as

[34] RCRA § 3005(j)(6) provides that facilities managing wastes in surface impoundments that are newly brought into the subtitle C system by a new listing or characteristic have four years to retrofit or close impoundments receiving newly identified or listed wastes (and no other hazardous wastes).

hazardous only under those scenarios. In the Military Toxics Project case, EPA reasonably determined that waste munitions would not pose a hazard if managed in accordance with existing military munitions handling regulations. Similarly, with regard to EDC/VCM wastewater treatment sludges in today's rulemaking we have reasonably determined that the waste will not pose a hazard if managed in hazardous waste landfills or non-hazardous waste landfills licensed or permitted by a state. We base this conclusion on the results of the Agency's risk assessment and in view of existing state and federal controls for non-hazardous waste landfills. We note that the finding by the court in Military Toxics Project did not hinge upon EPA deferring to a comprehensive regulatory program, but only to programs that address the appropriate waste management scenarios in a manner that EPA determined is necessary to protect health and the environment. Given the results of the Agency's risk assessment, we find that the management of these wastes in non-hazardous waste landfills licensed or permitted by a state is protective of human health and the environment. On the basis of this conclusion and in light of the Military Toxics Project decision, we conclude that EPA has the authority to promulgate a conditional listing for this waste.

3. Rationale for Final Listing Determination: Summary of the Impact of Public Comments on the Proposed Listing Determination for EDC/VCM Wastewater Treatment Sludges

The Agency decided to finalize a contingent management listing for EDC/VCM wastewater treatment sludges based on the EPA's finding that these wastes posed a substantial hazard to human health and the environment when managed in a land treatment unit, but did not pose this hazard when managed in a landfill. As discussed above, commenters argued that EPA's risk estimates for the landfill and land treatment unit were in error. After reviewing and carefully considering all information provided by commenters, we re-evaluated our risk assessment results. Based on information provided by commenters, we decided it was appropriate to adjust our proposed risk estimate, 2E–04, for the land treatment unit. As mentioned above in response to a commenter's concerns regarding the expected productivity of EPA's modeled agricultural field, EPA's risk estimate for the land treatment unit almost entirely was due to a farmer's ingestion of beef and dairy products from cattle that consume dioxin-contaminated forage and pasture soil. That is, the risk estimate is 2E–04 even when the portion of risk associated with cattle consumption of grain and silage are eliminated. Correcting the risk estimate to account for both cooking and post-cooking loss of beef and an overestimate of risk attributable to the erosion pathway analysis would reduce the risk estimate to 1E–04. Accounting for a more reasonable pasture size would reduce this risk estimate (1E–04) to approximately 7E–05. Moreover, adjusting the TCDD slope factor downward as recommended by the commenter, and removing 1,2,3,6,7,9- and 1,2,3,7,8,9-HxCDD from the risk assessment *completely,* would reduce this risk estimate only to 5E–05. Although EPA does not support making these adjustments to the toxicity values, doing so demonstrates that accepting the commenter's recommendation would not reduce the risk estimate to a value that, after consideration of other factors as described in Section VI.B.1. of this preamble, would change the Agency's finding that these wastes pose a substantial hazard to human health and the environment. Our analysis of the comments did not reveal any justification for modifying our proposed risk estimate for the landfill scenario.

Therefore, the Agency is listing EDC/VCM wastewater treatment sludges as EPA Hazardous Waste Number K174, unless the sludges are managed in a subtitle C landfill, or a non-hazardous waste landfill permitted or licensed by a state. The Agency believes that allowing the waste to continue to be managed under a low risk management scenario (i.e., non-hazardous waste 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 the level of risk posed from managing EDC/VCM wastewater treatment sludges in a landfill is not at a sufficient level to support a hazardous waste listing determination, 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 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 potential risks from the practice.

Under the contingent management listing approach finalized today for EDC/VCM wastewater treatment sludges, EDC/VCM sludges will be hazardous wastes unless they are disposed in a landfill. EDC/VCM wastewater treatment sludges that are handled in compliance with the contingent management approach will be considered nonhazardous from the point of generation. 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 is not placed directly on the land prior to disposal in a landfill. If the waste is not disposed of in a subtitle C landfill or a state-licensed non-hazardous waste landfill, then the waste meets the listing description and must be managed in compliance with subtitle C management standards from the point of generation.

In addition to requiring that EDC/VCM wastewater treatment sludges be disposed in a subtitle C landfill or a state-licensed landfill to meet the contingent management listing, the Agency also is restricting the placement of EDC/VCM wastewater treatment sludges directly on the land prior to disposal in a landfill (*e.g.,* storage in surface impoundments, storage in waste piles, spills). EPA wants to ensure that these wastes are managed in the manner found to be protective of human health and the environment. Under the terms of the listing, storage of EDC/VCM wastewater treatment sludge in tanks or containers, or in any manner other than direct placement on the land, prior to disposal will not constitute a violation of the conditions for exclusion from the hazardous waste listing.

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 document or demonstrate that sludges excluded from the listing description are being managed in accordance with 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.,* waste piles, surface impoundments) as well as demonstrate that the waste is disposed of in a landfill. We note that the Agency is not imposing any specific recordkeeping requirements as part of today's final rule. Instead the Agency is finalizing, as part of the listing description, a more flexible performance standard similar to the documentation requirement provided in 40 CFR 261.2(f) for documenting claims that materials are not solid wastes. Generators and other handlers of EDC/VCM that claim the waste is not a hazardous waste must merely demonstrate that the generator or handler has, and continues to handle the waste in compliance with the contingent management conditions. One of the simplest ways to make such a demonstration may be to provide a compliance or enforcement official, upon request, with a copy of a signed contract with a state-licensed landfill. In cases where such a contract does not exist, other documentation of past and on-going disposal practices such as signed non-hazardous waste manifests, shipping papers, and/or invoices should provide an appropriate demonstration of proper management. The Agency points out that a generator's or handler's ability to demonstrate recent and/or on-going shipments of EDC/VCM wastewater treatment sludges to appropriate disposal facilities will serve as sufficient demonstration of intent to continue such management practices for wastes being stored on-site in tanks or containers (or in any other manner other than direct placement on the land) and not yet offered for off-site shipment.

The Agency points out that should EDC/VCM wastewater treatment sludges meet a listing description for another listed hazardous waste, 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, due to the fact that they may be characterized as EDC/VCM wastewater treatment sludge.

C. Wastewater Treatment Sludges and Wastewaters From the Production of VCM–A

1. Wastewater Treatment Sludges From VCM–A Production

The EPA is listing as hazardous wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A). This wastestream meets the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous because it may pose a substantial or potential hazard to human health or the environment. The Agency identified significant potential risks to consumers of groundwater due to the release of mercury from this waste when managed in a landfill. We are not promulgating the proposed alternative option of conditionally listing this waste (*i.e.,* listing the waste only if it is not managed in a subtitle C landfill) because after reviewing comments we remain convinced that the current management practice of disposing of untreated forms of this waste in a subtitle C landfill, even after taking into account landfill controls, can pose significant risk as explained in more detail below.

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

In the August 25, 1999 **Federal Register** we proposed to list VCM–A wastewater treatment sludge due to the potential risk from consuming groundwater containing concentrations of mercury, arising from the landfill disposal of the VCM–A sludge, that exceed the Maximum Contaminant Limit (MCL).[35] At proposal, we considered risks arising from both an unlined landfill disposal and a subtitle C landfill disposal management scenario, because at that time we believed both scenarios were plausible forms of managing this waste. Under the unlined landfill scenario, we used the mercury TCLP analytical results for the VCM–A sludge (0.26 mg/L; facility split sample was 0.654 mg/L) and calculated a predicted groundwater concentration at a receptor well using a dilution and attenuation factor (DAF) of 40.[36] The predicted receptor well groundwater concentration exceeded the mercury MCL by a factor of three based on a mercury leachate concentration of 0.26 mg/L (obtained from a sample of the waste analyzed by EPA), and by a factor of eight using the mercury leachate concentration from the facility's split sample of 0.654 mg/L (64 FR at 46510).

Under the subtitle C landfill scenario, we took into account additional information regarding the increased mobility of mercuric sulfide (the form of mercury in the VCM–A sludge) under higher pH environments, and the degree to which subtitle C landfill controls (e.g., liner systems) would have to perform to prevent releases that exceed the MCL in groundwater at a modeled receptor well (64 FR at 46511). We documented that the pH measured in leachate from the subtitle C disposal cell where this waste is currently managed is greater than 9, which is in all likelihood due to the presence in the landfill of alkaline materials commonly used to stabilize many types of hazardous wastes. We also cited analytical results from a draft treatability study on the VCM–A waste, indicating that mercuric sulfide is less stable in a higher pH environment, and that the leachate resulting from a constant pH leach test at pH=10 contained 1.63 mg/L of mercury. We concluded that mercury in the VCM–A waste would be significantly mobilized under the conditions found in the subtitle C landfill scenario, and at proposal we said that ''* * * even assuming a low probability of [liner] failure * * * there may still be a release of mercury that results in an accedence 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'' (64 FR 46511). In other words, with a leachate concentration of 1.63 mg/L at pH=10 and a DAF of 40, the modeled receptor well mercury concentration is 0.041 mg/L when no credit is given to the liner system (*i.e.,* assuming an unlined landfill). Assuming that no mercury is released to groundwater if a liner system is 100% effective, one only has to reduce the ''effectiveness'' of the subtitle C liner system by a small margin, to 95%, to predict a mercury concentration in a modeled receptor well equal to the MCL for mercury.[37] The issue of the uncertainty with engineered liner systems is discussed in more detail further below.

Therefore, we presented at proposal two plausible management scenarios upon which we based our proposed listing, an unlined landfill and a subtitle C landfill. As discussed below in section VI.C.1.a, because we received information after proposal indicating that the unlined landfill scenario was not plausible, our final decision today to list the VCM–A sludge as hazardous is based only upon the subtitle C landfill scenario described above.

[35] The Maximum Contaminant Level Goal (MCLG) for mercury is 0.002 mg/L because EPA has determined that drinking water below this level of protection would not cause any adverse health effects. The MCL for mercury is also 0.002 mg/L, and is an enforceable standard set as close to the MCLG as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

[36] As noted at proposal, the DAF of 40 for mercury was developed for the 1995 proposed Hazardous Waste Identification Rule (60 FR 66344, December 21, 1995) for landfill leachate.

[37] (0.05)(0.041 mg/L) = 0.002 mg/L

a. Response to Major Comments Received on Proposed Rule for VCM–A Wastewater Treatment Sludges

VCM–A sludge is generated by only one facility in the United States, Borden Chemical and Plastics (BCP) in Geismar, Louisiana; therefore, the industry comments relating directly to this waste stream were from BCP. Environmental groups and waste treatment industry representatives also commented on the EPA's proposal to list this wastestream as hazardous.

i. Risk Assessment Submitted by BCP

In response to the Agency's proposed decision to list wastewater treatment sludges from the production of VCM–A, BCP provided the Agency with a groundwater pathway exposure and risk analysis for mercury in VCM–A wastewater treatment sludges managed in landfills, conducted by a contractor on their behalf. BCP concludes, based upon their risk assessment, that there would be no human health risks to consumers of groundwater resulting from releases of mercury from VCM–A waste managed in a landfill.

BCP's analysis was designed to parallel the manner in which EPA conducts contaminant fate and transport modeling when evaluating landfills. Specifically, BCP stated that its ''methods and assumptions followed to the extent possible those presented in [EPA's] Chlorinated Aliphatics Risk Assessment document when feasible.'' However, rather than using EPA's groundwater fate and transport model, EPACMTP, BCP's analysis used a simpler analytical groundwater transport model, AT123D. This model is not specifically designed to simulate leachate migration from land disposal units; although, when used appropriately, AT123D should be able to produce results that are protective and comparable to those obtained with EPACMTP. However, after carefully reviewing the risk assessment submitted by BCP, EPA found that there are significant deficiencies associated with certain aspects of the modeling and risk assessment and therefore is not persuaded by the conclusions drawn from BCP's analysis. These deficiencies are described below:

- EPA's most significant concern regarding the way in which BCP conducted its groundwater modeling is that BCP limited the period of time that the contaminant plume is allowed to migrate to 70 years from the time mercury was introduced into the groundwater. BCP's assumption has the effect of considering only exposure and hazard to current receptors and ignores potential hazard to future generations. In fact, in the case of release of leachate from a landfill, the greatest risk is often to future generations. This is because wastes initially are accumulated in landfills for many years prior to landfill closure, then, subsequent to landfill closure, leachate generation and migration in groundwater can occur for additional tens, hundreds, or thousands of years.
- EPA disagrees with the way that BCP considered the area of the landfill in its modeling efforts. Although the area of the waste management unit is not input directly into the AT123D model employed by BCP, the model does require an equivalent source length and width. In its analysis, BCP modeled an areal source with an area of one meter by one meter, and a depth (thickness) of 6 meters. The analysis submitted by BCP does not provide the area of the actual landfill in which the VCM–A sludge is disposed, but a source area equal to 1 m^2 does not represent a realistic landfill size, since industrial landfills are typically on the order of 50,000 to 100,000 m^2. Moreover, a landfill of the size modeled by BCP (6m^3) would not be large enough to contain the quantity of sludge that we estimate BCP generates in 1 year, 109m^3), let alone the quantity we estimate BCP might generate over a 30 year period (3,273m^3).
- In its AT123D modeling efforts, BCP assumed an aquifer hydraulic conductivity of 1E–04 centimeters per second (cm/s). The median hydraulic conductivity value that we would have selected to correspond to the location of the landfill where BCP disposes of their waste is 8E–03 cm/s.[38] In the context of BCP's analysis, it does not appear that the hydraulic conductivity value used was protective. On the contrary, BCP's conclusion that: ''* * * in the 70-year time span evaluated, mercury would move no further than between approximately 37–46 meters * * *.'' was supported in part through use of a hydraulic conductivity value that was 80 times less than the median hydraulic conductivity value that EPA would have selected, potentially resulting in an underestimate of the predicted groundwater flow rate. This could result in a significant underestimation of predicted contaminant migration.
- The value BCP used for the parameter that defines the dispersion of the contaminant plume (the dispersivity) was unrealistically large for the transport distances that BCP evaluated. Dispersion causes a contaminant plume to spread both ahead of the bulk flow of groundwater (longitudinally) and perpendicular to the bulk flow of groundwater (transversely and vertically). The effect of dispersion is to cause the leading edge of the plume to travel more rapidly and spread more widely than the bulk (average) groundwater flow. Dispersion also will cause the plume to become more diluted due to mixing with ambient (uncontaminated) groundwater. This dilution effect will be most pronounced at the periphery of the plume. BCP's methodology for estimating dispersivity was based on designating where the concentration value for the plume will be measured (that is, the location of the receptor well) and calculating an appropriate dispersivity value for that location, since dispersivity increases with distance from the source. Accordingly, BCP calculated dispersivity values corresponding to the location of a receptor well 152 meters from the landfill source. EPA acknowledges that this approach is consistent with generally accepted practices, and does not disagree with the approach in principle; that is, the dispersivity values used in BCP's modeling would have been appropriate to characterize the effect of hydrodynamic dispersion on plume concentrations at the location of the designated receptor well (152m from the source). BCP's error occurred when they elected to use the modeled concentration at a distance of 37m (the predicted leading edge of the contaminant plume) as the basis for their calculation of mercury hazard. BCP did not modify their estimate of plume dispersion to correspond to a closer distance to the source. By not correctly accounting for distance from the source, BCP's groundwater modeling analysis significantly overestimated the effect of dispersion at the edge of the plume, and the resulting dilution of the plume due to dispersive mixing. Consequently, the mercury concentration (and associated hazard) that BCP predicted to correspond to the edge of the plume was much lower than it would have been had they accurately estimated dispersion. More appropriately, BCP should have extended their modeling timeframe, as discussed above, such that they could have more accurately predicted contaminant concentrations at their designated receptor well distance.

BCP concluded from their analysis that essentially no migration of mercury would occur in groundwater, and that mercury concentrations in groundwater are below levels of concern. Because BCP limited their analysis to the evaluation of current receptors, potentially underestimated the hydraulic conductivity of the aquifer, overestimated aquifer dispersivity, and grossly underestimated the area of the landfill, EPA does not believe BCP's risk analysis can be used to support a listing decision for VCM–A sludge.

ii. Plausibility of Unlined Landfill Management Scenario

In the proposed rule, EPA stated that disposal of Borden's VCM–A sludge in a non-hazardous, unlined landfill was plausible, based upon gaps in the record, particularly prior to 1990. BCP commented that in all of the time it had responsibility for the operation of the VCM–A plant (which records indicate is since the early 1980's) Borden always managed its VCM–A sludge at a facility that was ''constructed and operated in

[38] The source of our hydraulic conductivity data is a database prepared by the American Petroleum Institute (Newell, Charles J., Loren P. Hopkins, and Philip B. Bedient, 1989. Hydrogeologic Database for Ground Water Modeling. API Publication No. 4476, American Petroleum Institute, Washington, D.C.). The range of values from which the median is derived is 1E–05 to 4E–01 cm/s.

accordance with the hazardous waste regulations that existed at the time of disposal.'' Upon consideration of BCP's claim that the specific inventory of VCM–A waste, cited by EPA as having been stored on site in 1985, was in fact disposed of as hazardous waste between March and May of 1985, there is no evidence the waste has ever been disposed of in an unlined, non-hazardous landfill. Moreover, given BCP's record of disposal of this waste in a hazardous waste landfill during the 1990's, and its comments that this is where BCP will continue to send the waste in the future, we see no compelling information to suggest the company would do otherwise. Accordingly, we agree that disposal in an unlined landfill is not plausible.

iii. Constant pH Leach Results Versus TCLP

BCP took issue with our overall approach to determining that the VCM–A waste poses significant risk when mismanaged. Specifically, BCP disagreed with EPA's assertion that the VCM–A waste, which is in the form of mercuric sulfide, leaches mercury more readily at higher pH conditions. In particular, BCP criticized our reliance on the results of a preliminary EPA-sponsored study [39] indicating (using only one sample) a leachate concentration for mercury at 1.63 mg/L at pH=10, and that the pH conditions of the landfill cell where this waste is presently disposed indicate an elevated pH as well (pH=9.48 to 9.7 as reportedly measured in the leachate collected from this landfill cell). Furthermore, BCP questioned our application of these analytical results to the circumstances surrounding the disposal of the VCM–A waste. BCP also argued that it appears that because we stated in the proposed rule that the TCLP may not be a reliable indicator of mercury mobility under these conditions, that EPA has ''invalidated its own regulatory procedures for this particular [waste] stream'' by relying on the waste-specific pH results discussed above, instead of relying on the existing TCLP method for defining whether or not the VCM–A sludge is hazardous. BCP was concerned that EPA's reliance on a waste-specific approach to determining the hazard of the VCM–A waste, rather than relying instead on the existing toxicity characteristic to determine hazardousness, was an ''unconventional method to single out this particular waste stream'' and was therefore arbitrary and capricious. BCP is arguing that it is inappropriate for EPA to assess the hazard of mercury in a waste when there is already an existing toxicity characteristic for mercury, and that by doing so for one specific waste EPA is selectively ''changing the rules'' for that waste.

EPA disagrees with BCP's comment that EPA should rely on the existing TCLP, and that doing otherwise unfairly or inappropriately singles out its waste. First, because EPA has undertaken a listing determination for a certain category of wastes (chlorinated aliphatic wastewater treatment sludges), and has further identified VCM–A sludge as a reasonable subcategory due to the markedly different manufacturing process from which the waste is generated, it is entirely reasonable for us to assess the hazards of this specific waste in the context of this listing determination. The fact that only one facility in the United States currently is generating the waste in this subcategory is irrelevant to the sound technical conclusion that it merits separate consideration. Second, in making a specific listing determination EPA is not limited to looking only at whether the waste is hazardous under the existing characteristics approach to defining hazardous waste. While the listing criteria in 40 CFR 261.11(a)(3)(i) do require EPA to consider whether a waste is characteristically hazardous, there are other criteria in § 261.11(a)(3) that the EPA also addresses in making listing determinations, which include a determination as to whether the waste poses significant risk based on a waste-specific evaluation.

Additionally, the toxicity characteristic regulation is a regulation of general applicability; that is, it potentially applies to all non-exempt solid waste generated. The TCLP leaching test was designed to represent likely leaching potential of waste in an MSW landfill, which was considered plausible worst-case management conditions for industrial solid waste generally. BCP's comments expressed concern that the Agency is singling this waste out for assessment under an approach different (and more stringent) than that applied to other wastes or to evaluation of solid waste under the TC regulation. The Agency is considering the pH dependency of mercury sulfide solubility, and considering other data on this key waste constituent, including both the changes in likely leachability under conditions different from the TCLP test but matching those of the landfill where the waste is actually disposed. In doing so, the Agency is not singling this waste out for more stringent assessment. Rather, the Agency is attempting to more fully consider all the scientific data on the waste, its constituents, and its actual management conditions, and applying these data in an assessment of the likely risks from the waste as it is actually managed. The whole point of a listing determination is to decide, on a wastestream-specific basis, whether the existing characteristics adequately address risks from the waste.

Regarding BCP's comment questioning the results from the EPA/ORD study on mercury mobility, while BCP claims to not necessarily dispute the results, it pointed out that the results were from a preliminary study that had not yet been peer reviewed, and that any decision EPA makes should be based upon peer-reviewed, final analytical reports with all QA/QC data available. BCP also commented that it attempted to duplicate the extraction of the VCM–A waste at varying pH (6, 8, and 10) but found very little difference in the resultant mercury leachate concentration, and all results were below the TCLP limit of 0.2 mg/L. BCP points out that contradicting results cast doubt on EPA's conclusions that mercury is more mobile at elevated pH when in the mercuric sulfide state.

EPA continues to believe that available evidence supports the conclusion that the solubility of mercuric sulfide increases with increasing pH, and that this conclusion is supported by scientific literature cited in the proposed rule [40] as well as additional scientific literature and EPA calculations presented below. A recently published study on mercury speciation in the presence of polysulfides agrees with our finding that there is an increase in the solubility of cinnabar (mercury sulfide) in the presence of elemental sulfur, particularly at high pH.[41] This same study also indicated that at a pH of 10, mercury can solubilize from mercuric sulfide at concentrations very similar to what was reported in the draft EPA/ORD study. EPA performed additional calculations using the geochemical assessment model MINTEQA2. We calculated the solubility of mercuric

[39] 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.

[40] 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.

[41] Jenny Ayla Jay, Francois M. M. Morel, and Harold F. Hemond, Mercury Speciation in the Presence of Polysulfides, Environmental Science and Technology, 2000, Vol. 34, No. 11, pages 2196–2200.

sulfide using conditions reported for the VCM–A waste (*e.g.,* pH reported for subtitle C landfill leachate where waste is disposed, sulfide concentration of VCM–A waste) and found the calculated mercury solubility agreed well with the mercury concentration data for the landfill leachate (originally included in the docket to the proposed rule). This further supports our assertion that sulfide and pH are controlling factors in the solubility of mercuric sulfide, and that this conclusion reasonably can be applied to the VCM–A waste as well.[42] Therefore, while we did indicate at proposal that the EPA/ORD study was preliminary, we believed it was important to present these results as evidence because they represented direct studies on the instant waste being evaluated for listing. EPA has received no specific information in comment that effectively contradicts this evidence, and has identified specific information in the scientific literature that supports it.

Regarding the results from BCP's own leach testing experiment, which BCP claims did not show a strong correlation between pH and mercury solubility, BCP stated that it had attempted to replicate EPA's study ''in the absence of any information regarding how the EPA contractor samples were extracted.'' [43] While EPA does not have any information on BCP's experiment (other than a summary of the findings) to explain why there might be differences between Borden's results and those from the EPA study, EPA's results are consistent with literature sources regarding the relationship between pH and mercury solubility from the mercuric sulfide form; therefore EPA does not agree that BCP's results indicate that EPA's conclusions are invalid.[44] Again, even absent the draft EPA/ORD study, the effect of pH on the solubility of mercury in mercuric sulfide is established independently in the scientific literature, as discussed above.

iv. Liner Effectiveness

EPA requested comment on the basis for listing as hazardous the VCM–A waste that is presently being disposed in a lined subtitle C landfill. BCP stated that EPA's reliance on some degree of liner failure as part of predicting the release of mercury to groundwater from a subtitle C landfill amounts to a ''repudiation of existing standards for * * * landfill management of hazardous waste.'' BCP argues that EPA's statement that there is ''inherent uncertainty'' associated with liner integrity in a subtitle C landfill is no greater with respect to its VCM–A waste than it is for any other waste currently disposed in C landfills. BCP continues by making numerous arguments that subtitle C liner systems are designed to be compatible with the wastes being disposed, and that the regulatory requirements applicable to these systems (*e.g.,* groundwater monitoring, leak detection, leachate collection, post-closure care and maintenance, etc.) are all designed to ensure system integrity in both the short- and long-term.

EPA has acknowledged the uncertainty associated with liner systems in the past. Taking this uncertainty into account when evaluating the potential risk from this specific waste stream is in no way a repudiation of EPA's reliance on liner systems overall. Indeed, the premise of the statutory land disposal restrictions requirements—one of the core features of RCRA—is precisely that liners and other containment systems, no matter how well designed, are inherently uncertain and cannot be relied upon alone to fully mitigate threats posed by hazardous wastes. In general, we believe releases from landfills are significantly reduced by well-constructed, monitored, and maintained liner and cap systems. However, we recognize that there is still uncertainty associated with liner performance, both in the near term as well as in the long term. While some studies indicate that engineering properties of liners may last for many (perhaps several hundred) years, there are a variety of factors that may influence longevity and performance, such as poor construction, installation, or geologic movement below the liner that can cause holes, tears, or larger failures. Some defects are likely to have little to moderate effect on the leakage rate. Other defects may have a significant effect and may necessitate corrective action (64 FR at 31582).

We are only considering this uncertainty to the extent that, as discussed previously in section VI.C.1, even if a liner system is capable of preventing 95% of releases over the long-term, the waste likely will present substantial risk to consumers of groundwater due to a release of mercury from the landfill unit (i.e., exceedance of the MCL). We are not saying we believe that liners will necessarily fail. What we are saying is that given the specific evaluation we have made of the VCM–A waste, a liner system can be 95% effective and we still would predict a release to groundwater that potentially poses risk (exceedance of the mercury MCL at a modeled receptor well). We think that over the long term such a change in effectiveness is sufficiently plausible to merit consideration in this listing decision. We emphasize that this assessment is specific to a waste containing a highly toxic, very persistent constituent coupled with the possibility of a small degree of liner degradation, and does not mean that EPA would choose to list any wastes voluntarily put into a subtitle C landfill.

Despite the uncertainty noted above on predicting how well liners will perform over periods of say, 100, 1000, or 10,000 years, and the fact that the oldest subtitle C units are less than 30 years old, EPA is nevertheless obligated in this listing determination to make a judgment whether waste disposed of in these units ''is capable of posing a substantial present or potential hazard to human health and the environment.'' Given that landfill controls would have to be 95% effective forever to prevent substantial risks from this highly concentrated, toxic, and persistent waste, EPA concludes that the waste is capable of posing a substantial hazard. While EPA cannot say how effective these units will be over the long term, we believe it is plausible that at least some will not be 95% effective forever. The alternative course would be for EPA to conclude the waste is not capable of posing a substantial hazard, by concluding that a Subtitle C landfill will most likely be 95% effective forever. But, we conclude that that is an unreasonable and unsupportable conclusion and are acting upon what seems like the more reasonable conclusion under the circumstances.

EPA also points out that under RCRA, the subtitle C management standards provide that hazardous wastes that are land disposed must be treated to reduce the risk of hazardous constituents being released to the environment as well as be disposed in landfills equipped with liners and leak detection. The existing standards for the safe management of hazardous wastes rest on more than the landfill management requirements, or liner integrity. The legislative history to RCRA 3004(m) states that this section of the statute ''makes Congressional intent clear that land disposal without prior treatment of these wastes with significant concentrations of highly persistent, bioaccumulative constituents

[42] Memorandum from John Austin to Ross Elliott, May 12, 2000.

[43] EPA notes that there was a summary description of the constant pH leaching procedure in Section 4.4 of the draft EPA report, which was part of the proposed regulatory docket.

[44] EPA also points to data in the proposed rule record from BCP's analysis of their mercuric sulfide sludge at three different pH values, which were all above the current TCLP limit and did vary with pH. See Appendix 1, Reclassification Petition Submitted to LDEQ, September 1987.

is not protective of human health and the environment.'' (130 Cong. Rec. S 9178; daily ed. July 25, 1984). Mercury is exactly the type of ''highly persistent, bioaccumulative constituent'' to which Congress was directing this statutory mandate.

v. pH Conditions of Disposal Environment

BCP questioned EPA's conclusions that the disposal conditions at the subtitle C landfill cell where the VCM–A waste is presently disposed are at elevated pH levels, based upon the recorded pH measurements EPA obtained for the leachate collected from this same cell. BCP also cited several factors that it stated led to the conclusion that the VCM–A waste will not be subjected to elevated pH conditions when disposed in the subtitle C cell where it currently is sent. BCP described several factors that would limit the influence of other co-disposed wastes on the VCM–A waste (and thus, BCP appears to be saying, reduce the likelihood of the VCM–A waste being subject to elevated pH conditions). BCP points out that the volume of the VCM–A waste disposed in the cell since 1985, which is relatively minor, compared with the large volume of other hazardous wastes in the disposal cell, the supposed absence of free liquids in a subtitle C landfill, the lower pH and resultant buffering capacity of the VCM–A waste, and the fairly solid nature of the VCM–A waste, all reduce the influence that other co-disposed wastes may have on the potential for mercury to leach from the disposed VCM–A sludge.

EPA disagrees that these factors would change the conclusion that is drawn from the measured elevated pH of the leachate removed from this landfill cell. In addition to the leachate pH measurements cited in the proposed rule for the same cell where BCP's VCM–A sludge is disposed, additional information from the landfill facility confirms these leachate pH measurements are consistent with the nature of the landfill leachate for this facility.[45] In fact, to the extent that these factors affect the pH of the landfill environment, we believe it is reasonable to conclude that the measured leachate pH provided by the landfill operator reflects the sum total of these various factors. Borden's comments give us no reason to believe that the leachate collected from this cell is not indicative of elevated pH conditions within the unit. We thus conclude that BCP's waste, while in the same disposal cell and coming into contact with leachate, would be exposed to the type of alkaline conditions that result in higher mercury mobility when in the sulfide form.

vi. Other Comments

BCP commented that should EPA decide to list the VCM–A waste as hazardous, we should select the alternative option proposed which would result in the VCM–A waste only being listed if sent anywhere other than to a subtitle C landfill (and provided the waste does not exhibit the toxicity characteristic for mercury). EPA proposed this alternative option in the event that we received comment persuading us that our assumptions were incorrect regarding mercury being more mobile in the presence of sulfides in a higher pH environment, or that our assessment of liner uncertainty is insufficient to predict a risk to consumers of groundwater. As discussed above, EPA remains convinced that mercuric sulfide is less stable under the elevated pH conditions of disposal in a subtitle C landfill, and that a liner system can be 95% effective and we still would predict a release to groundwater that potentially poses risk.

BCP also requested that should EPA proceed with a decision to list the VCM–A waste as hazardous, that we re-phrase the K175 listing description so it only applies to mercuric sulfide forms of sludge. The commenter said that this was so future technologies could be developed that are ''better'' and the sludge would no longer meet the listing if these changes are employed. Aside from suggesting that the reference to mercuric sulfide be removed, the commenter did not provide any specific potential changes that might occur, or how these changes would make the wastewater treatment sludge significantly different or less risky. The listing description proposed refers to the manufacturing process that uses mercuric chloride catalyst, and the commenter did not suggest changing that part of the listing; therefore EPA concludes that the commenter would still be faced with a wastewater treatment sludge containing very high levels of total mercury (to comply with regulatory limits on the amount of mercury in the discharged wastewater). Absent any specific examples, EPA can think of one possible change that could result in a sludge that could pose a greater potential risk. It is possible that the facility could continue to use the mercuric chloride catalysts (as is currently the case for the acetylene-based process), but alter the wastewater treatment process to produce a mercuric oxide sludge, in order to make the sludge more amenable to retorting for mercury recovery. Sludge from such a process might pose a greater risk, because the mercury would be more soluble than the current sulfide. We believe that the current listing description is appropriate, because it appropriately describes the waste subject to our evaluation.

b. Summary

In conclusion, EPA is listing as hazardous the VCM–A wastewater treatment sludge described above because this wastestream meets the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous. Our analysis that showed potential risk to consumers of groundwater due to a predicted exceedance of the MCL takes into account the toxicity and concentration of mercury in the waste (criteria at 40 CFR 261.11(a)(3)(i) and (ii)). This is because the mercury MCL is based upon toxic human health effects from ingestion of mercury, and because the high mercury concentration in the waste results in the predicted MCL at the modeled receptor well. We also determined that the potential of mercury to migrate from the waste into the environment under a plausible disposal scenario (criteria at 40 CFR 261.11(a)(3)(iii) and (vii)) and mercury's persistence and lack of degradation into non-harmful constituents (criteria at 40 CFR 261.11(a)(3)(iv) and (v)) also supported a decision to list this waste. This is because there is increased solubility of mercury in this waste at the elevated pH conditions in the landfill cell where the waste is disposed, and only a relatively small degradation of liner performance results in unacceptable risk to potential groundwater consumers. In addition, mercury is a persistent contaminant and therefore will not degrade before any predicted impact to groundwater occurs.

Listing criteria that the EPA considered but which did not form the basis for listing this waste include the ability of mercury to bioaccumulate in ecosystems, the nature and severity of human health or environmental damage from improper management of these wastes, and actions taken by other governmental agencies or regulatory programs. (40 CFR 261.11(a)(3)(vi), (ix), and (x)). Bioaccumulation of mercury is not relevant to the exposure pathway EPA assessed (ingestion of groundwater). Although no documented damage incidents were found for this particular waste, EPA believes that on balance this fact alone does not

[45] See Memorandum from Ross Elliott, U.S. EPA Office of Solid Waste, to RCRA Docket, ''Summary of Phone Call Between EPA and Carl Carlsson, Chemical Waste Management Inc.,'' July 12, 2000.

persuade us to make a finding that this waste should not be listed, when weighed against the other criteria described in this section that support a decision to list this wastestream. No governmental or regulatory actions [46] were identified that would lead EPA to decide to list this waste or conclude that waste was already sufficiently controlled to render further regulation moot.

Finally, EPA did consider certain ''other factors as may be appropriate'' together with the quantities of this waste generated (criteria at 40 CFR 261.11(a)(3)(xi) and (viii)) in a ''weight-of-evidence'' approach to reach a decision to list this waste as hazardous. As discussed in the Land Disposal Restrictions section of today's preamble (section VI.I.3), EPA believes that this waste can be disposed in a manner that helps ensure the mercury is more stable and less likely to leach. Because this waste is already being sent to a hazardous waste landfill, one important effect of today's listing is the assurance that the waste is properly treated (or otherwise meets specific standards as generated) and is disposed in a manner to reduce the likelihood of mercury releases to groundwater, releases that may result in unacceptable risk to consumers of groundwater. Given the reported amount of this waste generated per year (120 metric tons), and the high total concentration of mercury in the waste (approximately one percent mercury by weight), the total loading to the landfill is approximately one metric ton of mercury per year. Ensuring that this amount of mercury is disposed of in a form that minimizes releases of mercury was considered by EPA when making its final listing decision.

2. Wastewaters From VCM–A Production

a. Summary of Agency's Listing Determination for VCM–A Wastewaters

The EPA is not listing as hazardous wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM–A). This wastestream does not meet the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous, for the reasons described below.

[46] Although we noted at proposal that the facility had obtained a ''reclassification'' of the waste as non-hazardous from the State of Louisiana, this determination did not appear to be a blanket exemption from hazardous waste requirements, for example, should a process change result in a waste that fails the toxicity characteristic for mercury, the waste would have to be handled as hazardous waste).

b. Discussion of Agency's Listing Determination

As discussed above, only one facility in the United States 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. EPA proposed not to list this wastewater due to the fact that the wastewater already is identified as hazardous waste. As explained in the preamble to the proposed rule, the wastewater exhibits the toxicity characteristic for mercury and vinyl chloride. EPA received only one comment addressing the Agency's proposed decision not to list VCM–A wastewaters. This comment favored EPA's proposed decision.

The Agency bases its decision not to list VCM–A wastewaters as hazardous on the fact that the wastewaters already are identified as hazardous wastes under the toxicity characteristic. In fact, the concentration of mercury in a sample of this wastestream analyzed by EPA was over 40 times above the TC regulatory limit for mercury. Therefore, it is highly probable that the wastewater routinely contains levels of mercury which cause this wastestream to be defined consistently as characteristically hazardous waste. Therefore, EPA concludes that the TC adequately defines this wastestream as hazardous.

Additionally, the facility's dedicated wastewater treatment system is designed and optimized expressly for the removal of mercury, the source of which is the mercuric chloride catalysts, to comply with regulations promulgated under the Clean Water Act. 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 the Agency's decision not to list this wastewater as hazardous is based on the fact that the waste already is defined as a hazardous waste because it exhibits the toxicity characteristic and the potential risks posed by the wastestream are regulated both under RCRA and other programs. With respect to the discharge of the wastewater, the facility treats and discharges the wastewater in compliance with the conditions of a NPDES permit issued under the authority of the Clean Water Act. 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 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).

Given that this waste currently is regulated as hazardous because it exhibits the TC and given the fact that management of the wastestream is adequately regulated under a number of environmental regulatory programs, the Agency is promulgating a decision not to list VCM–A wastewaters as hazardous waste.

D. Wastewater Treatment Sludges from the Production of Methyl Chloride

1. Summary of Agency's Listing Determination for Methyl Chloride Wastewater Treatment Sludges

EPA is not listing as hazardous sludges from the treatment of wastewaters generated from methyl chloride production processes. The Agency has determined that this wastestream does not meet the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous.

2. Discussion of Agency's Listing Determination

Only one facility generates a non-hazardous wastewater treatment sludge from the production of methyl chloride. The facility generates less than 800 metric tons of the sludge annually and disposes of the sludge in an on-site landfill. As discussed in the preamble to proposed rule (64 FR 46516), EPA conducted a risk assessment of this waste, modeling one management scenario (the on-site landfill). The Agency's analysis of potential risks due to volatile emissions from the landfill found negligible risks (i.e., estimated risks less than 1E–6) 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. This estimate of individual risk, together with additional factors described below in

EPA's response to specific comments, led the Agency to conclude that this waste did not pose a substantial risk to human health and the environment.

3. Response to Major Comments Received on the Proposed Listing Determination for Methyl Chloride Wastewater Treatment Sludges

Two commenters questioned why the Agency proposed not to list the wastewater treatment sludges from methyl chloride production as hazardous, given that the individual cancer risk level from arsenic, via the groundwater pathway, is within the range of risk values that EPA generally associates with potential candidacy for listing the waste as hazardous. The commenters argued that EPA should not ignore the potential risks from the arsenic in the wastewater treatment sludges and should list the waste as hazardous.

EPA did not ignore the potential risk from arsenic. The estimated risk described by the commenter was the result of the Agency conducting a bounding analysis using worst case assumptions. Given that the Agency's assumptions were very conservative (*i.e.,* an adult receptor would drink leachate generated from the disposal of the methyl chloride wastewater treatment sludges for 58 years), and taking into account additional factors described below, the Agency determined that there is no substantial hazard to human health and the environment on which to base a decision to list the waste as hazardous.

As described in more detail in Section VI.B.1. of this preamble, EPA's policy for listing wastes as hazardous (originally outlined in the in 1994 Dyes and Pigments proposal, 59 FR 66077) is that wastestreams with risks in the range of 1E–6 to 1E–4 may be either listed or not listed after taking into account additional factors. Generally, our benchmark level for listing is the middle of the range (1E–05), but, as described in the preamble to the Dyes and Pigments proposal, we use a ''weight of evidence'' approach that considers other factors. In the case of our listing determination for methyl chloride wastewater treatment sludges, these additional factors include the conservative assumptions that resulted in the groundwater risk estimate for arsenic, along with additional information available to the Agency regarding the manner in which the waste is currently managed (*i.e.,* in a landfill). We also evaluated our risk assessment results in conjunction with additional information available to the Agency with regard to the constituent of concern (*i.e.,* arsenic).

If the Agency assumes a less direct pathway of ingestion (i.e., taking into account some dilution and attenuation expected with a landfill scenario, so that a person drinks groundwater contaminated with leachate, rather than the leachate directly), and applying a DAF of 5 (which would be a reasonable assumption for an unlined landfill), the predicted risk becomes 1E–5. However, the Agency also notes that assuming a DAF of 5 (as was described in the proposed rule) is likely too conservative, given that the landfill in which the methyl chloride sludge is disposed has a 24-inch clay liner and a leachate collection system. Therefore, the actual risk from arsenic in 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 and has a leachate collection system.

To further illustrate why assuming a DAF of 5 would be a very conservative assumption, in our assessment of risk from the EDC/VCM wastewater treatment sludge presented elsewhere in today's rule, arsenic was an initial constituent of potential concern. To support our analysis of potential groundwater risks from the landfilling of EDC/VCM wastewater treatment sludges, we modeled arsenic releases and obtained estimates of DAFs for arsenic (assuming an unlined landfill) of 13 for the high-end risk estimate, and a DAF of 93 for the central tendency estimate. Thus, even if the Agency does not take into account the liner and leachate collection system in the one landfill where currently non-hazardous methyl chloride sludge is managed, applying reasonable estimates of DAFs lowers the estimated risk to the lower end of the range of risks where the Agency may or may not list a waste; and upon consideration of the very conservative approach used in generating the arsenic risk estimate, the Agency concludes that the potential risk associated with arsenic in the waste is well below the range in which the Agency would deem the waste to pose a substantial hazard to human health and the environment. Therefore, EPA is finalizing a no list determination for wastewater treatment sludges from the production of methyl chloride.

E. Wastewater Treatment Sludges From the Production of Allyl Chloride

1. Summary of Agency's Listing Determination for Allyl Chloride Wastewater Treatment Sludges

EPA is not listing as hazardous waste sludges from the treatment of wastewaters generated from allyl chloride production processes. The Agency has determined that this wastestream does not meet the criteria set out at 40 CFR 261.11(a)(3) for listing a waste as hazardous. The Agency identified no risks of concern associated with the current management of this waste.

2. Discussion of Agency's Listing Determination

As discussed in the proposal, currently non-hazardous 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 in which the facility manages wastewaters from multiple production processes and facilities. 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 from the one facility generating a non-hazardous allyl chloride sludge, the sludge generated from the facility's wastewater treatment system is incinerated on site in a non-hazardous waste incinerator.

As described in the proposed rule, during the investigations undertaken in support of the listing determinations EPA collected one sample of sludge from the facility's combined wastewater treatment system. Two duplicate TCLP analyses were performed using the sample collected. The TCLP analyses indicated the presence of no TCLP constituents above regulatory levels. The sample also was analyzed for total constituent concentrations including arsenic and dioxins and furans. The total arsenic concentration in the waste was 11.7 mg/kg, and the total dioxin (TEQ/TCDD) concentration was 11.79 ng/kg.

The Agency did not assess risks by modeling management practices and exposure pathways, since both the total arsenic level and the total dioxin level detected in the sludge are below levels of concern and well within the range of background levels of those constituents

in soils.[47] [48] In addition, 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 the waste contains no constituents of concern at concentrations of concern, the Agency concludes that no significant risks are posed by the waste. The Agency is finalizing a determination not to list this waste as hazardous.

3. Response to Major Comments Received on the Proposed Listing Determination for Allyl Chloride Wastewater Treatment Sludges

One commenter questioned whether EPA had considered the fact that the one facility generating wastewater treatment sludges from the production of allyl chloride may manage this waste in a manner other than on-site combustion in the future. The commenter suggested that EPA should have conducted a risk analysis of managing the waste both in a non-hazardous waste incinerator and in an unlined landfill.

Given that the one facility generating this waste is managing the waste in an on-site incinerator and that the Agency has no information indicating that the facility has or intends to manage the waste in a manner other than on-site incineration, we believe that landfill management is not plausible for this wastestream. In the case of a waste that is generated by a single facility, we would not project a change in management practices without information or cause. EPA evaluated information provided by the facility regarding current management practices to project plausible scenarios. The Agency concluded that the facility has sufficient on-site capacity to continue to treat the waste in its non-hazardous waste incinerator. The total arsenic and total dioxin concentrations in the waste are below levels of concern.

A commenter suggested that the analytical work performed on the wastewater treatment sludge generated from allyl chloride production was inadequate, given that only one sample of the sludge was collected and analyzed by EPA.

The commenter did not provide any specific information as to why the allyl chloride sample collected by EPA was inadequate, other than it was one sample. As noted in Table 2–10 of the Listing Background Document (USEPA, 1999c), the Agency sampled 100% of the facilities producing allyl chloride, that is, EPA visited and sampled the one facility that produces this chlorinated aliphatic chemical. As discussed above and in the proposed rule, EPA is not listing this facility's allyl chloride wastewater treatment sludge because the chlorinated aliphatic production process at this facility contributes less than two percent of the total wastewater volume to the wastewater treatment process from which the sludges are generated. Given that there is only one generator of this waste and that the wastewaters from the allyl chloride production process contribute a relatively small portion to the facility's wastewater treatment system, EPA believes that our data, though perceived as limited by the commenter, is adequate to support the listing determination.

F. What is the Status of Landfill Leachate Derived-From Newly-Listed K175?

At the time of the proposed rule, information available to EPA indicated that wastewater treatment sludges from the production of VCM–A may have been managed previously in non-hazardous waste landfills. If these sludges had been managed in non-hazardous waste landfills, and if the leachate and gas condensate generated at such landfills is actively managed after the effective date of today's rule, the landfill leachate and gas condensate derived from the newly-listed VCM–A waste in such landfills could be classified as K175. As explained in the preamble to the proposed rule and in the final rule for leachate derived from newly-listed petroleum wastes (64 FR 6806), in such circumstances, we would be concerned about the potential disruption in current leachate management that could occur, and the possibility of redundant regulation (under RCRA and CWA) due to the application of the ''derived-from'' rule to the leachate. In the case of non-hazardous waste landfills receiving newly-listing hazardous wastes prior to the effective date of the listing decision, the leachate that is collected and managed from the landfills would be classified as hazardous, due to the application of the waste code for the newly-listed K175 to the leachate. As noted by a commenter in response to proposed petroleum listing determination, this could lead to vastly increased treatment and disposal costs without necessarily any environmental benefit.

In the chlorinated aliphatics proposed listing determination, EPA requested comment on whether or not VCM–A wastewater treatment sludges were previously disposed in non-hazardous waste landfills. Information provided to the Agency by the one generator of this waste indicates that this waste was not previously managed in non-hazardous waste landfills. The generator stated that they have always disposed of the VCM–A sludge in a subtitle C landfill. Since EPA has no evidence that this waste has been disposed of in non-hazardous waste landfills, the Agency sees no reason at this time to finalize the proposed temporary deferral for landfill leachate and gas condensate derived from newly-listed VCM–A wastes. Therefore, today EPA is not finalizing the proposed temporary deferral for landfill leachate as was proposed.

Although the Agency is not finalizing the proposed temporary deferral for applying the new K175 waste code to leachate from non-hazardous waste landfills that previously accepted K175, should the Agency, in the future, receive information indicating that one or more non-hazardous waste landfills did accept this waste prior to the effective date of today's rulemaking, we may re-consider our decision not to finalize the proposed deferral. The Agency notes that the proposed regulatory language for the temporary deferral, as published in the August 25, 1999 **Federal Register**, inadvertently included both the K174 and K175 waste codes. The regulatory language in the proposal only should have included the K175 waste code. Given that the Agency is finalizing the conditional listing approach for K174 (and thus EDC/VCM sludge disposed in a licensed landfill will not be listed hazardous waste) there is no reason to include (nor did EPA intend to include at proposal) the K174 waste code in the temporary deferral for the application of waste codes to leachate from non-hazardous waste landfills that previously accepted newly-listed wastes (40 CFR 261.4(b)(15)).

[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, 1999a.

G. Population Risks

As discussed previously, our proposed and final listing determinations were based upon estimates of individual risk. For the EDC/VCM wastewater treatment sludges, the projected population risks are low. We relied on individual risk estimates (excess lifetime cancer risk), and not population risk estimates, because we are concerned about risks to individuals who are exposed to releases of hazardous constituents. EPA concludes that, under certain waste management practices, these wastes are capable of posing a substantial present or potential hazard to human health or the environment. We have determined that using individual risk as a basis for this listing determination, which is consistent with past practices, also is appropriate because the Agency must protect against potential, as well as present hazards that may arise due to the generation and management of particular wastestreams. EPA acknowledges that in cases where small populations are exposed to particular wastes and waste management practices, population risk estimates may be very small. EPA finds it is important to address the current or potential substantial hazards to individuals living in small communities. Where individuals may be subject to substantial risks, EPA finds that such individuals deserve protection. In promulgating the final listing determinations for EDC/VCM and VCM–A wastewater treatment sludges, it is the increased risk for currently or potentially exposed individuals, regardless of how few individuals are exposed, against which EPA is reasonably protecting.

In the proposed rule, in addition to presenting the results of our risk assessments estimating individual risks, we also discussed the potential risk posed to populations from the management of chlorinated aliphatic wastewaters managed in tanks, and EDC/VCM sludges managed in land treatment units and landfills. We requested comment on whether or not it is appropriate to give weight to population risk in making our final listing determinations. We also invited comment on the effect of such an approach with respect to the Agency's environmental justice goals, including our goal of protecting human health in rural areas.

In response to the proposal, we received comments both supporting the use of population risk estimates in making listing determinations, and comments against this approach. Several commenters stated that the population risks estimated by EPA do not justify a decision to list as hazardous the wastes proposed for listing (chlorinated aliphatic wastewaters, EDC/VCM wastewater treatment sludges, VCM–A wastewater treatment sludges). Commenters argued that consideration of the risks posed by the management of these wastes to the entire population potentially exposed would lead to the conclusion that these residuals do not pose substantial hazards to human health. Therefore, the wastes should not be listed as hazardous. Commenters argued that EPA's failure to give serious consideration to the low levels of population risk is at odds with the RCRA statute, the listing criteria, and regulatory precedent within the federal government. Some commenters claimed that, due to the low population risk estimates, EPA cannot conclude that any of the residuals ''is capable of posing a substantial present or potential hazard to human health or the environment,'' as required in 40 CFR 261.11, and therefore EPA should not list any of the residuals.

In response, EPA notes that the use of ''population risk'' is not explicitly required nor prohibited in either the RCRA statute or the hazardous waste listing criteria in 40 CFR 261.11. EPA does not believe it is appropriate to allow contamination from waste management units to potentially cause substantial hazards to nearby residents simply because there are few individuals or wells in the immediate area. As stated above, our decision to list EDC/VCM and VCM–A wastewater treatment sludges is based on our concern about the present and potential hazards to those individuals who may be significantly exposed, even if there are few of them. In addition, the regulations clearly state that wastes are to be listed as hazardous, if they are ''capable of posing a substantial present or potential hazard'' (emphasis added). Therefore, it is the Agency's past and current view that as a policy matter, the Agency considers the threats to individuals, whether they exist today or in the future. EPA's discretion to base its hazardous waste listing decisions upon substantial risks to individuals, even if risk to the overall population is low or near zero, recently was upheld by the U.S. Court of Appeals for the District of Columbia Circuit in *American Petroleum Institute, et al.* v. *EPA* (No. 94–1683).

Specific comments received in response to the proposed rule included several commenters who argued that the legal standard in the RCRA statute for whether a waste is hazardous—that is, that the waste poses a ''substantial present or potential hazard to human health or the environment''—cannot be met unless EPA establishes that a large number of people are likely to have increased cancer risk due to exposure to the hazardous constituents in the waste, *i.e.*, the so-called ''population risk'' is high. We disagree with these commenters. EPA concludes in this listing (and has concluded in previous listings) that even if relatively few people may be subject to substantial hazards, those individuals still deserve protection. Accordingly, consistent with our past practice, we have based the EDC/VCM hazardous waste listing determination on the substantial hazard to currently or potentially exposed individuals, rather than on the increased number of cancer cases in the population at-large. The D.C. Circuit Court in *American Petroleum Institute, et al.*, v. *EPA* upheld EPA's practice in a previous listing decision to base the decision on its concern for substantial risks to individuals.

EPA points out that the use of the word ''substantial'' in the RCRA statute (*i.e.,* ''* * * substantial present or potential hazard * * *'') need not be restricted to a quantitative meaning or applied exclusively to population risk. In the case of the wastes being listed as hazardous wastes today, we have determined that risks to individuals are ''substantial.'' The estimated increased risk of cancer for the exposed individual is greater than 1 in 100,000. Consistent with EPA policy (see 59 FR 66072, at 66077), wastestreams for which the calculated high-end individual cancer risk level is 1 in 100,000 or higher generally are considered initial candidates for a listing decision. Wastestreams for which these risks are calculated to be 1 in 10,000 or higher will generally be listed as hazardous waste, although even for some of these wastestreams, there can be in some cases factors which could mitigate the high hazard presumption. Listing determinations for wastestreams with calculated high-end individual lifetime cancer risks falling into the range of 1 in 10,000 and 1 in 1,000,000 are also potentially listable but always involve an assessment of additional factors.[49] For specific discussion of how EPA

[49] ''The Superfund program has always designed its remedies to be protective of all individuals * * * that may be exposed at a site.'' 55 F.R. 8666, 8710 (Mar. 8, 1990). EPA's Superfund regulations at 40 C.F.R. § 300.430(e)(2)(i)(A)(2) establish remediation goals at levels that represent an excess upper bound lifetime cancer risk to an individual cancer risk to an individual at between 10^{-4} and 10^{-6}.

addressed these factors for EDC/VCM sludge see Section VI.B.1. of today's preamble.

In addition to comments arguing the legality of basing hazardous waste listing decisions on estimated risks to individuals, rather than population risks, we received comments claiming that the individual risk approach used by EPA was ''overly conservative and unrealistic.'' These commenters stated that EPA needs to use population risk estimates as a ''reality check'' on individual risk estimates. Two commenters also said that we should use individual central tendency risk estimates as a more meaningful or realistic estimate of potential risk.

EPA disagrees with commenters' assertions that the highly-exposed individual risk approach used in the risk assessment supporting today's listing determinations was overly conservative and unrealistic. In today's notice, as well as in the Response to Comment Document accompanying today's rule, we address specific comments regarding the risk assessment. Even though our listing decisions in today's rule are based upon predicted risks to highly-exposed individuals, we believe that these risks are within the distribution of risks that could reasonably be expected to exist in the population. In support of this conclusion, we note that as part of the analyses to support the notice of proposed rulemaking, we also conducted probabilistic modeling to more directly evaluate the anticipated distribution of risk levels. The high end deterministic risk estimate for the adult farmer under the EDC/VCM land treatment unit scenario fell at the 95th percentile of the probabilistic distribution. EPA's Guidance For Risk Characterization (USEPA, 1995) states: ''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.''

One commenter cited a 1987 study of 13 regulatory determinations where low population risk was cited as a reason not to regulate, and noted that the study suggests that EPA should not establish regulatory controls on the management of wastes, if the population burden is less than one cancer in 100 years.[50] The commenter described where the individual risk levels in the proposed chlorinated aliphatics listings fell in comparison to the individual risk levels in these other regulatory decisions.

EPA does not find this study leads it to change today's listing decisions. As already noted, the Agency has the discretion to base its listing decisions on the substantial hazard to highly exposed individuals, even if there is only a small number of them, as upheld by the U.S. Court of Appeals for the D.C. Circuit in *American Petroleum Institute* v. *EPA.* The study itself, however, has a number of flaws which lead EPA to reject its use. It deals with no RCRA decisions, but instead deals with a number of other statutes that have different mandates. This study also is outdated in that it was conducted a number of years ago when Agency risk assessment was less sophisticated than it is now. In particular, the study notes that at the time federal agencies overestimated risk assuming maximum exposures. Since issuance of EPA's 1992 ''Guidance on Risk Characterization for Risk Managers and Risk Assessors,[51] EPA has modified its risk assessment approach to determine a plausible high-end exposure analysis, which is intended not to overestimate risks to highly exposed individuals. Moreover, EPA's current guidance acknowledges that in situations where small populations are exposed ''individual risk estimates will usually be a more meaningful parameter for decision-makers.'' [52]

The study merely presents a listing of decisions made by various federal agencies under different statutory requirements. It does not suggest any rationale for the regulatory decisions other than the fact that they occurred. It seems to suggest that, because we decided against specific regulations in the past that coincided with a particular individual risk level (*e.g.,* 1×10^{-4}) and low numbers of cancer cases avoided, we are somehow obligated to make that same decision now. The commenter does not offer any other rationale for determining at what point the number of cancer cases avoided would support an Agency decision to list a waste as hazardous.

For several additional reasons, EPA disagrees with the suggestion that the Agency base today's listing decisions on total population risk or total number of cancer cases. In the first place and as previously noted, we believe we should not ignore substantial risks to individuals, if that might consign individuals to substantial risks, simply because only a few individuals potentially will be exposed. In addition, risk estimates alone do not dictate any particular listing decision. Even if EPA finds an individual risk of 1×10^{-5} or greater, for example, the Agency considers other factors and may decide to list or not list a waste as hazardous, based upon the consideration of all relevant factors. In finalizing today's listing determinations, the Agency is basing its decisions on the listing policy described in the December, 1994 proposed listing determination for dyes and pigment industry wastes (59 FR 66072). Furthermore, the Agency does not think that it is adequate to base a hazardous waste listing determination upon a comparison of potential risks posed by wastes covered by one rulemaking relative to risks posed by other wastes and potentially unrelated rulemakings. The Agency considers relevant factors particular to a waste and the plausible management practices affected when making each regulatory decision. As we have discussed thoroughly in this preamble and in the accompanied background documents, in this case we think the individual risk estimates and our consideration of other factors provide an adequate justification for listing both EDC/VCM and VCM–A wastewater treatment sludges as hazardous wastes.

Other comments received by the Agency include comments that stated that society does not have unlimited resources to address risks unless they are ''clearly substantial,'' as indicated by population risk. We point out however that the regulations state that EPA may list a waste if it is ''capable'' of posing a hazard and the underlying RCRA statutory language states that hazardous wastes are those that ''may * * * pose'' a hazard. Thus, the Agency disagrees that risks must be ''clearly'' substantial to be subject to RCRA regulation. Further, EPA disagrees that ''clearly substantial'' risk (or even a risk that ''may'' occur) must be indicated by a high population risk estimate. The statutory standard for listing a waste is ''substantial hazard.'' Where EPA finds that a waste poses a substantial hazard to highly exposed individuals, EPA will list the waste to protect those individuals potentially exposed.

Other commenters supported the Agency's use of individual risk estimates as the appropriate criteria for making hazardous waste listing determinations. For example, one commenter said that EPA should weigh individual risk more than population risk because the commenter believes there is greater uncertainty in population risk estimates than in

[50] Travis, Curtis C., 1987. Environment Science and Technology, Vol. 21, No. 5.

[51] 1992 Memorandum from the then Deputy Administrator F. Henry Habicht, ''Guidance on Risk Characterization for Risk Managers and Risk Assessors.''

[52] 1995 Guidance for Risk Characterization (section III.C.2), page 17.

individual risk estimates. No information was provided by the commenter as to why this would necessarily be the case. EPA agrees with the commenter that individual risk is an appropriate decision parameter, for the reasons already stated above.

Another commenter who supports the use of individual risk over population risk, argued that EPA is not compelled by governing regulation or statue to define ''substantial hazard'' in terms of population risk. The commenter also stated that EPA should take into account risks to populations from more than just the industry under study, since populations are potentially impacted by risks from many different facilities. For example, in parts of the country concerns have been raised previously about certain minority and poor populations bearing a disproportionate amount of risk for a variety of industries and wastes.

We agree that we are not compelled by governing regulation or statue to define ''hazard'' in terms of population risk. We may define ''hazard'' on the basis of substantial risk to individuals even when population risk estimates are low. Although population risk is one of many factors that has been considered in some Agency decisions, there are numerous precedents where the Agency has taken action, for example at Superfund sites and in previous listing determinations, when there are relatively few people potentially affected. Superfund is a particularly apt example since it, like RCRA, deals with protecting human health and the environment from harm arising from the mismanagement of waste. The D.C. Circuit Court particularly noted the consistency with Superfund in *American Petroleum Institute et al.,* v. *EPA* described above. While a different statute, the Agency has stated that the key objective of the CERCLA National Contingency Plan (NCP) is to protect individuals at contaminated sites (see 55 FR at 8710), and rejected using population risk as the point of departure for setting clean-up levels (see 55 FR at 8718). In addition, the CERCLA regulations (see 300.430(e)(2)(I)(A)(2), and 55 FR at 8848) direct EPA to establish preliminary remediation goals for carcinogens based on ''cancer risks to an individual.''

The Agency disagrees with the commenter's claim that potential risks from other industries should be estimated or accounted for in estimating potential risks from a particular wastestream generated by one specific industry. The benefits of this listing are the risks avoided from management of the newly-listed wastes. The Agency has no reason to factor in risks from other industrial wastes, unless a synergetic effect can be identified, which the commenter does not claim.

The Agency is committed to addressing environmental justice concerns and does consider risks to minority and disadvantaged populations in its decision making. Our goal is to ensure that no segment of the population bears a disproportionally high risk as a result of our decision making. The hazardous waste listing determinations promulgated today are based upon analyses conducted with a goal of protecting all potentially exposed individuals. No segment of the overall population will be placed at a disadvantage as a result of today's rulemaking.

Finally, the Agency is also concerned that land use patterns can change over time. For example, when evaluating a waste that adversely impacts groundwater, the Agency also is concerned about the potential contamination of future drinking water supplies, and of groundwater which may have other uses (*e.g.,* livestock watering, irrigation, aquaculture). If regulatory decisions were based solely on population risks at a particular point in time, beneficial uses could be precluded or, if the future users were unaware of the contamination, unacceptable risks could occur. This same objective, the protection of reasonably anticipated land use is an integral part of the Agency's Superfund remedy selection process.[53] Under Superfund, it is not sufficient only to consider potential risks to populations surrounding a particular site at the time of contamination or remediation; reasonably anticipated future land use patterns and future populations (*i.e.,* future receptors) are considered in risk assessments supporting remedy decision making and in selecting the final remedy.[54] In fact, the extensive experience with the Superfund program bears out these concerns. There are Superfund sites, for example, where residential developments were placed over former landfills that have turned out to be dangerous to the new populations, leading not only to risks to the population but expensive and time-consuming cleanups.

[53] Memorandum EPA Regional Waste Management Division Directors from Elliott P. Laws, ''Land Use in the CERCLA Remedy Selection Process,'' OSWER Directive No. 9355.7–04.

[54] See ''Risk Assessment Guidance for Superfund (RAGs), Volume I—Human Health Evaluation Manual, Part A,'' (Chapter 6), 1989.

H. Which Constituents Are Being Added to Appendix VIII to 40 CFR Part 261?

1. Summary of Agency's Decision To Add Two Constitutents to Appendix VIII

Two of the constituents of concern that are present in the EDC/VCM wastewater treatment sludges (K174) that will be designated as listed hazardous wastes as a result of today's rule do not currently appear on the list of hazardous constituents at 40 CFR part 261, Appendix VIII. Therefore, EPA is adding these two constituents, octachlorodibenzo-p-dioxin (OCDD) and octachlorodibenzofuran (OCDF), to Appendix VIII.

2. Discussion of Agency's Decision To Add Constituents 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 toxic. The Agency found substantial hazard associated with the presence of dioxins in EDC/VCM wastewater treatment sludges, when these sludges are managed in land treatment units. In our risk assessment, dioxin/furan risk was reported on a TCDD TEQ basis. As previously discussed in today's final rule, as well as in the proposal, TCDD TEQ concentrations are calculated by multiplying each 2,3,7,8 substituted congener by the appropriate TEF, and then summing the resultant concentrations to come up with a TCDD TEQ value. OCDD and OCDF are included in this calculation.

Several studies, as noted in the response to comments below, show that OCDD and OCDF have toxic effects on life forms. Therefore, we have concluded, based upon the results presented in these scientific studies, that OCDD and OCDF should be added to Appendix VIII of 40 CFR part 261.

3. Response to Major Comments Addressing Agency's Decision To Add Constituents to Appendix VIII

One commenter opposed the addition of OCDD and OCDF to Appendix VIII of 40 CFR part 261 on the basis that OCDD and OCDF contribute very little to the actual risk attributable to dioxin compounds. The commenter also contended that the assignment of non-zero TEFs to OCDD and OCDF cannot form the basis for a regulatory decision to list the compounds as hazardous constituents, since TEFs are intended only to be used as a tool to aid risk managers in thinking about potential health risks associated with the compounds. The commenter argued that

TEFs are not intended to provide a scientific basis for drawing the conclusion that OCDD or OCDF are toxic, carcinogenic, mutagenic, or tetratogenic. The commenter also argued that OCDD and OCDF do not meet the criteria in 40 CFR 261.11(a) for listing a substance on the Appendix VIII hazardous constituent list.

The commenter contends that the 1988 study by Couture, Elwell, and Birnbaum, although it led to a raising of the TEF for OCDD/OCDF to 0.001 by NATO/CCMS, does not support a non-zero TEF for OCDD/OCDF. A reevaluation of the study resulted in a downgrading of the TEF to 0.0001 by the World Health Organization. The commenter further contends that few statistically significant physiological effects have been observed in the study and that they are transitory in nature and are of uncertain toxicological significance. The commenter also points out that a longer-term subchronic study has been reported which dramatically demonstrates that dioxin-like effects are not produced by OCDD in animals even at high dose levels.

The commenter concludes that an extensive body of data exists that does not support the conclusion that OCDD is a toxicant, carcinogen, mutagen, or teratogen. In addition, the commenter states that essentially no toxicological data has been published for OCDF supporting the listing of the compound in Appendix VIII.

EPA disagrees with the commenter's arguments for several reasons. First, the Agency notes, in response to issues raised by the commenter, that as a preliminary matter, dioxin TEFs are irrelevant to EPA's decision to list OCDD and OCDF in Appendix VIII. The criteria in 40 CFR 261.11(a) for listing a substance on the list of hazardous constituents in Appendix VIII are that the constituents be ''shown in scientific studies to have toxic, carcinogenic, mutagenic or teratogenic effects on humans or other life forms.'' The Agency has determined that OCDD and OCDF meet these criteria, independent of any TEF calculation.

There are data from subchronic studies for both OCDD and OCDF which demonstrate dioxin-like effects (Couture *et al.*, 1988; DeVito *et al.*, 1997). Couture *et al.* (1988) is one of the best studies of OCDD and describes not only the effects but the importance of study design in examining the effects of OCDD. Couture *et al.* (1988) demonstrate toxic response of OCDD following subchronic exposures. In addition, this study also provides tissue concentrations at which these effects are observed. Couture *et al.* (1988) demonstrate that the absorption of OCDD is dependent upon both dosing volume and concentration of the solution. The higher the concentration the lower the absorption and the larger the volume (up to 5 ml/kg) the greater the absorption. Hence, high dose single exposures are unlikely to induce significant effects due to the limited absorption of OCDD. In contrast, low dose repeated exposures will allow for the bioaccumulation of OCDD, which eventually leads to biological effects. This is clearly demonstrated in the Couture *et al.* study (1988). The repeated exposure to 1 ug/kg of OCDD in a dose volume of 5 ml/kg produces time dependent effects that also are associated with increasing tissue accumulation of OCDD. OCDD induces hepatic CYP1A1 activity and increases CYP1A1 and CYP1A2 protein. Induction of CYP1A1 occurred as early as two weeks after treatment, and this response increased with time and with hepatic OCDD accumulation. Induction of CYP1A1 is a dioxin-like effect and is indicative of activation of the Ah receptor. Hepatic cytoplasmic vacuolization in the livers was also induced in a time dependent manner, first occurring after 40 doses and increasing in incidence and severity after 65 does of OCDD.

The Agency disagrees with the commenter's argument that these effects are transitory or of uncertain toxicological significance. First, the cytoplasmic vacuolization (lesions) in the liver increased in incidence and severity in a time dependent manner. The increased incidence and severity of these lesions were associated with increasing hepatic concentrations of OCDD. Animals at the last time point examined in the study of Couture *et al.* (1988) demonstrated the highest incidence and severity of these lesions; it is difficult to describe them as ''transitory'' as the commenters suggest, given that the effects worsened over the last five weeks of the study. Indeed, hepatotoxicity can be considered as part of a continuum of events leading to necrosis or carcinogenicity. Demonstration of events early in this continuum, such as cytoplasmic vacuolization, are cause for concern. The commenter also attributes the liver effects to ''nutritional, metabolic or hormonal imbalances.'' Indeed, dioxins are endocrine disruptors and hormonal imbalances are expected to be induced by OCDD and other dioxins. These hormonal imbalances should be considered adverse responses based on our understanding of the endocrine disrupting actions of these chemicals.

The commenter neglects to mention that not only was enzyme activity induced by OCDD in the rats, but CYP1A1 and CYP1A2 protein were also increased as demonstrated by western blot analysis (Couture *et al.*, 1988). These proteins have been implicated in playing important roles in oxidative damage and porphyria (Sinclair *et al.*, 2000). According to Nebert and colleagues ''metabolism of endogenous and exogenous substrates by perhaps every P450 enzyme, but certainly CYP1A1 and CYP1A2 (which are located, in part, in the mitochondrion), have been shown to cause reactive oxygenated metabolite (ROM)-mediated oxidative stress'' (Nebert *et al.*, 2000). Ames and colleagues have clearly demonstrated the role of CYP1A1 in oxidative stress (Park *et al.*, 1996).

The commenter cites a number of studies which suggest that OCDD is not toxic, in contrast to the studies of Couture *et al.* The studies cited are generally inadequately designed to address the toxicity of OCDD. Several studies have demonstrated that, while OCDD is poorly absorbed in biological systems (Norback *et al.* Birnbaum and Couture, 1988; Couture *et al.*, 1988) it can bioaccumulate through repeated exposures to low concentrations. In addition, in the Couture *et al.*, study, it took at least 40 doses over approximately nine weeks before enough of the chemical could accumulate to produce alterations in liver histology. Acute, single exposures to high concentrations of OCDD are unlikely to result in significant accumulation to induce a toxic response since very little of the dose shall be absorbed. In fact, this is one of the conclusions in the McConnell *et al.* study (1978). Hence, the acute studies on the effects of OCDD demonstrated none of the typical signs of dioxin-like toxicity due to the limited absorption of the chemical. Other studies have to a lesser or greater degree attempted subchronic exposures. However, these studies either are too short (Holsapple *et al.* (1986)) or use too concentrated a dosing solution (Norback *et al.*, 1975). In either case, too little OCDD was absorbed to induce effects.

The commenter cites a study by Wermelinger *et al.* (1990) as evidence that OCDD does not induce dioxin-like effects. The USEPA strongly disagrees with this conclusion. This manuscript was published as an extended abstract from the dioxin meetings (Organohalogen Compounds, 1:221–224). These data clearly demonstrate that both OCDD and OCDF administered in the diet result in clear dioxin-like activity. Both OCDD and OCDF resulted

in dose dependent increases in CYP1A1 activity and decreases in thymic atrophy. These responses are clearly the hallmark of dioxin-like effects in experimental animals. The Wermelinger *et al.* study clearly supports the finding of Couture *et al.*, that repeated low dose administration of OCDD results in dioxin-like effects. In addition, both Wermelinger *et al.* and Couture *et al.* provide similar estimates of the relative potency of OCDD, further supporting the inclusion of these chemicals in the TEF methodology.

The commenter cites a study by the National Toxicology Program in which a two year feeding study of OCDD produced no effects. We could not locate any reports of this study in the NTP databases. After contacting the NTP, it was determined that the study of OCDD was halted due to uncertain technical difficulties and no reports were ever prepared on any study of OCDD by the NTP. It is unclear where the commenter obtained its information, since a citation for the report was not provided.

The effects of OCDF are not as well studied as those of OCDD. Recent studies do document that subchronic exposure to OCDF demonstrates dioxin-like activities in mice (DeVito *et al.*, 1997). The subchronic exposure resulted in EROD induction in liver, lung and skin (DeVito *et al.*, 1997) and hepatic porphyrin accumulation (van Birgelen *et al.*, 1996) in these mice. These studies demonstrate that OCDF also possesses dioxin-like properties.

I. What Are the Land Disposal Restrictions Standards for the Newly-Listed Wastes?

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

The RCRA statute requires EPA to establish treatment standards for all wastes destined for 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 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). Once a hazardous waste is prohibited, the statute provides only two options for legal land disposal: meet the treatment standard for the waste prior to land disposal, or dispose of the waste in a land disposal unit that satisfies the statutory no migration test. A no migration unit is one from which there will be no migration of hazardous constituents for as long as the waste remains hazardous. RCRA Sections 3004 (d), (e), (f), and (g)(5).

5. What Are the LDR Standards for K174?

In today's rule, we are adopting treatment standards for several forms of dioxins and furans as well as a treatment standard for arsenic. With respect to the dioxins and furans being regulated, our standard requires either treatment by means of combustion (denoted as CMBST in the 40 CFR 268.40 Table) *or* that the specified types of dioxins and furans meet numerical standards prior to land disposal.

For most of the specified types of dioxins and furans (*e.g.,* the hexa, penta, and tetra classes of congeners) as well as arsenic, we are adopting the existing universal treatment standards and no significant issues have been encountered. However, the setting of congener-specific numerical standards for 3 hepta and 2 octa forms of dioxin/furan warrants some additional discussion. In previous rulemakings, we have not adopted treatment standards for these isomers. Several reasons convince us that we should do so in today's rule.

First, with the K174 waste, our risk analysis indicates that, should this waste be mismanaged in a land treatment unit, the hepta- and octa-chlorinated dioxin and furan isomers present high-end deterministic risks that, as described in Section VI.B.1. of today's rule, form the basis for EPA's decision to list this waste as hazardous. Second, studies have attributed dioxin-like toxicity to both the hepta and octa isomers. Based on the TCDD cancer slope factor and TEFs used in the risk analysis for this rule, the slope factors for OCDD and OCDF are effectively 15.6 $(mg/kg\text{-}day)^{-1}$ and the slope factors for the 2,3,7,8-substituted hepta dioxin and furan isomers are effectively 156 $(mg/kg\text{-}day)^{-1}$. These are by comparison 10 and 100 times, respectively, the slope factor for arsenic, an Appendix VIII constituent and known carcinogen.

The carcinogenicity and risk levels of the 5 hepta and octa isomers and their potential conversion to even more toxic isomers by dechlorination or photolytic mechanisms lead us to conclude that adopting specific treatment standards (*i.e.,* numerical or CMBST) for these isomers is warranted for the K174 wastes. Because we typically include the same standards for new listings into those for F039 (multisource leachate) to maintain equivalence within the LDR regulatory structure, we are also adding the same treatment standards in the F039 section of the 268.40 table (see section below on conforming changes).

In summary, today, we are promulgating as final the numerical standards that were proposed for the constituents of concern in the K174 wastewater treatment sludges from the production of ethylene dichloride and vinyl chloride monomer. We are finalizing the numerical standards based on the data received and analyzed at proposal. No comments or additional data were received regarding the achievability of the proposed standards so, therefore, we are adopting the same numerical standards as final. In addition we also are promulgating the option of complying with the technology standard of combustion (CMBST) for the organic constituents present in K174. The final treatment standards are presented in the following table.

TABLE I–1.—TREATMENT STANDARDS FOR K174

Regulated harzardous constituent		Wastewaters	Nonwastewaters
Common name	CAS[2] No.	Concentration in mg/L[1], or technology code[2]	Concentration in mg/kg[3] unless noted as ''mg/L TCLP'', or technology code
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822–39–4	0.000035 or CMBST[4]	0.0025 or CMBST[4]
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562–39–4	0.000035 or CMBST[4]	0.0025 or CMBST[4]
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673–89–7	0.000035 or CMBST[4]	0.0025 or CMBST[4]
HxCDDs (All Hexachlorodibenzo-p-dioxins)	34465–46–8	0.000063 or CMBST[4]	0.001 or CMBST[4]
HxCDFs (All Hexachlorodibenzofurans)	55684–94–1	0.000063 or CMBST[4]	0.001 or CMBST[4]

TABLE I–1.—TREATMENT STANDARDS FOR K174—Continued

Regulated harzardous constituent		Wastewaters	Nonwastewaters
Common name	CAS [2] No.	Concentration in mg/L[1], or technology code [2]	Concentration in mg/kg [3] 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 or CMBST [4]	0.005 or CMBST [4]
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001–02–0	0.000063 or CMBST [4]	0.005 or CMBST [4]
PeCDDs (All Pentachlorodibenzo-p-dioxins)	36088–22–9	0.000063 or CMBST [4]	0.001 or CMBST [4]
PeCDFs (All Pentachlorodibenzofurans)	30402–15–4	0.000035 or CMBST [4]	0.001 or CMBST [4]
TCDDs (All tetrachlorodi-benzo-p-doxins)	41903–57–5	0.000063 or CMBST [4]	0.001 or CMBST [4]
TCDFs (All tetrachlorodibenzofurans)	55722–27–5	0.000063 or CMBST [4]	0.001 or CMBST [4]
Arsenic	7440–36–0	1.4	5.0 mg/L TCLP

[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] 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.
[4] For these wastes, the definition of CMBST is limited to: (1) Combustion units operating under 40 CFR 266, (2) combustion units permitted under 40 CFR Part 264, Subpart O, or (3) combustion units operating under 40 CFR 265, Subpart O, which have obtained a determination of equivalent treatment under 268.42(b).

Regarding the use of combustion (CMBST) for the regulated organic constituents, commenters requested that we allow combustion as an alternative to the proposed (and now final) numerical treatment standards. This is consistent with the approach taken for F024, a set of previously listed chlorinated aliphatic wastes (62 FR 26000–3, May 12, 1997). We agree and are promulgating the requested change. As a consequence, facilities treating K174 wastes will have the option of complying with either the numerical standards promulgated or the technology standard of CMBST for the regulated organic constituents.

Adopting combustion as an alternative to the numerical standards serves a general LDR programmatic interest as well. We typically promulgate numerical performance standards to allow facilities maximum flexibility in determining for themselves how best to achieve compliance with the LDR treatment standards. If we promulgate a technology-specific treatment standard (such as combustion) instead, this flexibility is lost. In today's rule, by promulgating combustion as an alternative compliance option, we are not disturbing the degree of flexibility afforded to facilities; rather, we are maintaining or enhancing it.

However, when we specify a treatment technology like CMBST as the LDR standard, the analytical elements of compliance change. Typically, when we specify a method of treatment (like CMBST), no testing and analysis of treatment residuals is required because we are confident that use of the specified technology will reduce the level of target constituents (organics in the case of CMBST) to levels that minimize threats to human health and the environment. For K174, the regulated organic constituents of concern are dioxin/furan congeners, which, if combustion is used for treatment, will not be individually analyzed in the treatment residue (*e.g.,* the ash).

Several factors suggest that such individual constituent analysis is not necessary and that specifying CMBST is appropriate. First, if combustion in well designed and operated units is used to treat K174, the structural features of dioxin/furan congeners (*e.g.,* the presence of the oxygen in the ring formation) suggest that all dioxins and furans in K174 should be substantially destroyed by the high temperature combustion process that would have to be used.

Second, we ensure that combustion will occur in well designed, operated, and highly regulated units. Part of the CMBST standard itself (as modified in today's rule for K174 waste) is that combustion of K174 must occur either in units subject to the standards in 40 CFR part 264 subpart O or 40 CFR part 266, subpart H, or in interim status incinerators where the owner/operator has made a specific demonstration that the unit can operate in a manner equivalent to a part 264 or part 266 combustion unit. The type of facilities that can combust K174 is thereby restricted to highly-regulated RCRA units (or, after the current transition period, Clean Air Act permitted units subject to MACT standards). This will ensure that combustion is done only in a closely-regulated facility and in a manner that provides protection for human health and the environment. More specifically, combustion will occur only in units subject to the recently upgraded dioxin/furan emission standards of the MACT Hazardous Waste Combustion Rule as well as standards for other hazardous air pollutants, such as metals (64 FR 52828, September 30, 1999). Given this level of regulation and permitting oversight, we do not find the need to impose additional and, with respect to other dioxin/furan congeners, unique analytical burdens on the regulated community regarding these 5 hepta and octa congeners.

Of course, K174 does have metal constituents of concern, which would not be treated by the combustion process and that would remain in the combustion treatment residuals (*e.g.,* ash and scrubber water). We therefore are retaining metal treatment standards for all circumstances, *i.e.,* whether or not the treatment used by a facility involves combustion. When combustion is used to treat the organics to achieve LDR compliance, facilities still will need to conduct compliance testing and analysis for all regulated metal constituents in the combustion treatment residuals prior to disposal. This approach is patterned after EPA's promulgation of a similar alternative treatment standard for F024 (wastes from production of chlorinated aliphatics) and also for F032 (wastes from wood preserving processes). See 55 FR 22580–22581, June 1, 1990. See also 62 FR 26000–26003, May 12, 1997.

Another issue warranting brief discussion concerns a related, but in reality quite different, issue. Commenters, in general, oppose the regulation of the additional congeners individually, and state that the existing dioxin and furan congeners covered under UTS standards are sufficient to serve as surrogates for the effective treatment of the 5 hepta and octa

congeners. These commenters would omit the 5 hepta and octa congeners entirely from list of regulated hazardous constituents for which LDR treatment standards are set.

We do not agree with this approach. Absent a specific requirement that hepta and octa congeners be treated (*i.e.,* by including them as regulated hazardous constituents for K174 in the table in 268.40), generators would not be obliged to determine the presence of these congeners. Without such a determination, it is certainly possible that generators would not engage in any organic-oriented treatment at all. For example, if the other dioxin/furans are below treatment levels, generators would not have to combust the K174 waste. Given our concern about the potential threats posed to human health and the environment by dioxins and furans, we are choosing to require treatment wherever harmful congeners are present above the treatment standard. Also, the formation pathways for dioxins and furans are highly waste specific, such that we have no way of knowing the concentration of one isomer based on the presence or absence of another.

We conclude that a surrogate approach without compliance testing for the 5 hepta and octa isomers, such as that which would be the consequence of the commenters' views, would not be adequate. Therefore, with today's rule, we are promulgating treatment standards for each of the 5 hepta and octa dioxin and furan isomers identified in the proposal.

3. What Are the LDR Treatment Standards for K175?

We proposed two options for establishing treatment standards under the LDRs for the mercury-bearing waste to be listed as K175 (64 FR 46521). The first option would have included three treatment standards that would essentially be the same as those for other mercury-bearing wastes. These standards are:

(1) for K175 wastes containing greater than 260 mg/kg total mercury, the treatment would be recovery of the waste's mercury content via roasting and retorting (RMERC);
(2) for K175 RMERC residues containing less than 260 mg/kg total mercury, the residues would have to meet a numerical standard of 0.2 mg/L TCLP mercury prior to land disposal; and
(3) for K175 wastes and non-RMERC treatment residues containing less than 260 mg/kg total mercury, these wastes and treatment residues would have to meet a numerical standard of 0.025 mg/L TCLP mercury prior to land disposal

We also proposed that wastes and residues in this last category be treated so that a pH of 6.0 or less is achieved prior to land disposal, and that disposal of these wastes and residuals be restricted to landfill cells where only wastes with similar pH properties are co-disposed.

Because of the potential difficulty in roasting and retorting K175 waste, the Agency requested performance data, and solicited comment on a second treatment standard option. This option would require that K175 waste exhibit no more than 0.025 mg/L TCLP mercury for disposal without any requirement that the waste be roasted or retorted.

The K175 wastes are typically much greater than 260 mg/kg mercury, ranging from approximately 3,000 to 17,700 mg/kg mercury, and are greater than one percent in total organic constituents.[55] As noted in the proposal (64 FR at 46521), when these wastes (high mercury and 1% or more organics) exhibit the toxicity characteristic, they would already be subject to requirements of either RMERC (roasting and retorting) or IMERC (incineration in units operated in accordance with RCRA incinerator standards).

Commenters questioned the ability and willingness of commercial retorting and roasting treatment facilities to accept K175 wastes, citing two factors. First, with a K175 mercury content of approximately one percent, commercial retorters may not recover enough mercury to be cost-effective, and second, most commercial retort facilities may not be able to accept wastes in excess of 500 ppm Appendix VIII organics and still comply with their RCRA permitting limits (USEPA, 1999c).[56] This information suggests that adopting an RMERC standard for K175 may present significant practical difficulties that could not be overcome in the near term.

In addition to the practical points made by commenters, no roasting and retorting performance information for the subject waste or even a similar waste was submitted in comment. Since the Agency itself lacks data on the properties of the subject waste following roasting and retorting, we are not able to persuasively conclude that this type of treatment technology can achieve the level of mercury removal desired. In addition, we have no firm basis for determining whether the RMERC residues from treating K175 could meet the existing 0.2 mg/L TCLP total mercury standard so that the RMERC residues could be land disposed. We are therefore disinclined to adopt a K175 treatment standard that involves mandatory roasting and retorting.

Conversely, with respect to the second option proposed for K175 treatment standards, several factors suggest that this is a better approach to adopt. First, as discussed above, the commercial roasting and retorting alternatives may not exist. Second, the physical properties of the waste indicate that the waste can readily achieve 0.025 mg/L TCLP mercury. Testing conducted for EPA shows the waste sample tested readily achieved 0.025 mg/L TCLP mercury, as the sample tested leached only 0.0027 and 0.0058 mg/L total mercury at pH 4 and 6 respectively.[57]

Third, at this point in time, the Agency is reviewing the appropriateness of thermal treatment and recovery of mercury in all forms of hazardous waste, not solely K175. See 64 FR 28949, May 28, 1999. Therefore, requiring RMERC for K175 at this juncture may prove to be somewhat premature even if adequate data and assurance of commercial treatment capacity were to exist. Because we have an acceptable and effective treatment alternative, we are able to postpone having to make a policy judgment about promoting or requiring mercury recovery and recycling in today's rule (which would just apply to K175) until we are better prepared to resolve the longer term issues of mercury recovery in a comprehensive and more environmentally effective manner.

Based on all these factors, the Agency has selected stabilization as the appropriate technology upon which to base our K175 treatment standard, and is setting 0.025 mg/L TCLP mercury together with control of the pH of co-disposed wastes (as discussed below) as the land disposal restrictions for K175. This standard may be achieved by any technology (other than impermissible dilution), and does not prohibit roasting/retorting should it be shown to achieve the performance standard. While no data were provided in response comment on this proposal, subsequently a vendor has indicated a willingness to demonstrate that the

[55] See 64 FR at 46510; see also Table 4–14 from Listing Background Document for Chlorinated Aliphatics Listing Determination (Proposed Rule) (USEPA, 1999c).

[56] In accordance with 40 CFR 266.100, a ''metals recovery'' unit such as a commercial mercury retorter is conditionally excluded from most RCRA permit requirements provided that the facility complies with certain operating restrictions, one being a prohibition against accepting wastes in excess of 500 ppm Appendix VIII organics.

[57] Paul Bishop, Renee A. Rauche, Linda A. Rieser, Markram T. Suidan, and Jain Zhang; ''Stabilization and Testing of Mercury Containing Wastes,'' Department of Civil and Environmental Engineering, University of Cincinnati, March 31, 1999.

waste could be retorted successfully.[58] Should subsequent testing demonstrate that retorting produces a waste form better suited for stabilization and having less potential for long-term mercury release, the standards promulgated today could potentially be adjusted as part of the ongoing re-evaluation of mercury waste treatment technologies. See 64 FR 28949, May 28, 1998. Any modification of today's promulgation would be the subject of a future proposal.

Other comments focused upon the proposed requirement that disposal of K175 wastes and treatment residues which are less than 260 mg/kg total mercury be restricted to landfill cells into which disposal of wastes in excess of pH 6.0 is prohibited. Commenters noted that the waste could readily be treated to a pH <6.0 but stated that, given the relative small quantity of waste generated, monofill disposal of K175 or co-disposal only with similar wastes would not be feasible. One commenter suggested macroencapsulation of the K175 waste as is currently performed for debris would provide a viable alternative to achieve isolation of the waste from surrounding, potentially adverse landfill conditions. Subsequent discussions with Chemical Waste Management Inc. confirm that acidic wastes make up only a small portion of hazardous wastes and that it would not be feasible to manage a small cell for only K175 or for K175 and only similar wastes of pH <6.0.[59]

Control of the disposal site conditions is essential to ensure that the mercury present in this waste remains immobile so that long-term threats to human health and the environment are minimized. The solubility measurements conducted on the waste for EPA are consistent both with results found in the mercury literature [60] as well as with calculations from a geochemical stability model for mercury sulfide complexes.[61] The testing and subsequent solubility calculations confirm that above pH 6.0, increased mobility of mercury as mercuric sulfide/hydrogen sulfide complexes occurs with increasing pH and sulfide concentration.

Therefore, we find that to minimize the potential future threats from mercury mobilization, our treatment standard must ensure that pH is maintained at 6.0 or less for K175 waste. Because we agree with the commenter's suggestion about the practical advantages of macroencapsulation in some situations, we are finalizing treatment standards that require, prior to land placement: (1) Wastes to be at pH 6.0 or less, and placement is restricted to landfill cells in which disposal of other wastes in excess of pH 6.0 is prohibited; or (2) wastes to be at pH 6.0 or less, and macroencapsulation per the requirements of 40 CFR 268.45. The pH restriction in the latter standard is to ensure that mercury is not in a mobile form should the macroencapsulation vessel fail over time. This additional level of protection is part of the best demonstrated and available treatment (BDAT) needed to minimize the threats posed by potential mobilization of the mercury within a landfill over the long-term. Furthermore, macroencapsulation itself is not viewed as BDAT (except in unusual cases such as debris) because it merely isolates the waste from the environment for a period of time and does not actually effect any treatment. We have amended the regulations promulgated today accordingly.

Affected parties and other stakeholders should note that we may revisit the requirement for macroencapsulation should we determine, at some future date, that the generation rate of materials requiring disposal at low pH has increased to the point where maintaining a separate cell for these wastes is an operationally feasible option for a landfill.

We did not pursue to regulatory conclusion other potential avenues by which mercury mobilization could be affected for a number of reasons. Two avenues would be to regulate the sulfide content of the waste itself or the sulfide concentration in the disposal environment, or both. These approaches are fraught with technical and implementation difficulties. For example, chemical and biological processes within the disposal unit may reduce sulfate to sulfide at varying rates depending on in situ conditions. Also, current test methods do not readily distinguish free sulfide from that bound as mercuric sulfide in the waste. Hence, adopting sulfide limits on incoming K175 wastes or mandating in situ sulfide levels would likely not be reliable or implementable means of ensuring mercury immobility. On the other hand, pH can readily be determined using the existing procedure SW–846 Method 9045C. Thus, practical considerations also favor limitation of waste pH at the time of disposal as a more viable option to control potential mobilization of mercury once the wastes are disposed.

In summary, for K175 waste, we are finalizing a treatment standard requiring that, prior to land disposal: (1) The waste must meet a TCLP leachate concentration of 0.025 mg/L mercury or less, (2) the waste must be at or below a pH 6.0 when disposed, and (3) the wastes must be macroencapsulated or, if not, placement is restricted to landfill cells in which disposal of other wastes in excess of pH 6.0 is prohibited. We are promulgating these land disposal restriction requirements for K175 to ensure the long term protection of human health and the environment.

4. What Are the Conforming Changes to F039 and Universal Treatment Standards?

We proposed 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; 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin (OCDD); and 1,2,3,4,6,7,8,9-octachlorodibenzofuran (OCDF) be added to the list of regulated constituents in hazardous waste F039 multisource leachate. The F039 waste code applies to hazardous waste landfill leachates in lieu of the original waste codes when multiple waste codes would otherwise apply. F039 wastes are subject to numerical treatment standards equivalent to UTS. We proposed these additions to the constituents regulated by F039 to maintain the implementation benefits of having one waste code for multisource leachate.

Commenters correctly noted that the Agency did not add the constituents of the carbamate waste listing to F039 (61 FR 15566), an issue not directly within the purview of this rulemaking. As a result, multisource F039 leachates that also contain one of the listed carbamate wastes must be treated to comply with carbamate hazardous waste codes to meet the 40 CFR 268.48(c) requirement for treatment to achieve the lowest treatment standard for constituents of concern. Therefore, such wastes would be subject to multiple codes; the very situation F039 sought to eliminate. The Agency's intent upon promulgating F039 was that the single F039 waste code would replace the multiple codes to which such wastes were then subject (52 FR 22619, June 1, 1990). To limit

[58] Personal communication with SepraDyne Corporation representatives.

[59] Memorandum from Ross Elliott, U.S. EPA Office of Solid Waste, to RCRA Docket, ''Summary of Phone Call Between EPA and Carl Carlsson, Chemical Waste Management Inc.,'' July 12, 2000.

[60] See 64 FR at 46522. See also Jenny Ayla Jay, Francois M. M. Morel, and Harold F. Hemond, Mercury Speciation in the Presence of Polysulfides, Environmental Science and Technology, 2000, Vol. 34, No. 11, pages 2196–2200.

[61] Memorandum from John Austin to Ross Elliott, May 12, 2000.

any further proliferation of circumstances where treatment standards in addition to F039 may apply, we are promulgating the additional K174 dioxin and furan constituents of concern as proposed. Resources permitting, conforming changes may be proposed for the carbamate waste constituents at some future date.

We also proposed that the numerical standards derived for 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 Table of Universal Treatment Standards (UTS) at 40 CFR 268.48. These constituents contribute to the overall risks that formed the basis for EPA's decision the EDC/VCM sludges pose a substantial risk to human health and the environment, as shown in the risk assessment accompanying this rule. Their presence in other hazardous wastes should be mitigated by effective treatment to avoid similar risks after land disposal. By adding these numerical standards for five dioxin and furan congeners, we are ensuring that treatment of hazardous waste addresses these risks.

Following the adoption of today's rule, all characteristic wastes that have these constituents as underlying hazardous constituents above the UTS levels will require treatment of these additional constituents before land disposal. This is in direct accord with our mandate under the LDR treatment program to ''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.'' [62]

Commenters in general objected to changes to UTS because of their perceived cost of the analysis and concerns over available treatment capacity, which will be discussed in the following section. We were not persuaded by the commenters' arguments. Waste generators must already comply with treatment requirements for tetra-, penta-, and hexa- chlorinated dibenzo-p-dioxin and dibenzofuran congeners. Much of the labor and cost of analysis of the currently regulated congeners can not be separated from the costs associated solely with the hepta and octa congeners because the analysis of these 5 additional isomers is accomplished intrinsically as part of the overall method and is not separable. Hence, sample preparation, labor, and instrument time are not increased by including these 5 additional congeners.

Commenters also suggest that treatment and control of the existing regulated dioxin/furan congeners provides adequate protection against potential risks associated with the hepta and octa congeners. Commenters appear to recognize that the hepta- and octa-dioxin/furan congeners contribute significantly to the overall carcinogenicity of K174 wastes and waste treatment residues, and that they also must be controlled if human health and the environment are to be protected. In essence, these commenters would have us make broad assumptions for all situations about the ancillary impacts of treating and controlling certain dioxin and furan congeners, but not others that nevertheless present significant risks to human health and the environment.

We are not in a position to make such broad assumptions regarding our degree of control over dioxin and furan congeners that present significant risks. We have chosen to take a more conservative tack, providing treatment standards that, when met, ensure that long-term threats to human health and the environment are minimized (RCRA Section 3004(m)). For reasons noted earlier (*e.g.,* carcinogenicity of these congeners, dechlorination or photolytic changes to more toxic congeners, and assuring treatment if these congeners are present), we conclude that direct control of these 5 hepta and octa congeners is warranted.

For these reasons, the Agency is promulgating the proposed additions to the Table of Universal Treatment Standards (UTS) at 40 CFR 268.48 and to the list of regulated constituents for F039, multisource leachate from hazardous waste, in 40 CFR 268.40.

J. Is There Treatment Capacity for the Newly-Listed Wastes?

1. Introduction

Under the land disposal restrictions (LDR) determinations, the Agency must demonstrate that adequate commercial capacity exists to manage listed hazardous wastes in compliance with BDAT standards before the Agency can restrict the listed waste from further land disposal. The Agency performs capacity analyses to determine the effective date of the LDR treatment standards for the proposed listed wastes. This section summarizes the results of EPA's capacity analysis for the wastes covered by today's rule. For a detailed discussion of capacity analysis-related data sources, methodology, and detailed responses to comments for each waste covered in this rule, see USEPA, 2000f [63] (*i.e.,* the Capacity Background Document).

EPA's decisions on whether to grant a national capacity variance are based on the availability of alternative treatment or recovery technologies capable of achieving the prescribed treatment standards. Consequently, the methodology focuses on deriving estimates of the quantities of newly-listed hazardous waste that will require either commercial treatment or the construction of new on-site treatment or recovery as a result of the LDRs. The resulting estimates of required commercial capacity are then compared to estimates of available commercial capacity. If adequate commercial capacity exists, the waste is restricted from further land disposal unless it meets the LDR treatment standards prior to disposal. If adequate capacity does not exist, RCRA Section 3004(h)(2) authorizes EPA to grant a national capacity variance for the waste for up to two years or until adequate alternative treatment capacity becomes available, whichever is sooner.

2. Capacity Analysis Results for Newly Identified Wastes

In conducting the capacity analysis for the wastes newly-listed by today's rule, EPA examined data on waste characteristics and management practices gathered for the purpose of the chlorinated aliphatics hazardous waste listing determinations and on available treatment or recovery capacity for these wastes. The data sources for the analyses are primarily the 1992 RCRA Section 3007 survey, the follow-up survey specific to these wastes conducted in 1997 (see the docket for this rule for more information on these survey instruments), the available treatment capacity data submission that was collected in the mid-1990's, and the 1997 Biennial Report (BR). EPA analyzed the capacity-related information from these data sources, reviewed the public comments received in response to the proposed rule, and corresponded or met with several commenters to obtain more specific information.

We identified the following annual quantities of the newly-listed wastes that are generated and therefore the quantities of waste that potentially could require commercial treatment. Information available to the Agency indicates that up to 6,100 tons of K174 per year could potentially require

[62] RCRA Section 3004(m).

[63] U.S. EPA. 2000f. Background Document for Capacity Analysis for Land Disposal Restrictions: Newly Identified Chlorinated Aliphatics Production Wastes (Final Rule), September.

commercial treatment capacity. The Agency notes, however, that because EPA is finalizing a conditional listing approach for the K174 wastewater treatment sludges under which these wastes are not hazardous if disposed of in a subtitle C or a non-hazardous waste landfill, it is possible that little or no hazardous waste treatment capacity will be required for this waste. In addition, approximately 130 tons of K175 are generated annually and potentially could require commercial treatment capacity. EPA has determined that there is adequate commercial treatment or recovery capacity available to treat both of these wastes.

For wastewaters from chlorinated aliphatic production processes (proposed as K173), some commenters requested a national capacity variance for this waste in response to the proposed rule. Since EPA is finalizing a decision not to list wastewaters from chlorinated aliphatic production processes as hazardous (as discussed in section VI.A), there is no need for a capacity variance determination for this waste stream.

EPA proposed not to grant a capacity variance for K174 waste (EDC/VCM wastewater treatment sludge). No comments were received regarding the variance determination, available treatment or disposal capacity, or the quantity of the waste potentially requiring treatment, either in nonwastewater or wastewater forms. As described in section VI.I above, we are finalizing the proposed numerical treatment standards as well as an alternative treatment standard of hazardous waste combustion. We estimate that the commercially available sludge and hazardous waste combustion capacity is at least 300,000 tons per year (see details in the Capacity Background Document) and therefore sufficient to treat any K174 hazardous wastes that could require treatment.

As discussed earlier in this preamble, EPA has identified (as a result of public comments) that one facility may generate K174 in a surface impoundment as a result of today's rule. The facility may remove K174 waste before the effective date of the new listing and therefore may not be subject to LDR requirements.[64] The impoundment can also be retrofitted, closed, or replaced with tank systems. If the impoundment continues to be used to actively manage K174 waste, the unit will be subject to subtitle C requirements. In addition, any hazardous wastes that are actively managed in an impoundment (other than wastes removed from an impoundment as part of a one-time removal) after the effective date of today's rule are subject to the land disposal prohibitions.[65] EPA expects that the one facility currently managing chlorinated aliphatic wastewaters in surface impoundments (and which therefore may potential manage EDC/VCM sludges in impoundments after the effective date of today's rule) will cease to do so before the effective date of this rule.

However, as described earlier in this preamble (see section VI.B.2.b.vii) regarding the listing determination for EDC/VCM wastewater treatment sludges, this facility (or others) could manage newly-listed K174 in surface impoundments, provided they are in compliance with the appropriate standards for impoundments (40 CFR parts 264 and 265 subpart K) and the special rules regarding surface impoundments (40 CFR 268.14). EPA notes that those provisions require (by reference) basic groundwater monitoring (40 CFR parts 264 and 265 subpart F), management, and recordkeeping, but are afforded up to 48 months to retrofit to meet minimum technological requirements (see RCRA Section 3005(j)(6)(A)).

Based on the foregoing, EPA concludes that sufficient treatment or disposal capacity is available to manage K174 waste generated after the effective date of the LDR treatment standards either on site or offsite, even if generators seek offsite management for all K174 wastes in a permitted subtitle C disposal or treatment unit. Therefore, EPA is finalizing its decision not to grant a capacity variance for wastewater and nonwastewater forms of K174.

With respect to K175 waste, several commenters raised issues with regard to permitting requirements and constraints of commercial treatment facilities, including the ability of commercial facilities to accept nonwastewater forms of K175 waste and comply with the proposed land disposal restrictions of RMERC. As discussed earlier, EPA is finalizing a numerical treatment standard for this waste (in conjunction with other pH-related restrictions and macroencapsulation), which has been demonstrated to be achievable using stabilization. Sufficient commercial stabilization, pH, and macrocapsulation treatment capacity exists to treat and dispose of mercury-containing wastes and to meet the final treatment standards adopted today. In addition, the one facility generating K175 uses a sulfide precipitation technology and therefore may be able to meet the numerical mercury concentration standard upon generation of the waste. Depending on their ability to control pH and to perform on-site macrocapsulation, no other commercial treatment might be necessary prior to off-site hazardous waste landfilling. EPA notes that generators can use any treatment technology (except impermissible dilution) to meet the numerical mercury concentration and pH standards promulgated today.

EPA proposed that the K175 waste (about 130 tons per year) be co-disposed in a landfill with other wastes with similar pH (6.0 or less). Commenters did not indicate the existence of any technical difficulties in meeting the additional pH requirement. Furthermore, they did not provide any data or information on the issue of available monofill disposal capacity for this waste or landfill co-disposal with similarly acidic (pH 6.0 or less) wastes. Based on previous activities in the commercial sector as well as the lack of adverse comment, we find no reason to doubt that owners of commercial landfills can and at some point will create a special cell based on customer's needs, compliance conditions, and contract negotiation.

However, as noted earlier, we understand from one stakeholder that facilities with hazardous commercial landfill capacity may not have sufficient volumes of similarly acidic wastes to make it cost-effective to designate an entire unit or cell for disposal of only low pH wastes. We have therefore adopted an alternative that allows land disposal in other types of landfill cells following macroencapsulation of the waste (assuming the waste meets other applicable standards, such as Hg concentration and pH 6.0 or less). Based on a discussion with a hazardous waste management facility,[66] we find that macroencapsulation of K175 waste can be made readily available for K175 waste. Based on available data and analyses, EPA has therefore determined that sufficient commercial treatment and disposal capacity exists to manage K175 waste to meet the LDR standards, and we are today finalizing our decision not to grant a capacity variance for

[64] If the waste is actively managed in unretrofitted impoundments (*i.e.,* impoundments not satisfying the minimum technology requirements specified in RCRA sections 3004(o) and 3005(j)(11)) after the effective date of today's rule, it would be land disposed in a prohibited manner.

[65] See RCRA § 3004(m)(1) ''Simultaneously with the promulgation of regulations under subsection (d), (e), (f), or (g) prohibiting one or more methods of land disposal of a particular hazardous waste * * * promulgate regulations specifying those levels or methods of treatment * * *''

[66] Personal communication with Carl Carlson, Chemical Waste Management Inc.

wastewater or nonwastewater forms of K175.

In summary, we conclude that sufficient capacity exists for the management of both wastewater and nonwastewater forms of K174 and K175. For K174 and K175 wastes, the customary time period of six months is sufficient to allow facilities to determine whether their wastes are affected by this rule, to identify onsite or commercial treatment and disposal options, and to arrange for treatment or disposal capacity if necessary. LDR treatment standards thus will become effective when the listing determinations become effective for the wastes covered under this rule—the earliest possible date. This conforms to RCRA section 3004(h)(1), which indicates that land disposal prohibitions must take effect immediately when there is sufficient treatment or disposal capacity available for the waste.

Further, for soil and debris contaminated with the newly-listed wastes, EPA proposed not to grant a national capacity variance. EPA received no comments regarding this issue. We expect that the majority of contaminated soil and debris will be managed on-site and therefore would not require substantial off-site commercial treatment capacity. Therefore, EPA is not granting a national capacity variance for hazardous soil and debris contaminated with the newly listed wastes covered under this rule. LDR treatment standards for K174 and K175 hazardous soil and debris will therefore become effective when these listing determinations become effective.

Based on the 1992 RCRA section 3007 questionnaire and the 1997 updated responses, there were no data showing underground injection of the newly-listed wastes or indicating that the newly-listed wastes are mixed with radioactive wastes or with both radioactive wastes and soil or debris. EPA did not receive comments indicating that these wastes are underground injected or that they are mixed with radioactive wastes or with both radioactive wastes and soil or debris. Therefore, EPA is not granting a national capacity variance for K174 and K175 wastes that might be underground injected, mixed with radioactive wastes, or mixed with both radioactive wastes and soil or debris. LDR treatment standards for K174 and K175 underground injected and mixed wastes (if any exists) will therefore become effective when these listing determinations become effective.

Finally, EPA may consider a case-by-case extension to the effective date based on the requirements outlined in 40 CFR 268.5, which includes a demonstration that adequate alternative treatment, recovery, or disposal capacity for the petitioner's waste cannot reasonably be made available by the effective date due to circumstances beyond the applicants' control, and that the petitioner has entered into a binding contractual commitment to construct or otherwise provide such capacity.

3. Available Treatment Capacity for Other Wastes Subject to Revised UTS and F039 Standards

Several commenters expressed concern that EPA did not adequately consider the need for alternative treatment capacity for other hazardous wastes subject to the proposed revisions to the UTS and F039 (multiple source leachate) standards. Such additional treatment would be necessary to meet the treatment standards for the five additional dioxin and furan congeners being added to the UTS table (§ 268.48) and the list of regulated constituents in F039 (§ 268.40). Commenters noted that EPA must consider the potential need for national capacity variances by determining what fraction of the hazardous wastes are required to meet these new requirements, the appropriate means of treatment (if any), and the sufficiency of national treatment capacity for these wastes.

When changing the treatment requirements for wastes already subject to LDR (including F039 and characteristic wastes), EPA no longer has authority to use RCRA section 3004(h)(2) to grant a capacity variance to these wastes. However, EPA is guided by the overall objective of section 3004(h), namely that treatment standards which best accomplish the goal of RCRA section 3004(m) (to minimize threats posed by land disposal) should take effect as soon as possible, consistent with availability of treatment capacity. Our task is therefore to balance the points raised by commenters against the clear statutory direction that treatment standards, such as those at issue here, should be imposed in the shortest feasible time provided capacity is available.

With respect to the issue of capacity availability, we find first that only a limited quantity of hazardous waste leachate is expected to be generated from the disposal of newly-listed K174 and K175 wastes and added to the generation of leachates from other multiple restricted hazardous wastes already subject to LDR. Absent any data from commenters suggesting to the contrary, we have no reason to delay imposition of the LDRs on this ground.

Second, with respect to the other, and potentially much larger volumes of, wastes that would be affected, we evaluated the universe of wastes that could be impacted by today's revisions to the lists of regulated constituents for F039 and UTS. Commenters themselves did not supply any information on these volumes in support of their generalized claims of insufficient capacity or their views that delaying the effective date of these treatment standards is warranted. However, based on 1997 Biennial Report data and some assumptions of waste compositions and their potential for land disposal, we were able to estimate the potential need for additional treatment. For example, EPA estimated an upper bound of 68,000 tons per year of the nonwastewaters mixed with other waste codes, the F039 leachate from which would be potentially impacted by the revisions to the F039 treatment standards. In a similar fashion, we estimated that no more than 130,000 tons per year of characteristic nonwastewaters potentially could be affected by the promulgated changes to the UTS.

Of course, these upper bound estimates are most likely very overstated since only a portion of each estimated waste volume may contain one or more of the five congeners at concentrations above the numerical concentrations specified in the UTS table and the F039 list. Available hazardous waste landfill leachate characterization data from EPA's Office of Water indicate that only one of 15 samples analyzed shows leachate concentration of OCDD exceeding the numerical UTS level adopted today. Any concentrations below these numerical standards would not trigger any treatment obligation or the concomitant need for treatment capacity. (See the Capacity Background Document for detailed analysis.) Furthermore, EPA does not anticipate that waste volumes subject to treatment for F039 or characteristic wastes would significantly increase because waste generators already are required to comply with the treatment requirements for tetra-, penta-, and hexa-chlorinated dioxin/furan congeners. The volumes of wastes for which additional treatment is needed *solely* due to the addition of the five new congeners to the F039 and UTS lists is therefore expected to be very small. Both of these factors indicate the highly conservative nature of our volume estimates.

However, even though our volume estimates are highly conservative and overstated, we find that there still would be no shortage of treatment capacity. Based on data submittals in the mid-1990's and the 1997 Biennial

Report, EPA has estimated that approximately 37 million tons per year of commercial wastewater treatment capacity are available, and well over one million tons per year of liquid, sludge, and solid commercial combustion capacity are available. These are well above the quantities of wastewater and nonwastewater forms of F039 or characteristic wastes potentially requiring treatment for the 5 hepta and octa isomers even under the conservative screening assumptions described above. We find therefore that there is sufficient treatment capacity for these wastes to ensure that the wastes meet today's revisions to the UTS and F039 treatment standards. For this reason, EPA is finalizing its decision not to delay the effective date for adding the five hepta-and octa-dioxin and furan congeners to the lists of constituents for F039 and UTS. As with the other treatment standards being promulgated today, these revised F039 and UTS standards will become effective six months after the date of promulgation, the same date on which the K174 and K175 listing will become effective. This will provide sufficient time to allow facilities to determine whether their wastes are affected by this rule, to identify onsite or commercial treatment and disposal options, and to arrange for treatment or disposal capacity if necessary.

VII. What Is the Economic Analysis of Today's Final Rule?

A. What Is the Purpose of the Economic Analysis?

In 1999, the EPA presented an initial economic analysis (in the form of both a preamble discussion, and a supplementary ''Economics Background Document'(USEPA, 1999b), for public review in support of the RCRA K173/K174/K175 listing proposed rule (64 **Federal Register**, 46517–46519, August 25, 1999). The primary purpose of the 1999 economic analysis was to estimate regulatory compliance costs associated with the proposed rule. Secondary purposes were to provide (1) descriptive information about the economic sectors (*i.e.* the chemical industry) and other types of facilities potentially affected by the proposed rule, and (2) descriptive information about the economic activities involving chlorinated aliphatic hydrocarbon chemicals (CAHCs).

As a result of both public comments and changes to the rule, EPA revised the 1999 ''Economics Background Document'' (USEPA 1999b). In comparison to the 1999 economic analysis, the primary objectives of this final economic analysis are: (1) to present and respond to the public comments received about the economic analysis for the 1999 proposed rule, and (2) to estimate the impacts of the final rule. The findings for each objective are summarized below.

The Economics, Methods, and Risk Assessment Division (EMRAD) of EPA's Office of Solid Waste (OSW) conducted the economic analyses for both the 1999 proposed rule, and for this final rule. The ''Economics Background Document'' (USEPA, 2000a) [67] in support of this final rule, is available to the public from the EPA's RCRA Docket (refer to the introduction to this preamble for instructions on how to obtain a copy). References to statements below pertaining to facts, data, assumptions and other types of information, are identified in the final rule background document.

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

In conjunction with the 1999 proposed rule (64 FR 46517), EPA requested public comment on the following eleven specific information elements pertaining to the data, assumptions, design, accuracy, representativeness and completeness of the initial ''Economic Background Document'' (dated 30 July 1999, 127pp., which is available over the Internet at *http://www.epa.gov/epaoswer/hazwaste/id/chlorali/economic.pdf*): (1) Economic study design, (2) industry facility universe, (3) affected waste volumes/sources, (4) industry sector profile, (5) baseline (current) waste management practices, (6) regulatory compliance waste management, (7) compliance facility process modifications, (8) waste management costs, (9) regulatory impact financial benchmarks, (10) economic analysis data sources, and (11) other impact considerations. As described elsewhere in this preamble, EPA received a total of 20 sets of public comments on the 1999 proposed rule, of which 14 commenters offered a total of 61 remarks on the 1999 economic analysis. EPA presents and addresses each comment in the ''Response to Public Comments'' background document (USEPA, 2000g) [68], also available from the EPA RCRA Docket.

For purpose of summary here, the 61 remarks made by the 14 commenters who targeted the 1999 economic analysis may be grouped according to six topics: (1) K173 compliance cost estimates, (2) K174 compliance cost estimates, (3) K175 compliance cost estimates, (4) economic analysis framework, (5) overall magnitude of rule cost, and (6) industry characterization. Many of the commenters made remarks about multiple economic analysis topics (as well as about other aspects of the proposed rule, such as preamble language and risk analysis). Forty-two of the 61 remarks were directed at the EPA's K173 compliance cost estimate, stating that EPA's 1999 estimate was too low for a variety of reasons, including lack of complete descriptive information about all possible wastewater tanks affected, as well as incomplete assessment of all potential costs involved in retrofitting wastewater tanks with covers and tank air emission control devices. However, because the K173 listing is dropped from the final rule, EPA has dropped the K173 cost estimate from the economic analysis, rather than revise it. Otherwise, EPA has incorporated into the final rule economic analysis, information contained in other public comments addressing the K174 listing, K175 listing, economic analysis framework, and industry characterization. Four of the comments also contained remarks about the K174 listing, questioning the magnitude of its associated recordkeeping burden, and claiming that EPA did not consider other impacts arising from RCRA's ''mixture and derived-from'' clause. One commenter challenged EPA's assertion of the current market availability of K175 waste retorting treatment. The 14 commenters made nineteen remarks questioning the industrial scope of the listing, whether the rule would impact other types of facilities/wastes, and the appropriateness of EPA's cost annualization and future industry waste generation parameters. The 14 commenters also offered thirty-three remarks about the cost-effectiveness of the rule, the total industry cost of the rule, and challenged EPA's assertion that the proposed rule was not economically ''significant'' according to the $100 million annual effect threshold established in Executive Order 12866 (30 September 1993). Finally, commenters offered seven remarks raising questions about EPA's count of the affected number of facilities, EPA's characterization of the size of wastewater tanks in the affected industry, and EPA's characterization of the affected industry's annual sales and growth rate.

[67] U.S. EPA. 2000a. Economics Background Document. Office of Solid Waste. September.

[68] U.S. EPA. 2000g. Response to Public Comments on Proposed Listing Determination for Chlorinated Aliphatic Wastes. Office of Solid Waste. September.

C. What Are the Expected Economic Impacts of This Final Rule?

As of the late 1990s, 39 facilities in the US manufacture chlorinated aliphatic hydrocarbon chemicals. Eighteen of these are potentially subject to the rule, 17 as generators of K174 waste, and one as a generator of K175 waste. None of these 18 facilities are owned by small-sized companies. The 21 remainder facilities do not currently manufacture the types of chemicals and associated industrial wastes which are listed as RCRA ''hazardous'' industrial wastes by the rule.

The anticipated economic impacts associated with the final rule primarily consist of industry compliance costs, likely to be incurred by three of the 18 relevant waste generators (two K174 and one K175), and by four commercial waste handlers.

Because of the facts that: (1) Many of the CAHC manufacturing facilities and commercial industrial waste handlers are currently regulated under RCRA (via the existing RCRA F024 and F025 wastecodes, among others), (2) some CAHC manufacturing facilities currently manage some wastewater sludges as hazardous waste, (3) the K174 listing is targeted upon a subset of chlorinated aliphatic production processes, and/or (4) the K174 final rule is ''conditional'' upon only certain waste management practices, the incremental impact of this listing is expected to be substantially less than it otherwise would be if all waste generators fitting the listing descriptions, or if all 39 chemical class manufacturers, were affected. Consequently, the incremental impact of the final rule is expected to be less than it otherwise could be (*e.g.,* impacts could be higher under a listing affecting all facilities across the industry sector, rather than the final targeted and ''conditional'' listing approach which affects only a few facilities).

EPA estimates that the average annualized national cost of this rule will be between $0.42 and $4.05 million per year (consisting of $0.53 to $7.21 million in initial costs and $0.35 to $3.25 million in recurring annual costs), if one generator of EDC/VCM wastewater treatment sludge (K174) is able to make arrangements for the apparent lower-cost option for managing its affected industrial wastewaters. But if that generator is not able to make the appropriate waste management arrangements prior to the effective date for the final rule, such that the one facility might find it cannot make arrangements for a lower cost means of managing its affected wastewater (from which the EDC/VCM wastewater treatment sludges are derived), then it could face relatively high monthly costs for temporarily transporting its wastewater offsite to a commercial hazardous waste management facility, until it can complete an alternative (and lower-cost) waste management arrangement for its wastewaters. For the purpose of reflecting EPA's uncertainty about this facility's actual cost impacts, as well as other cost estimation parameters, EPA included other higher cost waste management options and industry compliance cost contingencies (such as possible surface impoundment corrective action costs) in the economic analysis for the final rule (Economics Background Document USEPA 2000a). Inclusion of all of these high-cost assumptions results in an upper-end EPA cost estimate of $23.37 million in average annualized cost (which includes up to 22 months of temporary offsite transport for the generator of EDC/VCM wastewater treatment sludge currently managing its wastewaters in a surface impoundment). EPA notes that total costs also include minor impacts on EPA regional offices and states with authorized RCRA programs to implement the new rule, as well as other ''incidental effects.'' The reader is referred to the ''Economics Background Document'' for additional details about all cost items included in EPA's estimate of national cost.

VIII. When Must Regulated Entities Comply With Today's Final Rule?

A. Effective Date

The effective date of today's rule is May 7, 2001.

B. Section 3010 Notification

Pursuant to RCRA section 3010, the Administrator may require all persons who handle hazardous wastes to notify EPA of their hazardous waste management activities within 90 days after the wastes are identified or listed as hazardous. This requirement may be applied even to those generators, transporters, and treatment, storage, and disposal facilities (TSDFs) that have previously notified EPA with respect to the management of other hazardous wastes. The Agency has decided to waive this notification requirement for persons who handle wastes that are covered by today's hazardous waste listings and already have (1) notified EPA that they manage other hazardous wastes, and (2) received an EPA identification number. The Agency has waived the notification requirement in this case because it believes that most, if not all, persons who manage the wastes listed as hazardous in today's rule already have notified the Agency and received an EPA identification number. However, any person who generates, transports, treats, stores, or disposes of these newly listed wastes and has not previously received an EPA identification number must obtain an identification number pursuant to 40 CFR 262.12 to generate, transport, treat, store, or dispose of these hazardous wastes by February 6, 2001.

C. Generators and Transporters

Persons who generate newly identified hazardous wastes may be required to obtain an EPA identification number if they do not already have one (as discussed in section VIII.B, above). If generating or transporting these wastes after the effective date of this rule, generators of the wastes listed today will be subject to the generator requirements set forth in 40 CFR Part 262. These requirements include standards for hazardous waste determination (40 CFR 262.11), compliance with the manifest (40 CFR 262.20 through 262.23), pretransport procedures (40 CFR 262.30 through 262.34), generator accumulation (40 CFR 262.34), record keeping and reporting (40 CFR 262.40 through 262.44), and import/export procedures (40 CFR 262.50 through 262.60). We note that the generator accumulation provisions of 40 CFR 262.34 allow generators to accumulate hazardous wastes without obtaining interim status or a permit only in certain specified units; the regulations also place a limit on the maximum amount of time that wastes can be accumulated in these units. If these wastes are actively managed in surface impoundments or other units that are not tank systems, containers, drip pads, or containment buildings as outlined in 40 CFR 262.34, accumulation of these wastes is subject to the permitting requirements of 40 CFR Parts 264 and 265, and the generator is required to obtain interim status and seek a permit (or modify interim status or a permit, as appropriate). Also, persons who transport newly identified hazardous wastes will be required to obtain an EPA identification number (if they do already have one) as described above and will be subject to the transporter requirements set forth in 40 CFR Part 263. [NOTE: Generators of EDC/VCM wastewater treatment sludge who manage the waste in compliance with the requirements of the conditional listing (*i.e.,* dispose of the waste in a landfill and do not store the waste directly on the land prior to landfilling, are not subject to the hazardous waste

generator requirements at 40 CFR Part 262.]

D. Facilities Subject to Permitting

Today's rule is issued pursuant to HSWA authority. Therefore, EPA will regulate the management of the newly identified hazardous wastes until states are authorized to regulate these wastes. EPA will apply Federal regulations to these wastes and to their management in both authorized and unauthorized states.

1. Facilities Newly Subject to RCRA Permit Requirements

Facilities that treat, store, or dispose of wastes that are subject to RCRA regulation for the first time by this rule (that is, facilities that have not previously received a permit pursuant to Section 3005 of RCRA and are not currently operating pursuant to interim status), might be eligible for interim status (see Section 3005(e)(1)(A)(ii) of RCRA). To obtain interim status based on treatment, storage, or disposal of such newly identified wastes, eligible facilities are required to comply with 40 CFR 270.70(a) and 270.10(e) by providing notice under Section 3010 and submitting a Part A permit application no later than May 7, 2001. Such facilities are subject to regulation under 40 CFR Part 265 until a permit is issued.

In addition, under Section 3005(e)(3) and 40 CFR 270.73(d), not later than November 8, 2001, land disposal facilities newly qualifying for interim status under section 3005(e)(1)(A)(ii) also must submit a Part B permit application and certify that the facility is in compliance with all applicable groundwater monitoring and financial responsibility requirements. If the facility fails to submit these certifications and a permit application, interim status will terminate on that date.

2. Existing Interim Status Facilities

Pursuant to 40 CFR 270.72(a)(1), all existing hazardous waste management facilities (as defined in 40 CFR 270.2) that treat, store, or dispose of the newly identified hazardous wastes and are currently operating pursuant to interim status under section 3005(e) of RCRA, must file an amended Part A permit application with EPA no later than the effective date of today's rule (*i.e.,* May 7, 2001). By doing this, the facility may continue managing the newly listed wastes. If the facility fails to file an amended Part A application by that date, the facility will not receive interim status for management of the newly listed hazardous wastes and may not manage those wastes until the facility receives either a permit or a change in interim status allowing such activity (40 CFR 270.10(g)).

3. Permitted Facilities

Facilities that already have RCRA permits must request permit modifications if they want to continue managing newly listed wastes (see 40 CFR 270.42(g)). This provision states that a permittee may continue managing the newly listed wastes by following certain requirements, including submitting a Class 1 permit modification request by the date on which the waste or unit becomes subject to the new regulatory requirements (*i.e.,* the effective date of today's rule), complying with the applicable standards of 40 CFR Parts 265 and 266 and submitting a Class 2 or 3 permit modification request within 180 days of the effective date.

Generally, a Class 2 modification is appropriate if the newly listed wastes will be managed in existing permitted units or in newly regulated tank or container units and will not require additional or different management practices than those authorized in the permit. A Class 2 modification requires the facility owner to provide public notice of the modification request, a 60-day public comment period, and an informal meeting between the owner and the public within the 60-day period. The Class 2 process includes a ''default provision,'' which provides that if the Agency does not reach a decision within 120 days, the modification is automatically authorized for 180 days. If the Agency does not reach a decision by the end of that period, the modification is permanently authorized (see 40 CFR 270.42(b)).

A Class 3 modification is generally appropriate if management of the newly listed wastes requires additional or different management practices than those authorized in the permit or if newly regulated land-based units are involved. The initial public notification and public meeting requirements are the same as for Class 2 modifications. However, after the end of the 60-day public comment period, the Agency will grant or deny the permit modification request according to the more extensive procedures of 40 CFR part 124. There is no default provision for Class 3 modifications (see 40 CFR 270.42(c)).

Under 40 CFR 270.42(g)(1)(v), for newly regulated land disposal units, permitted facilities must certify that the facility is in compliance with all applicable 40 CFR part 265 groundwater monitoring and financial responsibility requirements no later than May 7, 2001. If the facility fails to submit these certifications, authority to manage the newly listed wastes under 40 CFR 270.42(g) will terminate on that date.

4. Units

Units in which newly identified hazardous wastes are generated or managed will be subject to all applicable requirements of 40 CFR part 264 for permitted facilities or 40 CFR part 265 for interim status facilities, unless the unit is excluded from such permitting by other provisions, such as the wastewater treatment tank exclusions (40 CFR 264.1(g)(6) and 265.1(c)(10)) and the product storage tank exclusion (40 CFR 261.4(c)). Examples of units to which these exclusions could never apply include landfills, land treatment units, waste piles, incinerators, and any other miscellaneous units in which these wastes may be generated or managed.

5. Closure

All units in which newly identified hazardous wastes are treated, stored, or disposed after the effective date of this regulation that are not excluded from the requirements of 40 CFR parts 264 and 265 are subject to both the general closure and post-closure requirements of Subpart G of 40 CFR parts 264 and 265 and the unit-specific closure requirements set forth in the applicable unit technical standards Subpart of 40 CFR part 264 or part 265 (*e.g.,* Subpart N for landfill units). In addition, EPA promulgated a final rule that allows, under limited circumstances, regulated landfills, surface impoundments, or LTUs to cease managing hazardous waste but to delay subtitle C closure to allow the unit to continue to manage non-hazardous waste for a period of time prior to closure of the unit (see 54 FR 33376, August 14, 1989). Units for which closure is delayed continue to be subject to all applicable 40 CFR 264 and 265 requirements. Dates and procedures for submittal of necessary demonstrations, permit applications, and revised applications are detailed in 40 CFR 264.113(c) through (e) and 265.113(c) through (e).

IX. How Will This Rule Be Implemented at the State Level?

A. Applicability of Rule in Authorized States

Under section 3006 of RCRA, EPA may authorize qualified States to administer the RCRA hazardous waste program within the State. See 40 CFR part 271 for the overall standards and requirements for authorization. Following authorization, the State

requirements authorized by EPA apply in lieu of equivalent Federal requirements and become Federally enforceable as requirements of RCRA. EPA maintains independent authority to bring enforcement actions under RCRA sections 3007, 3008, 3013, and 7003. Authorized States also have independent authority to bring enforcement actions under State law. A State may receive authorization by following the approval process described under 40 CFR part 271.

After a State receives initial authorization, new Federal requirements promulgated under RCRA authority existing prior to the 1984 Hazardous and Solid Waste Amendments (HSWA) do not apply in that State until the State adopts and receives authorization for equivalent State requirements. The State must adopt such requirements to maintain authorization.

In contrast, under RCRA section 3006(g) (42 U.S.C. 6926(g)), new Federal requirements and prohibitions imposed pursuant to HSWA provisions take effect in authorized States at the same time that they take effect in unauthorized States. Although authorized States are still required to update their hazardous waste programs to remain equivalent to the Federal program, EPA carries out HSWA requirements and prohibitions in authorized States, including the issuance of new permits implementing those requirements, until EPA authorizes the State to do so.

Authorized States are required to modify their programs only when EPA promulgates Federal requirements that are more stringent or broader in scope than existing Federal requirements. RCRA section 3009 allows the States to impose standards more stringent than those in the Federal program. See also 40 CFR 271.1(i). Therefore, authorized States are not required to adopt Federal regulations, both HSWA and non-HSWA, that are considered less stringent.

B. Effect on State Authorizations

EPA is promulgating this rule (with the exception of the changes to Part 302) pursuant to sections 2002(a), 3001(b), 3001(e)(2), and 3007(a) of the Solid Waste Disposal Act, which are HSWA provisions. We will add the new requirements to Table 1 at 40 CFR 271.1, which identifies Federal program requirements promulgated pursuant to HSWA. Because this rule is promulgated pursuant to the HSWA, after its effective date EPA will implement it rule in all States, including authorized States. Once authorized States modify their programs to adopt equivalent rules and receive authorization for such rules from EPA, those rules will become RCRA subtitle C requirements that apply in that States in lieu of the equivalent federal requirements.

Because this rule is promulgated pursuant to HSWA, a State submitting a program modification may apply to receive either interim or final RCRA authorization under RCRA 3006(g) or (b) on the basis that State regulations are, respectively, substantially equivalent or fully equivalent to EPA's regulations. The procedures and schedule for State programs modifications for either interim or final authorization are described in 40 CFR 271.21 and 271.24. Note that all HSWA interim authorizations will expire on January 1, 2003 (see 40 CFR 271.24(c)).

X. What Are the Reportable Quantity Requirements for Newly-Listed Wastes (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 lists a hazardous waste under RCRA, the waste is also a hazardous substance pursuant to CERCLA 101(14), and the Agency adds the waste to the table of CERCLA hazardous substances in the CFR. 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 Adding Chlorinated Aliphatic Wastes to the Table of CERCLA Hazardous Substances?

Yes. Today, EPA is adding the newly listed chlorinated aliphatic wastes (K174 and K175) to the list of CERCLA hazardous substances. As discussed below, EPA also is finalizing adjusted RQs for these wastes.

C. How Does EPA Determine Reportable Quantities?

Under CERCLA, all new hazardous substances generally 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 K174 or K175 Under CERCLA?

Today, EPA is promulgating adjusted statutory RQs for newly-listed hazardous wastes K174 and K175 waste streams of one pound based on their hazardous constituents. EPA also is adjusting the RQ at one pound for K174 based on its hazardous constituents, chlorinated dibenzo-p-dioxins (CDDs) and chlorinated dibenzofurans (CDFs). EPA is promulgating an adjusted RQ of one pound for newly-listed waste K175 based on its hazardous constituent, mercury. However, in determining when to report a release of K174 or K175, EPA will 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 when you know the quantities of all hazardous constituents of a mixture or solution, you must notify of releases of an RQ or more of such constituents (40 CFR 302.6). Therefore, if you know the concentration of the hazardous constituents of a hazardous waste, you can calculate the amount of waste released needed to reach the RQ for the constituents. By using the maximum observed concentration that EPA is promulgating today, you may apply the mixture rule, even if you do not 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 K174 or K175 in an amount that will reach the RQ for any of the hazardous constituents. This approach is reasonable and conservative because the sampling data presented in the Listing Background Document (USEPA, 1999c) accurately identify the maximum observed concentrations of the hazardous constituents in the chlorinated aliphatics waste streams. Table X–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 X–1.—MAXIMUM OBSERVED CONCENTRATION AND CORRESPONDING RQ FOR HAZARDOUS CONSTITUENTS THAT ARE BASIS FOR NEWLY-LISTED K174 AND K175

Waste	Constituent	Max. concentration (ppm (mg/kg))	RQ (lb)
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	0.0000241	1
	1,2,3,6,7,8-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
	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 K174 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 X–1. Thus, if K174 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 K174 to reach the RQ for this waste (based on the maximum observed concentration of OCDF). If 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 K0175 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 K174 and K175 and Their Hazardous Constituents?

The hazardous constituents identified as the basis for listing K174 as hazardous waste 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 K174.

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.[69] Therefore, because each of the hazardous constituents has an RQ or reference RQ of one pound, EPA is promulgating an adjusted RQ of one pound for K174.

The hazardous constituent identified as the basis for listing as hazardous VCM–A wastewater treatment sludges (K175) 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 K175 has an RQ of one pound, EPA is promulgating an adjusted RQ of one pound for this waste.

G. How Do I Report a Release?

To report a release of 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.

[69] 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.

H. Is CERCLA Reporting Required for Spills of EDC/VCM Wastewater Treatment Sludge That (Prior to the Spill) Does Not Meet the Listing Description for K174?

Commenters to the proposed rule asked whether spills of EDC/VCM wastewater treatment sludge, where prior to being spilled the sludge does not meet the K174 listing because of the manner in which it is being managed, would have to be reported in compliance with the CERCLA RQ reporting requirements. The Agency notes that we are finalizing a contingent management listing for EDC/VCM wastewater treatment sludges under which these sludges would be regulated as K174 wastes unless they are destined for management in a subtitle C landfill or a non-hazardous waste landfill licensed or permitted by a state. As part of the listing description, once the EDC/VCM wastewater treatment sludge is placed on the land it meets the listing description. Therefore, contrary to the commenter's suggestion, spills of EDC/VCM sludges would not be excluded from the K174 listing. A spill of EDC/VCM wastewater treatment sludges would constitute the release of a CERCLA hazardous substance, and provided that an amount equal to or exceeding the RQ had been released, would be subject to CERCLA notification requirements.

I. 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 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.

XI. What Are the 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 includes a novel legal or policy issue arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order. Today's final rule, which includes an alternative listing approach for one of the newly-listed wastestreams, deviates from the Agency's standard or historic listing approach in that the Agency is listing as hazardous only those quantities of the waste that are managed in a manner that reflects unacceptable risks. This differs from the Agency's traditional approach to listing a waste as hazardous, in which the listing determination captures the entire quantity of a targeted wastestream that poses unacceptable risks to human health and the environment when managed in one or more particular manners.

Due to the Agency's decision to promulgate a listing approach that deviates from our historical hazardous waste listing approach, the Agency is deeming today's action to be ''significant.'' Prior to finalizing today's rule, EPA submitted this proposed policy change to OMB for review. Changes made to the Agency's proposal in response to OMB suggestions or recommendations are documented in the public record.

Although today's final rule is not ''economically significant,'' the Agency prepared an Economics Background

Document (USEPA 1999b) 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 VII. The complete Economics Background Document (USEPA 1999b) is available for public review from the RCRA docket, according to instructions provided in the introduction to this preamble.

EPA anticipates that the final rule will primarily affect three of the 18 known US generators of K174 and K175 hazardous wastes, causing these three facilities to modify current waste management practices, according to the terms and conditions of the final rule. None of these 18 facilities are owned by small-sized companies. The 15 remainder chemical plants will incur relatively minor annual costs for documentation of current waste management practices. In addition, EPA anticipates that four industrial waste management operators will be affected by either increased or decreased annual volumes and business revenues associated with the management of wastes from the three affected chemical plants. EPA also anticipates that states with authorized RCRA programs will be affected as they will be required to implement and enforce the final rule. Finally, EPA anticipates that other Federal agencies and non-governmental organizations may be incur relatively minor costs associated with reading and propagating the final rule.

EPA estimates that the national average annual cost of the final rule will be between $0.42 to $4.05 million. Under broader cost estimation uncertainty assumptions which allow for temporary offsite trucking of affected wastes by one facility if it requires additional time beyond the final rule six-month compliance deadline to modify its current waste management practices, the upper-bound of this cost estimate increases to $23.37 million in average annual cost.

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, a 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 final 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); 1200 Pennsylvania Avenue NW.; Washington, DC 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 final 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 requiring that facilities generating EDC/VCM wastewater treatment sludges be able to document their compliance with the conditions provided for exclusion from the scope of the conditional hazardous waste listing promulgated today. This requirement is necessary to ensure that EDC/VCM 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; 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 final 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 93 hours, and the annual cost associated with the additional paperwork burden will be $5,254. Total estimates over three years are 279 hours and $15,762.

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.

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.

Today's rule contains no Federal mandates (under the regulatory provisions of Title II of the UMRA) for State, local, or tribal governments or the private sector. The rule would not impose any federal intergovernmental mandate because it imposes no enforceable duty upon state, tribal or local governments. States, tribes and local governments would have no compliance costs under this rule. It is expected that states will adopt similar rules, and submit those rules for inclusion in their authorized RCRA programs, but they have no legally enforceable duty to do so. For the same reasons, we determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments, and thus, is not subject to the requirements of sections 202 and 205 of UMRA. In addition, EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' The Executive Order defines ''policies that have federalism implications'' to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. This proposed rule directly affects the chlorinated aliphatics industry. States and local governments will not incur direct compliance costs under this rule. It is expected that states will adopt similar rules, and submit those rules for inclusion in their authorized RCRA programs, but they have no legally enforceable duty to do so. Thus, Executive Order 13132 does not apply to this rule.

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 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 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 final 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 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 promulgated in this rule are projected to reduce risks to children potentially exposed to the constituents of concern.

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 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 rule is intended to reduce risks from the generation and management of hazardous wastes 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 promulgating decisions to list two wastes as hazardous (*i.e.,* 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 listing determinations. 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 listing determinations 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 not listing 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 in 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.

J. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A Major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective May 7, 2001.

List of Subjects

40 CFR 148

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

40 CFR 261

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

40 CFR Part 268

Environmental protection, Hazardous materials, Waste management, Reporting and recordkeeping requirements, Land disposal restrictions, Treatment standards.

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, Emergency Planning and Community Right-to-Know Act, Extremely hazardous substances, 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: September 29, 2000.

Carol M. Browner,

Administrator.

For the reasons setforth in the preamble, title 40, chapter I of the Code of Federal Regulations is 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 (j) and (k) to read as follows:

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

* * * * *

(j) Effective May 8, 2001, the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K174 and K175 are prohibited from underground injection.

(k) The requirements of paragraphs (a) through (j) of this section do not apply:

(1) If the wastes meet or are treated to meet the applicable standards specified in subpart D of 40 CFR part 268; 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 of this part.

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. 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	Hazardous code
*	*	*
Organic chemicals:		
*	*	*
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: (i) they are disposed of in a subtitle C or non-hazardous 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.	T
K175	Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.	T
*	*	*

5. 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
*	* * * * * * *
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

Appendix VIII to Part 261—Hazardous Constituents

6. Appendix VIII to Part 261 is amended by adding in alphabetical order of common name the following entries:

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-Octachlorodibenofuran	39001–02–0	
* * *	* * *	*	*

PART 268—LAND DISPOSAL RESTRICTIONS

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

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

Subpart C—Prohibitions on Land Disposal

8. Section 268.33 is revised to read as follows:

§ 268.33 Waste specific prohibitions—chlorinated aliphatic wastes.

(a) Effective May 8, 2001, the wastes specified in 40 CFR part 261 as EPA Hazardous Wastes Numbers K174, and K175, soil and debris contaminated with these wastes, radioactive wastes mixed with these wastes, and soil and debris contaminated with radioactive wastes mixed with these wastes are prohibited from land disposal.

(b) The requirements of paragraph (a) 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.

(c) 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 levels of subpart D of this part, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.

(d) Disposal of K175 wastes that have complied with all applicable 40 CFR 268.40 treatment standards must also be macroencapsulated in accordance with 40 CFR 268.45 Table 1 unless the waste is placed in:

(1) A Subtitle C monofill containing only K175 wastes that meet all applicable 40 CFR 268.40 treatment standards; or

(2) A dedicated Subtitle C landfill cell in which all other wastes being co-disposed are at pH≤6.0.

9. In § 268.40, the Table is amended by adding entries to F039 in alphabetical order, by adding in alphanumeric order new entries for K174 and K175, and by adding footnote 12 to read as follows:

§ 268.40 Applicability of treatment standards.

* * * * *

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TREATMENT STANDARDS FOR HAZARDOUS WASTES Note: NA means not applicable					
WASTE CODE	Waste Description and Treatment/Regulatory Subcategory[1]	Regulated Hazardous Constituent		Wastewaters	Nonwastewaters
		Common Name	CAS[2] Number	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)	35822-46-9	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
		*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
* * * * *	* *				
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)	35822-46-9	0.000035 or CMBST[11]	0.0025 or CMBST[11]
		1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF)	67562-39-4	0.000035 or CMBST[11]	0.0025 or CMBST[11]
		1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-HpCDF)	55673-89-7	0.000035 or CMBST[11]	0.0025 or CMBST[11]
		HxCDDs (All Hexachlorodibenzo-*p*-dioxins)	34465-46-8	0.000063 or CMBST[11]	0.001 or CMBST[11]
		HxCDFs (All Hexachlorodibenzofurans)	55684-94-1	0.000063 or CMBST[11]	0.001 or CMBST[11]
		1,2,3,4,6,7,8,9-Octachlorodibenzo-*p*-dioxin (OCDD)	3268-87-9	0.000063 or CMBST[11]	0.005 or CMBST[11]
		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	0.000063 or CMBST[11]	0.005 or CMBST[11]

		PeCDDs (All Pentachlorodibenzo-*p*-dioxins)	36088-22-9	0.000063 or CMBST[11]	0.001 or CMBST[11]
		PeCDFs (All Pentachlorodibenzofurans)	30402-15-4	0.000035 or CMBST[11]	0.001 or CMBST[11]
		TCDDs (All tetrachlorodi-benzo-*p*-dioxins)	41903-57-5	0.000063 or CMBST[11]	0.001 or CMBST[11]
		TCDFs (All tetrachlorodibenzofurans)	55722-27-5	0.000063 or CMBST[11]	0.001 or CMBST[11]
		Arsenic	7440-36-0	1.4	5.0 mg/L TCLP
K175	Wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process.	Mercury[12]	7438-97-6	NA	0.025 mg/L TCLP
		pH[12]		NA	pH ≤6.0
	All K175 wastewaters	Mercury	7438-97-6	0.15	NA
* * * * *	* *				

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* * * * * * *

Footnotes to Treatment Standard Table 268.40

[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 40 CFR 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.

* * * * * * *

[11] For these wastes, the definition of CMBST is limited to: (1) combustion units operating under 40 CFR 266, (2) combustion units permitted under 40 CFR part 264, subpart O, or (3) combustion units operating under 40 CFR 265, subpart O, which have obtained a determination of equivalent treatment under 268.42(b).

[12] Disposal of K175 wastes that have complied with all applicable 40 CFR 268.40 treatment standards must also be macroencapsulated in accordance with 40 CFR 268.45 Table 1 unless the waste is placed in:

(1) A Subtitle C monofill containing only K175 wastes that meet all applicable 40 CFR 268.40 treatment standards; or

(2) A dedicated Subtitle C landfill cell in which all other wastes being co-disposed are at pH≤6.0.

* * * * *

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

§ 268.48 Universal treatment standards.

(a) * * *

UNIVERSAL TREATMENT STANDARDS

[Note: NA means not applicable]

Regulated constituent common name	CAS[1] number	Wastewater standard	Nonwastewater standard
		Concentration in mg/L[2]	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)	35822–46–9	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
* * * * * * *			
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
* * * * * * *			

* * * * * * *

[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 40 CFR 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

11. The authority citation for Part 271 continues to read as follows:

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

12. In § 271.1(j) tables 1 and 2 are amended by adding the following entries in chronological order by date of publication 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
* * * * * * *			
September 29, 2000	Listing of Hazardous Wastes K174 and K175.	65 FR 67132	May 7, 2001.
* * * * * * *			

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

Effective date	Self-implementing provision	RCRA citation	**Federal Register** reference
* * * * * * *			
May 7, 2001	Prohibition on land disposal of K174 and K175 wastes, and prohibition on land disposal of radioactive waste mixed with K174 and K175 wastes, including soil and debris..	3004(g)(4)(C) and 3004(m)	November 8, 2000. 65 FR 67132.
* * * * * * *			

* * * * *

PART 302—DESIGNATION, REPORTABLE QUANTITIES, AND NOTIFICATION

13. 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.

14. 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)
* * *	*	*	*		*		*
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.
1 *—Indicates that the 1-pound RQ is a CERCLA statutory RQ.
4—Indicates that the statutory source for designation of this hazardous substance under CERCLA is RCRA Section 3001.
[f] See 40 CFR 302.6(b)(1) for application of the mixture rule to this hazardous waste.

15. Section 302.6 is amended by revising paragraph (b)(1)(iii) to read as follows:

§ 302.6 Notification requirements.

* * * * *

(b) * * *

(1) * * *

(iii) For waste streams K169, K170, K171, K172, 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
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. 00–25928 Filed 11–7–00; 8:45 am]

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