United States Environmental Protection Agency
Office of Solid Waste
Washington, D.C. 20460
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Response to Comments Document

Hazardous Waste Listing Determination for Chlorinated Aliphatics Production Wastes (Final Rule)

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Environmental Defense Fund (EDF)
CALP-00008

Introduction/Comment Summary:

I. INTRODUCTION

These comments are submitted by national, state, and local environmental organizations in response to the U.S. Environmental Protection Agency's (EPA's) proposed hazardous waste listing determinations for certain wastes from the chlorinated aliphatics industry under the Resource Conservation and Recovery Act (RCRA). The proposal was published in the Federal Register of August 25, 1999 at 64 Fed. Reg. 46476.

A. Description of the Commenters

These comments are submitted by a diverse group of environmental organizations working at all levels of government to improve environmental quality generally, and the operating practices of chlorinated aliphatics waste generating facilities specifically.

EDF is a national non-profit environmental advocacy organization with more than 300,000 members dedicated to the protection of human health and the environment by inter alia, eliminating unnecessary exposure to hazardous substances, including hazardous wastes. EDF members live, work, and recreate in areas immediately affected by the improper management of hazardous and industrial wastes, including the chlorinated aliphatics wastes addressed in this rulemaking. EDF participates extensively in RCRA implementation and oversight, including activities in the regulatory, legislative, and judicial contexts. For example, EDF is the plaintiff in EDF v. Browner, Civ. No. 89-0598 (D.D.C.), the case governing the timing and scope of this rulemaking.

The Lone Star Chapter of the Sierra Club is a non-profit conservation grassroots organization consisting of 19 regional groups covering most of Texas. It has more than 22,000 members, many of whom live within communities directly affected by many different types of environmental releases. Hazardous waste regulation is a main concern for the Lone Star chapter. For example, it has previously investigated and challenged disposal practices for spent catalysts, and is actively involved in state pollution prevention and waste minimization programs, including Clean Texas 2000. The Lone Star Chapter is part of the national Sierra Club. Also joining these comments are numerous smaller grassroots organizations and community groups concerned about public health and environmental impacts from chlorinated aliphatics industry at issue in the instant rulemaking. Many members of these organizations live near to the chlorinated aliphatics facilities impacted by this rulemaking. These organizations include the following:

1. Galveston-Houston Association for Smog Prevention, Houston, Texas
2. Public Citizen of Texas, Austin, Texas
3. SEED - Sustainable Energy & Economic Development Coalition, Austin, Texas
4. Downwinders At Risk, Midlothian, Texas
5. Friends United for a Safe Environment, FUSE, Inc. -- incorp in TX & AR.
6. Citizens Aware & United for a Safe Environment, Midlothian, Texas
7. People Against Contaminated Environments, Beaumont, Texas
8. Mothers Organized to Stop Environmental Sins (MOSES), Winona, Texas
9. People Against Contaminated Environments, Corpus Christi, Texas
10. Texans United Education Fund, Houston, Texas
11. Texas Campaign for the Environment, Austin, TX
12. Grandparents of East Harris County, Houston, Texas
13. Concerned Citizens of Channelview, Channelview, Texas
14. Orange County Citizens for Clean Air, Orange. Texas
15. Protect All Children's Environment, Marion, North Carolina
16. Health Awareness & Water Knowledge, Seguin, TX
17. Citizens to Save Lake Waco, McGregor, TX
18. Groups Allied to Stop Pollution, Lancaster, TX
19. People United for the Environment, Corsicana, Texas
20. Wylie Residents Against Pollution, Wylie, Texas
21. West Odessans for Clean Air, Odessa, Texas
22. Hays County Residents for Clean Air, Austin, Texas
23. Grimes County Residents Against Pollution, Navasota, Texas
24. West Texas Toxics Alliance, El Paso, Texas
25. Concerned Citizens of Wailer County, Hempstead, Texas
26. Toxic Exposure Network, San Antonio/New Braunfels, Texas
27. Pollution Solution, Lafayette, LA
28. Concerned Citizens of Edroy/Odem, Texas
29. Research and Education Against Continuing Toxics. Texas City, Texas
30. RESTORE of Longville, Louisiana

In addition, two organizations from California and one from Oklahoma join us: California Communities Against Toxics Rosamond, CA and Desert Citizens Against Pollution, Lancaster, CA and Earth Concerns of Oklahoma, Tulsa, Oklahoma.

B. Summary of the Comments

On August 25, 1999, EPA proposed to list three of six wastes from the chlorinated aliphatics industry and proposed a no-listing determination for three wastes. EPA proposed to list the following wastes, using standard listing, contingent management listing and conditional listing mechanisms:

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

K 174: 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 D landfill licensed or permitted by the state or federal government; (ii) they are not otherwise placed on the land prior to final disposal; and (iii) the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill.

K 175: Option 1: Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. Option 2: Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process, unless i) the sludges are disposed in a Subtitle C landfill, and ii) the sludges do not fail the toxicity characteristic for mercury in 40 CFR 261.24, and iii) the generator maintains documentation demonstrating that the waste was disposed of in a Subtitle C landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in a Subtitle C landfill.

EPA proposed not to list the following three wastes:

process wastewaters from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene based process;
wastewater treatment sludges from the production of methyl chloride; and
wastewater treatment sludges from the production of allyl chloride.

In addition, EPA proposed that the tank air emission standards of 40 CFR Part 264/265 Subpart CC apply to tanks managing chlorinated aliphatic wastewaters, provided proposed triggering concentration levels are met.

All three of the waste streams EPA proposed for listing present substantial hazard to human health and the environment. EPA has ample justification for listing these three wastes.

EPA, however, is urged to list the EDC/VCM sludges using EPA's standard approach to listing rather than relying on a landfill contingent management approach. EPA's risk assessment for landfilling of EDC/VCM sludges significantly underestimates the risks posed by landfilling these sludges, and thus this contingent management approach for EDC/VCM sludges is not protective of human health and the environment.

For various reasons detailed below, EPA should also list the VCM-A sludges using the standard listing mechanism rather than the proposed conditional listing approach, as the latter approach is not protective of human health or the environment, will be extremely difficult to implement and enforce, and acts as a disincentive to waste reduction and minimization.

Moreover, EPA based the proposed listings - standard, contingent management and conditional - on the results of fundamentally flawed risk assessments that used a series of improper assumptions and modeling methods. The risk assessment therefore seriously understates the risks posed by these wastes. An appropriately conducted risk evaluation, correcting the flaws discussed in these comments, would indicate much greater risks presented by the these wastes and thus the case for standard listing of these wastes will be stronger. These greater risks substantially undercut EPA's reasoning for the use of conditional and contingent based listing.

1.1 EDF Comment

II. EDC/VCM LIST DETERMINATION

EPA is proposing a contingent management listing for sludges generated from treating wastewater associated with the manufacture of ethylene dichloride and vinyl chloride monomer (EDC/VCM wastewater treatment sludge, K175). EPA is proposing to list EDC/VCM wastewater treatment sludges as hazardous unless the sludges are managed in a Subtitle D or a Subtitle C landfill. (See 64 Fed. Reg. 46508.) As outlined below, we urge EPA to use standard listing for this waste because the proposed contingent management approach is unprotective of human health and the environment. The landfill modeling significantly underestimated the risks posed by landfilling these sludges as it fails to consider appropriate waste volumes and landfill unit size. In addition, the risk assessment significantly underestimates the risks posed by these sludges as it fails to consider the air emission pathway from storing huge quantities of this waste.[1]

A. <u>EPA is clearly justified in listing EDC/VCM sludges to protect of human health and the environment: however, these wastes should be covered by standard listing rather than contingent management listing that exempts these wastes from Subtitle C management so long as they are landfilled.</u>

We strongly support EPA's decision that EDC/VCM sludges warrant listing. Significant risks posed by the hazardous constituents in this waste, including dioxins and arsenic, mandate listing to protect human health and the environment. The health risks posed by dioxins alone clearly justify this listing. Dioxins are a probable human carcinogen; in animal testing, TCDD is one of the most potent carcinogens ever evaluated. Non carcinogenic effects have also been reported. Some studies suggest evidence of immunotoxicity, such as alteration in lymphocyte populations; cell surface markers or lymphocyte proliferative response. There is also evidence of reproductive and developmental effects from exposure to dioxins.[2] Health risks from arsenic are very well

[1] There are additional deficiencies in the risk assessment that impact EPA's predicted risks posed by EDC/VCM sludges. These additional deficiencies are outlined below in these comments in the section specifically entitled Risk Assessment Deficiencies.

[2] For further descriptions of health effects of dioxins and of EPA's Dioxin Reassessment, see the section of these comments regarding the listing for chlorinated aliphatics wastewaters.

documented.[3] There is clear evidence that exposure to arsenic creates an increased risk of cancer in humans and EPA classifies it as a Group A Known Human Carcinogen.

EPA's Table III - 3 and Table III - 4 (64 Fed. Reg. 46493) in the preamble summarize the significant (greater than lx 10-5) risk for EDC/VCM wastewater treatment sludges managed in an onsite land treatment unit and in a landfill. As calculated by EPA, high risks are presented both by dioxin and by arsenic. This risk estimate clearly is sufficient to support a standard listing of these wastes, in accordance with EPA's listing policies and practice. EPA itself acknowledges that the risks predicted from its analysis of the EDC/VCM sludges are "well above the listing benchmark." [4] Given the great volumes of these materials and given the arguments below as to why the landfilling of these materials without prior treatment is not protective of human health and the environment, EPA is urged to use the standard listing mechanism for these EDC/VCM sludges. Standard listing for this waste is clearly the mechanism that will most effectively control the threats posed by this waste stream.

Agency Response:

The Agency disagrees that a standard listing approach is required to control risks posed by this waste. The Agency is finalizing a conditional listing approach for EDC/VCM wastewater treatment sludges. EPA's final listing determination is based on the fact that an analysis of the risks associated with EDC/VCM wastewater treatment sludges shows that one of the current waste management practices (land treatment) results in significant risk while the primary management practice (disposal in an non-hazardous waste landfill) shows no significant risk. The EPA statement quoted by the commenter from the proposed rule (64 FR at 46507) that the risks from EDC/VCM sludges are "well above the listing benchmark" was taken from the EPA's clearly-identified discussion of the land treatment unit risk, and the Agency clearly explained in the proposed rule that while the land treatment unit risk warrants listing the waste when managed in this fashion, the risk estimated from landfilling these sludges in unlined landfills does not warrant listing. EPA notes that Tables III-3 and III-4 (referred to by the commenter as presenting both land treatment unit and landfill risks) only contained land treatment unit risks. Table III-5 containing landfill risks was inadvertently left out of the *Federal Register* notice published on August 25, 1999 due to an error by the Government Printing Office. However, the landfill risk information in Table III-5 was adequately summarized elsewhere

[3] See EDF's Scorecard, www. scorecard.org, on arsenic. Scorecard incorporates governmental and other authoritative information on chemicals, including their known and suspected health effects.

[4] See 64 Fed. Reg. 46507.

in the preamble to the proposed rule (64 *FR* at 46492 and 46507), and was also in the Risk Assessment background document in the proposed rulemaking docket. A correction notice adding the missing Table III-5 was published in the *Federal Register* on September 9, 1999 (64 *FR* 49052).

The Agency believes that allowing the waste to continue to be managed under a management scenario for which EPA did not identify significant risk (*i.e.*, non-hazardous waste landfilling of untreated EDC/VCM sludge) outside of the subtitle C system achieves protection of human health and the environment, and that little additional benefit would be gained by requiring that all EDC/VCM wastewater treatment sludges be managed in accordance with RCRA subtitle C management standards. Given the Agency's finding that no significant risks are posed from managing EDC/VCM wastewater treatment sludges in a landfill, the Agency sees no reason to include sludges managed in this manner in the scope of the hazardous waste listing. Additionally (and after consideration of the predicted risk differential between land treatment and landfilling), because only one facility 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 the risk from the practice.

EPA is basing its conditional listing approach for EDC/VCM wastewater treatment sludges on the basis of significant potential health risks from dioxin when the sludges are managed in a land treatment unit. As explained in more detail below, the Agency is not basing its listing determination on potential risks from arsenic. The Agency finds that EDC/VCM wastewater treatment sludges do not pose risks at levels of concern due to the presence of arsenic.

Responses to the commenter's concerns regarding the waste volumes and landfill size used by EPA in the risk assessment for EDC/VCM wastewater treatments sludges are provided below. Also, provided later in this document is the Agency's response to the commenters concerns regarding the consideration of air emissions from the storage of EDC/VCM wastewater treatment sludges.

1.2 EDF Comment

B. <u>EPA's contingent management approach under which EDC/VCM would not be regulated as hazardous if they are placed in a nonhazardous waste landfill, is flawed, unreasonable and not protective of human health and the environment.</u>

1. EPA's landfill modeling substantially underestimates the risk posed by these wastes.[5]

(a.) Overview

In determining whether to list wastes, EPA begins by assessing the risks of current disposal practices and plausible mismanagement scenarios. The risk models used for this purpose are highly influenced by the inputs used for waste volume and waste unit area size. Unfortunately, the inputs used in this rulemaking are unrealistically low and thus substantially understate the risks posed by EDC/VCM sludges. Specifically, EPA inappropriately assumes that the waste generation rates reported in 1996 reflect the only plausible mismanagement scenario which warrants modeling in this rulemaking -- even though available information makes clear that waste volumes have subsequently increased significantly. As a legal matter, EPA's use of 1996 volumes and other inappropriate volume and waste management assumptions, and the failure to consider actual or potential codisposal of wastes in the chlorinated aliphatics industry, violate Section 1004(5) of RCRA, which defines "hazardous waste" as wastes posing a present or potential hazard to human health and the environment based upon quantity and other factors. Similarly, these deficiencies violate EPA's criteria for listing determinations, which requires an assessment of "plausible types of improper management."

(b.) Waste Volume

First, the volumes used in EPA's landfill modeling do not reflect recent facility expansion and do not reflect codisposal with wastewaters. The volumes are based on 1996 data. However, since that time, several new developments have occurred which indicate very significant growth in the volume of EDC/VCM sludges. Specifically, since the 1996 EPA survey, several facilities have greatly expanded capacity of production of EDC and VCM, thus greatly increasing generation of EDC/VCM sludges.[6] Formosa has plans to add 290 million pounds of EDC at Point Comfort, Texas. Georgia Gulf added 400 million pounds of EDC capacity and 350 million pounds of VCM capacity in 1996 at its Plaquemine, Louisiana site. Borden increased their VCM capacity by 250 million pounds by the end of 1997. Oxymar completed expansion to increase their capacity to 2.1 billion pounds of VCM production in July 1997. PHH Monomers, in a joint venture between PPG and Condea Vista, opened a 500 million pound unit at Lake Charles in 1996. Obviously, these increases are very significant and EPA's risk analysis must account for these changes. EPA's current assumptions vastly underestimates the risks posed by these sludges. These increased volumes further justify a standard listing of these materials.

[5] The following landfill modeling issues also apply to landfill modeling of the other sludges at issue in this rulemaking for which landfills were assessed.

[6] The following statistics are taken from www.chemexpo.com, 1998 data.

In addition, the volumes EPA uses in its landfill modeling do not reflect the actual codisposal practice currently being used in these facilities for wastewaters. Many wastewater treatment systems handling EDC/VCM wastewaters also handle other chlorinated aliphatic and non-chlorinated aliphatic wastewaters. As a result, EPA's EDC/VCM sludge grouping is actually part of a much larger volume of unsegregated waste sludges generated by a wide array of wastewater treatment. In other words, for a facility with a wastewater treatment system generating 100 tons of sludge that treats 75% EDC/VCM wastewaters and 25% non-EDC/VCM wastewaters, EPA "apportioned" EDC/VCM sludge volume would be 75 tons. Therefore, instead of using actual sludge volumes, EPA calculates "apportioned" volumes. By separating out each of the sludges generated by this industry into distinct groupings (i.e., separating EDC/VCM sludges from VCM-A sludges from methyl chloride sludges from allyl chloride sludges) and considering its risk in isolation, EPA substantially understates the overall volume of waste and concomitantly the risks posed by current management practices.

Moreover, the volumes used by EPA do not adequately account for potential commingling at the landfill of EDC/VCM sludges from numerous facilities located in close proximity to each other. As shown by EPA's geographical distribution of chlorinated aliphatics manufacturers, this industry is heavily concentrated in just two states. Many of these plants are in very close proximity. For example, Plaquemine, Louisiana (home of Georgia Gulf) is Just on the southern outskirts of Baton Rouge (home of Formosa). Geismar, Louisiana (which is not far from Plaquemine or Baton Rouge) is the home of at least two chlorinated aliphatic facilities. Lake Charles, Louisiana (home of PPG Industries) is approximately five miles from Westlake, Louisiana (home of Condea Vista). Deer Park, Texas (home of Occidental Chemical) is within 20 miles of La Porte, Texas (home of Geon). EPA recognizes to a limited extent that some of these facilities send their sludges to the same landfill. EPA indicates that it has evidence of co-management of sludges from Formosa (in Point Comfort, Texas) co-managing wastes with Oxymar (from Gregory, Texas) and co-management of sludges from Borden (from Geismar, LA) with sludges from PPG Industries (from Lake Charles, LA). Given the statistics provided above regarding the significantly increasing volumes of this waste, it is increasingly likely that the wastes end up co-managed in the same facility. This co-management increases the concentrations of hazardous constituents in these waste streams and thus increases the risks. This is yet another reason EPA should use standard listing for these sludges. EPA's modeling assumptions vastly underestimate actual or potential waste co-management scenarios.

This co-management will continue to be exacerbated by closure of Subtitle D landfills, a current trend that is consolidating this waste management practice. EPA has recognized this trend many times.[7]

[7] See various EPA documents concerning capacity of nation's Subtitle D landfills, citations for which are located on EPA's web page on landfills.

Agency Response:

EPA acknowledges that the waste volumes used in our analysis of potential risks from EDC/VCM wastewater treatment sludges were based upon 1996 data, but disagrees that use of this data was unreasonable. First, the commenter points to reported and planned increases in chemical production as a direct indication of increased wastewater treatment sludge volume, without any specific reason other than a presumed positive correlation between the two. The Agency points out to the commenter that there may be significant uncertainties in projecting changes in waste volume based upon projections of increased chemical production capacity, due to uncertainties in the relationship between production rates and waste generation rates, and the effects that changes in technology, the nature of possible 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. EPA views this uncertainty as potentially significant where the wastes in question are sludges generated from centralized wastewater treatment systems. Many of these centralized treatment systems often serve to treat wastewaters from other non-chlorinated aliphatic production, and are therefore currently designed to treat certain volumes of wastewater containing certain constituents. EPA would have to project whether and how potential increases in chlorinated aliphatic and other chemical production would impact factors related to sludge volume, such as wastewater volume, constituent concentration, efficiency of the biological treatment system, changes in process chemistry or effluent guidelines, all of which EPA views as beyond the scope of this rulemaking effort.

In addition, even assuming some increase in sludge volume into the future, 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). Given that such an increase waste generation results in a relatively small change in potential risk, and given also the significant uncertainty EPA noted regarding predicting potential changes in waste volume, the Agency finds that it was reasonable to use the 1996 waste volume data in its risk assessment estimates.

In response to commenter's concerns regarding the Agency's use of "apportioned" sludge volumes to isolate risks from chlorinated aliphatic production processes, EPA believes that the approach used was appropriate for isolating the risk from the specific industry wastes under review. EPA explained in the preamble to the proposed rule (see 64 *FR* at 46483) that the Agency used

apportioned sludge volumes, together with analytical data only from "dedicated" sludge samples[8] in our risk analysis, to determine risks associated with EDC/VCM production processes. The isolation of risks attributable to volumes and constituents associated only with chlorinated aliphatic production processes is fully compliant with the Agency's obligations under Paragraph 1.m. of the consent decree. Given resource constraints and the schedule restrictions imposed by the consent decree, it was not possible for the Agency to evaluate the potential risks associated with every potential constituent of concern in commingled wastewaters and attributed to a variety of non-chlorinated aliphatic production processes. In addition, given the scope of EPA's mandate under RCRA (as amended by HSWA) for making hazardous waste listing determinations, many wastes from the non-chlorinated aliphatic production processes (that are commingled with chlorinated aliphatic wastes) have been evaluated under other listing determinations (*e.g.,* petroleum refining, solvents, organic chemicals). In fact, in several cases, the Agency found that facilities currently manage commingled wastes as hazardous due to the contributions of non-chlorinated aliphatic wastes subject to previous listing determinations.

In response to EDF'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 there was specific information indicating that this was occurring or had occurred (*i.e.*, 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, the Agency accounted for two instances where sludges generated by two generators are disposed in the same landfill.[9] In both cases, the Agency used the combined sludge volume in assessing the quantities of sludges managed in off-site landfills. The Agency did not attempt to project or speculate on future co-disposal scenarios because of the lack of adequate information indicating the nature of co-disposal in the future.

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[8] "Dedicated" sludges are comprised only of sludges from treating wastewaters from the production of EDC/VCM, and do not include sludges from treating commingled wastewaters from EDC/VCM and other production processes.

[9] See page 54 of "Listing Background Document for the Chlorinated Aliphatics Listing Determination."

1.3 EDF Comment

(c.) Waste Unit Area

The waste unit area is the most important parameter in EPA's groundwater modeling. Unfortunately, once again EPA has deviated from past practice and used modeling assumptions that cannot be supported by present or potential waste management practices.

For groundwater pathways, EPA's used a high end landfill area was 420,888 square meters, corresponding to the 90th percentile of the municipal landfill distribution. While EPA wisely chose only one size for high end municipal landfills, the size of the landfill is inexplicably small given the corresponding value in other listing determinations (for example, the carbamates rulemaking). Since the size of offsite facilities should not be industrial sector dependent, EPA cannot artificially create an assumption that these EDC/VCM sludges will be managed in landfills less than one-half the size of landfills receiving other wastes for which EPA has conducted listing determinations. Again, in the instant rulemaking, EPA diverged from previous listing determination methodologies without justification or explanation. In the carbamates listing determination, one landfill size was set for both onsite and offsite landfilling, based upon the total quantity of carbamate waste requiring disposal. The high-end value was 949,317 square meters.

(d.) Distance to the nearest receptor well

EPA's high-end value for the distance to the receptor well is 102 meters, for both onsite and offsite units. The central tendency value was 430 meters. Significantly, in the previous listing determination, covering dye and pigment wastes, EPA used 48 meters as the high-end value for the distance to the nearest receptor well from an offsite landfill. The use of a much larger value -- 102 meters -- in the instant rulemaking is arbitrary and unjustified.

Agency Response:

The Agency is continuously refining its risk assessment procedures, so it is not unusual for certain input values to be somewhat different from what they might have been five or six years ago, when the carbamates determination and the dyes proposal were published. The current procedure we generally use to calculate high end individual risk for listing determinations is to set two parameters to their 90th percentile values (or maximum value if there are only a few data points for a parameter) and the rest of the parameters at their central tendency values. This approach is designed to produce a risk estimate which is above the 90th percentile of the risk distribution but still on the distribution. In the case of the groundwater risk analysis for the EDC/VCM sludges, the high end risk result from the deterministic analysis was above the 97.5th percentile on the probabilistic risk distribution (p.5-24, TBD), meaning that the selected high end parameters were more than sufficiently conservative to meet the Agency's criteria for a high end risk analysis.

1.4 EDF Comment

2. EPA must evaluate the air emissions pathway during storage prior to disposal and if significant risks are found must preclude pre-disposal storage in uncovered units.

Perhaps the most significant failure on EPA's part was its failure to consider the air emissions pathway during storage of the EDC/VCM sludges prior to disposal. Huge quantities of these wastes can be and are stored for indefinite periods of time and thus there is a very significant potential for substantial air emissions during this period. EPA must analyze this pathway, which may itself yield a risk level sufficient for a standard listing (as distinct from the proposed contingent listing which apparently would allow unregulated storage prior to disposal).

Huge quantities of these wastes are stored in storage tanks (either aerated or nonaerated) or containers prior to disposal.[10] Despite the huge waste volumes involved, EPA chose not to assess this air pathway; EPA never mentions this pathway or explains why the air pathway from waste storage prior to disposal is not assessed.

According to EPA's August 1999 Revised Risk Assessment for the Air Characteristic Study, EPA found after a peer reviewed analysis of unregulated air emissions from waste management units, that the highest risks were presented by air emissions from aerated and nonaerated tanks.[11] Notwithstanding EPA' s own findings, EPA did not assess this high risk air pathway presented by storing the EDC/VCM sludges prior to disposal.

Agency Response:

The commenter states that EPA did not consider air emissions from tanks and containers storing EDC/VCM wastewater treatment sludges prior to disposal. However, the commenter's reference to "huge quantities of these wastes" in "storage tanks (either aerated or nonaerated) or containers prior to disposal," and the accompanying citation of Appendix D-1 from the Listing Background Document (which presents wastewater management data) makes it appear it is referring to chlorinated aliphatic wastewaters, not sludges. For example, wastewater volumes in Appendix D-1 are much greater than the corresponding sludge volumes in Appendix D-2; also, wastewater treatment tanks (not sludge storage tanks) are more aptly described using the terms "aerated" or "non-aerated." However, because of the overall position of this comment EPA assumes the issue being raised in this comment is releases to air from storing EDC/VCM sludges after these wastes have been removed from the wastewater treatment

[10] See Appendix D- 1 to the Listing Background Document.

[11] Revised Risk Assessment for the Air Characteristic Study, USEPA, Office of Solid Waste, August 1999, EPA 503-R-99-019a, Volume One.

system. In Section 1.5 below, the commenter raises the issue of releases to air from EDC/VCM sludges at the point of disposal in a landfill.

As described in Section 3.1.1.2 of the Listing Background Document, EDC/VCM wastewater treatment sludges are generated as a result of wastewater treatment, almost exclusively in tanks (*e.g.*, aerated biological treatment tanks). EPA considered air emissions from aerated biological treatment tanks only when assessing the potential risks for *wastewaters*, not sludges, and did not consider as relevant air emissions from EDC/VCM wastewater treatment sludges while these sludges are in the bottom of these treatment tanks, covered by water.

EDC/VCM sludges are then removed from these tanks, dewatered using a filter press, and temporarily stored in roll-off containers prior to disposal. These sludges are relatively inert (having been derived from aggressive biological treatment) and wet (having 41 to 74 percent moisture by weight.) There were no indications during Agency site visits that any activity other than temporary storage in containers prior to landfilling was occurring (i.e., no indications of 'indefinite' storage alluded to by the commenter). EPA did not model air emission pathways from any tanks or containers used to store EDC/VCM wastewater treatment sludges prior to landfill disposal, because we do not believe this pathway poses any significant risk compared to the risks from wastewater treatment tanks.

In addition, please see EPA's response to comment in Section 1.5 below. Risk estimates for vapor phase emissions from EDC/VCM sludges in a landfill did not show any significant risk. As described in Section 1.5 below, EPA also reasonably concluded that particulate emissions from EDC/VCM sludges in a landfill would not be expected to show significant risk. Because these sludges would not be expected to show risk via the air pathway when deposited in a landfill (*i.e.*, dumped out of their containers) EPA reasonably concludes these sludges would not be expected to show significant risk while being temporarily stored in containers prior to disposal. The Agency believes it is reasonable to assume that any potential for air releases would not be any greater when sludges are temporarily stored in containers, than when dumped in a landfill.

Regarding the commenter's reference to the Air Characteristic Study findings that the "highest risks were presented by air emissions from aerated and nonaerated tanks," EPA points out that the 1999 Revised Risk Assessment for the Air Characteristic Study found that the highest risks from unregulated air emissions from waste management units were from wastewaters managed in aerated and non-aerated *treatment* tanks, which was the scenario evaluated for this listing determination.

1.5 EDF Comment

3. EPA failed to consider particulate emissions from landfills and certain tanks.

In addition to the above pathway, EPA did not consider particulate emissions from landfills stating that the moisture content of the waste would prevent release of particulates. This assumption is not well founded, given possible climate and wind conditions (for example, location of a landfill in an arid climate with high wind). Nor did EPA consider releases from tanks other than air emissions for treatment tanks managing chlorinated aliphatics wastewaters. EPA is assuming first that the integrity of the tanks would prevent releases and then that the overflow and spill controls would prevent releases -- even though no overflow and spill control are required for nonhazardous waste tanks, including tanks that manage wastewaters subsequently discharged either to Publicly Owned Treatment Works (POTWs, more commonly called municipal sewage plants) or surface waters. Failure to consider these plausible mismanagement scenarios violates EPA's criteria for listing determinations, which requires an assessment of "plausible types of improper management."

Agency Response:

With regard to particulate emissions from EDC/VCM wastewater treatment sludges disposed in landfills, as explained in the proposed rule (64 *FR* at 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 by weight, which the Agency believes 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).

However, assuming that particulate emissions did occur, we do not think this would present significant risk based on the results of our risks analyses for the land treatment unit. 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.

The commenter also stated that EPA failed to assess tank releases, again appearing to refer to both releases from sludge as well as wastewater tanks. Regarding wastewater tanks, 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 3007 Survey responses that the industry uses aerated biological treatment tanks, many of which are uncovered, or open to the atmosphere. Even if liquids were spilled, the air emissions from those spills would likely be much less than the emissions from active aerated treatment of those liquids, which is what the Agency modeled.

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.

1.6 EDF Comment

4. Constituents concentrations and contaminants screened out

EPA's samplings included three samples of the non-dedicated EDC/VCM sludges. EPA states that it does not use these samples in its Risk Assessment but rather used the samples from the "apportioned" EDC/VCM sludges. If, however, EPA had based its risk assessment on the nonsegregated, nonapportioned samples, it appears that the concentrations of contaminants are much higher.[12] This is particularly true for the constituent of concern, dioxins, where the contaminant levels are orders of magnitude higher. These higher levels reflect the actual sludges that are being disposed. EPA should consider these higher levels in its assessment, which will more appropriately estimate the risks actually posed by these sludges.

EPA conducts fate and transport modeling to determine the concentration of contaminants that will come into contact with receptors. For the land treatment unit and the landfill unit, EPA uses partitioning modeling to determine how much of the contaminants remain in the units and how much is released. However, for the landfill, EPA says it used TCLP analytical results (rather than the partitioning equations) as the predictor of leachate concentration. Thus, EPA is using TCLP results are a proxy for the concentrations of contaminants that would be generated in leachate if the waste were placed in a municipal landfill. Significant concentrations of lead and chrome are found in the samples of EDC/VCM sludges, yet these contaminants are non-detect in the TCLP data, and thus are screened out. There is data that suggests that high iron content effects lead (see

[12] See sampling tables for EDC/VCM sludges in Listing Background Document.

preamble in Phase IV LDR proposed rule). EPA should determine whether the low lead-leaching values are an artifact of the TCLP rather than an accurate reflection of the properties of the waste; if so, EPA should utilize the partitioning equations. In any event EPA should explain its evaluation in the final rule's preamble.

Agency Response:

As explained in the Agency's response to comment in Section 1.2 above, the Agency used apportioned sludge volumes, together with analytical data only from "dedicated" sludge samples in our risk analysis, to determine risks associated with EDC/VCM production processes. The isolation of risks attributable to volumes and constituents associated only with chlorinated aliphatic production processes is fully compliant with the Agency's obligations under Paragraph 1.m. of the consent decree. However, 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, or have caused the Agency to re-evaluate the listing determination.

In response to the comment that "there is data that suggests that high iron content effects lead" and that "EPA should determine whether the low lead-leaching values are an artifact of the TCLP rather than an accurate reflection of the properties of the waste," the Agency is aware that the presence of iron in a waste may affect the TCLP leach test result of lead under some circumstances. This issue was discussed in the Phase III LDR proposed rule and subsequently finalized in the Phase IV LDR final rule on May 26, 1998 (63 FR 28556-58), rules to which the commenter refers. In the situation described in the referenced LDR rulemakings, iron filings (metallic iron) were being added to lead-bearing foundry sands at very high levels (approximately 10% of the total waste) which absent the iron failed the TC regulatory value in the TCLP test, but passed with the iron added. On further investigation (Kendall, 1996), the Agency found that the high iron levels reduced the TCLP test results for lead by two mechanisms. First, in the presence of the high amount of metallic iron, a chemical reduction of lead salts to insoluble metallic lead occurs, lowering the amount of dissolved lead measured in the TCLP test. Second, adsorption of lead onto iron oxide particles could occur. The Agency expressed concern about the practice of adding these high concentrations of metallic iron to the foundry sands because the practice was not considered to meet the legal criterion of "minimizing threats" from the waste necessary to be considered legitimate waste treatment under RCRA, and the Agency concluded that the addition of iron constituted impermissible dilution.

The Agency also distinguished between the situations where iron was added to a waste after its generation, and the presence of iron in a waste when first generated. The effects of iron on the TCLP results for chromium were not studied.

There are several important differences between the foundry sands example above and the present case. Since the EDC/VCM sludges have undergone aerated biological treatment, it is reasonable to assume that any iron that is present is oxidized, and the adsorption of lead onto the iron oxides is the most likely effect that could occur. Examination of the wet-weight data used in the landfill risk assessment shows that only 2 of 4 samples had iron in the range of the foundry sands (4-10 percent), and therefore could possibly be expected to behave in a similar manner. However, in his discussion of the effects of iron on lead TCLP levels, Kendall (1996) notes that the iron oxide adsorption phenomenon is

> "...a function of pH, and over a fairly narrow pH range the percent adsorption can go from low to high. However, this pH edge is not a constant for a particular ion, but strongly depends on the ratio of metal ion to HFO binding sites. For the TCLP situation it is prudent to look at experimental evidence rather than to try to calculate the degree of adsorption, since the ionic strength is high and the metal ion concentrations are high. Dzombak and Morel do not give all the necessary adsorption parameters to do calculations for TCLP extracts of foundry sand."

In other words, understanding the details of the adsorption phenomenon as it might affect the lead in the EDC/VCM sludges cannot be determined with certainty from examining the record to which the commenter points, without additional experimental evidence. As stated above, these studies did not address the potential effect of iron on chromium, and the Agency has no additional information with which to draw any conclusions. However, EPA also notes that the other two EDC/VCM sludge samples, which also were non-detect for lead and chromium in the EPA's TCLP analysis, had total iron concentrations well below (less than 1 percent) the range identified in the foundry sand example. The fact that total iron concentrations in two of the four sludge samples used in the landfill analysis were well below the levels identified in the foundry sand example, and these TCLP results were also non-detect, suggests that for both lead and chromium, the iron content may not be the reason for the resultant TCLP non-detects.

Despite this uncertainty, EPA notes that the total lead totals levels in the EDC/VCM sludges are relatively low (1.6-13.0 mg/l), and would produce maximum possible TCLP leach values of 0.08-.65 mg/l (conservatively assuming 100% leaching of lead from the sample). Application of the uniform dilution and attenuation factor applied in the TC regulation of 100 would result in possible drinking water well concentrations of 0.0008-0.0065 mg/l. This range of values is below the current drinking water treatment standard for lead of 0.015 mg/l. Additionally, if EPA had modeled the leaching and groundwater fate and transport of lead from a landfill using the constituent-specific approach of the 1995 HWIR

proposed regulation (60 *FR* 66406, December 21, 1995 *Federal Register*), the estimated maximum lead concentration reaching a drinking water well would be even lower, even if all of the lead in the EDC/VCM sludges was estimated to partition to groundwater in the modeling (landfill DAF estimated as 5000; maximum well concentration 0.000016-0.00013 mg/l). Given the implausibility of the EDC/VCM sludges causing contamination of a drinking water well under these conservative assumptions, the Agency concluded that although there may be some effect of oxidized iron in the sample on the TCLP results used in the landfill modeling, it does not matter.

Finally, 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 the 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 in the preamble to the final rule, 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). The TCLP leach test was designed specifically to simulate some of the key conditions affecting the leaching of waste constituents in MSW landfills (pH of 5, presence of acetic and other short-chain fatty acids (55 *FR* 11798; March 29, 1990 *Federal Register*). The TCLP test is also specific to the waste, i.e., it evaluates the leaching potential of the specific waste of concern, in this instance EDC/VCM sludges, and considers the potential effects of the waste matrix (Sanchez et al., March 1999) and the chemical form of the waste.

Therefore, 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 concludes that there may be an effect of oxidized lead on the TCLP samples, but there is sufficient uncertainty in this mechanism that the Agency cannot reliably conclude there was a significant effect on the EDC/VCM sludge samples. Since EPA does not believe there would be potential risks from groundwater even under conservative assumptions regarding leaching, the screening analysis performed was quite adequate to conclude that no significant risks would be posed by the lead in the EDC/VCM sludges. The study EPA evaluated regarding effects of iron on the TCLP results did not address chromium, and the Agency did not find additional information to draw any conclusions on this effect.

1.7 EDF Comment

5. EPA assumes daily cover and runoff controls and assumes no leaching will occur until after the landfill is closed.

EPA is assuming in its risk assessment that the landfills are municipal landfills and therefore are covered daily and have runoff and run on controls. This assumption clearly underestimates the risks as none of these waste streams are disposed of in municipal landfills, but rather at on-site landfills or off-site "nonhazardous industrial" landfills. States have widely varying requirements for these units; many do not require cover or runoff control. Thus these assumptions are unsupported in the record.

In addition, in its groundwater modeling, EPA uses a simplifying assumption that leaching doesn't begin until after landfill closure, that is for 30 years. This assumption clearly leads to an underestimate of the risks posed. There is no basis in the rulemaking record, or common sense. to assume that nonhazardous industrial waste landfills - which may be entirely unlined and lack any groundwater monitoring system - will be entirely free from leaks until after closure.

Agency Response:

EPA disagrees that our assumptions regarding daily run on/runoff controls and daily cover are incorrect and that we under-estimated the risks of managing EDC/VCM wastewater treatment sludge in landfills. 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 run on/runoff controls, or in the case of one state, although state regulations do not require these controls, the controls are nonetheless being implemented through operating 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 run on/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 run on and runoff controls. Given that all landfills currently accepting EDC/VCM wastewater treatment sludges currently are applying daily cover and are equipped with run on/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 assumptions made in the risk analysis regarding the landfill scenario were reasonable and representative of actual disposal conditions

EPA also disagrees that our simplifying assumption that contaminant leaching from a landfill does not occur until after the landfill closes (that is, after

30 years) underestimates groundwater risk for EDC/VCM sludges managed in landfills. 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). 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.

1.8 EDF Comment

6. Other deficiencies

Numerous other deficiencies in the risk assessments are described below in these comments in the section specifically entitled Risk Assessment Deficiencies. These additional deficiencies apply equally to the EDC/VCM sludge and are incorporate here by reference.

C. <u>EPA's contingent management approach is inappropriate for EDC/VCM sludges</u>.

One of the main purposes of RCRA, and in particular, the HSWA amendments, is to require treatment of wastes prior to land disposal. Thus, EPA's proposal to allow a waste that the Agency otherwise would list as hazardous (absent the fact that the waste is managed in a landfill) to be land disposed without treatment and in conditions that may result in hazardous constituents leaching from the waste, is clearly not appropriate. As EPA itself often acknowledges, Congress clearly expressed its intent that the Agency not rely on landfilling for long-term environmental protection. In the HSWA Amendments, Congress added as one of the "findings' to RCRA that,

land disposal facilities are not capable of assuring long-term containment of certain hazardous wastes, ... [and][13] reliance on land disposal should be minimized or eliminated.[14]

As a result of this finding, and others, Congress added the land disposal restriction program to RCRA, which significantly restricts land disposal of untreated hazardous waste and provided the mandate in Section 3004(m) that EPA develop treatment standards for "diminishing the toxicity of wastes or substantially reducing the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized." In addition, the legislative history makes clear Congress' view that land disposal without prior treatment of these wastes with significant concentrations of highly persistent, bioaccumulative constituents (such as the dioxins found in EDC/VCM sludges) is not protective of human health and the environment.[15]

EPA has found that treatment of waste under the LDR standards of RCRA significantly reduces potential risks for disposal of wastes. This is particularly true for wastes that are persistent and do not degrade. The EDC/VCM waste stream contains many such constituent of concern, including dioxins/furans and arsenic. Treatment in accordance with a prescribed BDAT can reduce the possibility that leachable constituents are available for release to the environment.

Thus, EPA's contingent management approach relying on landfills for EDC/VCM sludges directly conflict with the Agency's stated position and with Congressional intent that wastes be treated to reduce toxicity of hazardous constituents before final disposal. In light of EPA's predicted risk, standard listing of these sludges is amply justified. A standard listing will ensure applicability of land disposal restrictions which will significantly reduce the threats posed by this sludge.

In developing the land disposal restriction program, Congress expressly rejected the idea that operating controls could substitute for pretreatment of hazardous waste, stating.

The Committee does not intend that the Administrator circumvent the Committee's intent to restrict land disposal by simply imposing additional management conditions on land disposal. … Where land disposal is allowed, the Committee intends the Administrator to require best management practices that include treatment, not just containment or cleanup.[16]

EPA in the current rule is not only proposing landfilling with no prior treatment, EPA is proposing these wastes go to <u>either</u> Subtitle C or Subtitle D landfills -- even though conditions at the latter can. The condition of a given Subtitle D landfill can vary from well-managed with the

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[13] RCRA, Section 1002(b)(7)

[14] <u>Id.</u>

[15] l30 Cong. Rec. S 9178; daily ed. July 25, 1984.

[16] H. Rep. 98-198 Part 1, 98th Congress, 1st Sess. (1983) at 38.

latest liner requirements to an unlined landfill in a sandy soil with unmonitored shallow groundwater. If EPA decides to go forward with this conditional listing despite these arguments and the despite the flaws in the landfill modeling, EPA should at least require this waste go to a Subtitle C landfill. These facilities at least have more sophisticated personnel and equipment, and meet minimum technology requirements, allowing them to handle these wastes more safely than Subtitle D facilities.

In summary, EPA should list EDC/VCM sludges utilizing standard listing. EPA's risk assessment significantly underestimates the risks posed by landfilling these wastes and thus the contingent management approach relying on landfills is not protective of human health and the environment.

Agency Response:

The Agency's risk assessment results show that EDC/VCM wastewater treatment sludges do not present significant risks to human health and the environment if disposed in unlined landfills, without being treated prior to disposal. We therefore do not agree with the commenter regarding the necessity of imposing treatment requirements under RCRA subtitle C, nor do we agree that the RCRA statute requires treatment if the Agency has determined that a waste is not hazardous, as is the case here. Given that the wastes pose no significant risks when disposed in unlined landfills without prior treatment, we see no reason to impose treatment standards.

1.9 EDF Comment

III. OTHER LIST DETERMINATIONS

EPA is proposing to list the following wastestreams. The following paragraphs provide comments addressing each of these proposed list determinations.

A. Chlorinated Aliphatic Wastewaters - K173

EPA proposes to list chlorinated aliphatic wastewaters (K173). EPA specifically requests comment on this proposed listing and on whether there are factors EPA should consider in favor of or opposing this listings.

We strongly support the proposal to list this waste stream. Significant risks posed by the hazardous constituents in this waste mandate listing to protect human health and the environment. Risks posed may actually be greater than predicted by EPA' s risk assessment due to the flaws (outlined below) in its modeling and methodology. Even with these flaws, the

predicted risks clearly justify listing.[17] The numerous constituents in the wastestream, including dioxins and chloroform, pose very significant risks.

The health risks posed by dioxins are assessed in EPA's draft Health Assessment Document for 2,3,7,8 -TCDD and Related Compounds in 1994. (This Assessment has been reviewed by the Science Advisory Board, but has not yet been made final). Dioxins are a probable human carcinogen; in animal testing, TCDD is one of the most potent carcinogens ever evaluated. Non carcinogenic effects have also been reported. Some studies suggest evidence of immunotoxicity, such as alteration in lymphocyte populations; cell surface markers or lymphocyte proliferative response. There is also evidence of reproductive and developmental effects from exposure to dioxins. Other studies provide evidence of further health impacts.[18]

Health risks from chloroform are well document.[19] Chloroform is a recognized human carcinogen. It is 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. It 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.[20]

Agency Response:

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

Two specific issues raised by the commenter need to be addressed. First, with respect to the footnote stating that EPA inappropriately used the 80^{th} percentile as a high end risk estimate, the actual results from the Risk Assessment Technical Background Document (USEPA, 1999) are that the high end risk estimate used ($2 \times 10^{-5)}$ was between the 80^{th} percentile (1×10^{-5}) and the 90^{th} percentile on the proabilistic risk distribution. Also, as noted in the Addendum to the Risk Assessment Technical Background Document (USEPA, 2000), we

[17] For example, it is inappropriate for EPA to use the 80% percentile in its high end risk analysis as EPA did for these waste. 64 Fed. Reg. 46489. According to EPA's policy and past practice, EPA is to consider exposure above the 90th percentile for high end risk analysis.

[18] For further information, see EPA's Draft Dioxin Reassessment

[19] See EDF's Scorecard, www. scorecard.org, on chloroform. Scorecard incorporates governmental and other authoritative information on chemicals, including their known and suspected health effects.

[20] Id.

believe that the probabilistic risk estimates are too high, meaning that the 90th percentile of the actual distribution is likely to be below 5 x 10^{-5}.

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) 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.

Second, while EPA acknowledges the commenter's concerns regarding chloroform's adverse health effects the Agency also agrees with a different commenter who, based on evaluations conducted by EPA's Office of Water (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.

The Agency has concluded 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 x 10^{-5}. The Agency therefore is finalizing a decision to not list chlorinated aliphatic wastewaters as hazardous waste.

1.10 EDF Comment

EPA is clearly justified in listing this waste stream. Standard listing for this waste is clearly the mechanism to use to reduce the threats posed by this waste stream.

1. Tank Air Emission rules

EPA is also applauded for its proposal to require air emission control requirements for tanks used to manage chlorinated aliphatic wastewaters. Clearly, these air emission controls for these tanks are necessary to address the very significant risks posed by air emissions from these tanks. One of the principal findings in EPA's recently revise Air Characteristics Study is that, of the many

waste management practices evaluated, the highest risk for inhalation of hazardous constituents is presented by aerated treatment tanks.

Aeration increases the potential for a chemical to be emitted to the air, which results in a higher emission rate per unit area for these tanks relative to other units. We urge EPA to finalize this rulemaking with controls for these units. However, we urge EPA to also address the following concerns with the dioxins concentration limit and implementation of these standards.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

1.11 EDF Comment

(a.) EPA's proposed dioxins concentration limit to trigger air emission control rules is not protective of human health or the environment and should instead be set at a 10-6 risk level (or lower if warranted by noncancer effects).

EPA proposes a concentration limit of 1 ng/L TCDD TEQ in wastewater to trigger the application of the tank standards of Subpart CC. EPA states that this concentration limit was calculate based on the deterministic risk estimate of 1 x 10-5. For the reasons stated below, this risk target level is not sufficiently protective or appropriate for these wastes but rather should be set at 1 x 10-6. In addition, other assumptions underlying the risk assessment upon which the concentration based limit was set were also flawed (as further outlined below in these comments).

First, a risk target level of 1 x 10-5 is not consistent with HWIR approach. In the most recent proposed HWIR waste rulemaking, the Agency stated that it believes that risk targets - i.e., values that are used in calculating waste concentrations at which wastes will no longer be considered hazardous - must minimize threats to human health and the environment. In calculating waste concentration exit levels in the recent HWIR proposal, EPA uses a cancer risk target of one-per-million (1 x 10-6). Here the goals are the same - if emissions under the concentration level are not to be subject to Subtitle C regulation, the Agency must assure that the materials are well below hazardous levels.[21]

[21] The use of 1 x *10-5* will most likely end up with risk-based concentration levels set inconsistently with any future HWIR exit levels.

Secondly, a risk target level of 1 x 10-5 is clearly not appropriate when risks are not assessed combining constituents. Under such circumstances, EPA's listing policy directed EPA to be more protective and thus EPA should use a risk target level of 1 x 10-6. In the instant case, dioxins are not the only constituents of concern found in this waste stream. There are the other constituents of great concern including chloroform. EPA does not address whether the concentration limit for dioxins is protective for chloroform or for any other hazardous constituents in the waste. EPA's failure to consider these other potential emissions and the additive risks of these constituents increases the uncertainties and is a another reason that a target risk level of 1 x 10-5 is not an appropriate risk target. EPA's listing policy states that the Agency is to consider unknown or unquantified risk in setting its target risk level, but has failed to do so in setting this concentration limit.

Non-cancer endpoints for dioxins should also be considered for adults and for breast feeding infants. A trigger level based on non-cancer endpoints may be higher than the cancer-based trigger level, but this should not be assumed. A trigger level for non-cancer endpoints should be approximated and considered.

Agency Response:

First, the comments specifically addressing the proposed 1 ng/L wastewater dioxin concentration as a mechanism to "trigger" application of the proposed subpart CC requirements are moot because, as mentioned above, EPA is not finalizing the proposed listing of chlorinated aliphatic wastewaters. Because EPA is not listing this wastestream, the Agency is not finalizing the proposed amendments to the wastewater treatment unit exemption, or the proposed amendments to the Subpart CC requirements.

However, as explained in the preamble to the proposed chlorinated aliphatics rule, in setting the dioxin concentration trigger level for chlorinated aliphatic wastewaters, EPA chose to base the TCDD TEQ limit on the lowest TCDD TEQ concentration measured in a dedicated wastewater sample for which a high-end deterministic risk estimate was 1×10^{-5}. Setting the regulatory trigger level for the proposed tank cover and air emissions standards to correspond with a 1×10^{-5} risk estimate is consistent with the Agency's established listing policy.

The EPA disagrees that a risk target level of 1E-5 for cancer risk is not consistent with the HWIR waste approach recently re-proposed (November 19, 1999 *Federal Register*; 64 FR 63382), and notes that the HWIR rule is still a proposed rule at this time. In the November 19, 1999 HWIR proposed rule, EPA clearly explained how the proposed HWIR approach regarding the consideration of cancer risk in setting exit criteria is consistent with the Agency's current approach to hazardous waste listings. EPA stated that the Agency "generally sets regulations at risk levels between 1E-6 and 1E-4 (in other words, from one in a million to one in ten thousand increased chance of developing cancer during a lifetime). In the RCRA hazardous waste listing program, a 1E-6 risk is usually the presumptive "no list" level, while 1E-5 is often used to determine which wastes are considered initial candidates for listing (see, for example, the

petroleum listing at 63 FR 42117). For HWIR, we would evaluate the exemption levels that result from both the 1E-6 and the 1E-5 risk levels." (64 *FR* at 63440). EPA went on to state in the HWIR re-proposal that because it would be inconsistent to establish exit criteria less stringent that the criteria used for identifying hazardous wastes (e.g., in the listing program), the cancer risk level used in setting HWIR exit levels would not be higher than 1E-5. The fact that EPA is requesting comment in that re-proposal on options that include exit levels based upon a 1E-6 cancer risk level, for a proposed system of exiting wastes from Subtitle C, is not inconsistent with the listing approach used in the final chlorinated aliphatics rule.

Returning to the commenter's concerns about the 1 ng/L trigger level, EPA notes that the lead option proposed by EPA for chlorinated aliphatic wastewaters was a 'standard' listing (*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 the final rule 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[22]) for the contaminant. EPA has not established RfDs for any of the dioxin or furan congeners (USEPA, 1994[23]). EPA is awaiting the finalization of the *Draft Dioxin 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

[22]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.

[23]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.

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, 2000a).

1.12 EDF Comment

(b.) Assuming EPA finalizes the rule with the concentration limit trigger, EPA should require submission of test plans and results.

EPA has proposed a self-implementing program under which generators will be in charge of determining when, how and what to test, with no public or government review of testing plans (or test data) before the concentration-based limit takes effect, and thus exempts the tanks from emission controls. This invites not only outright fraud by bad actors, but honest errors by generators who may make mistakes in resolving these complex technical issues. At the very least, generators should be required to submit data demonstrating that the concentration limit is met to the relevant authority and there should be a waiting period between submission of the data and prior to the uncontrolled venting of tank emissions.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

1.13 EDF Comment

(c.) Technical Standards of Subpart CC to the Instant waste

EPA proposes that the tank standards of Subpart CC apply to tanks managing chlorinated aliphatics wastes. While EPA should apply tank management standards to the tanks managing chlorinated waste, the Subpart CC standards must be appropriately examined and modified to address the risks posed by emissions from these tanks and to ensure the standards protect human health and the environment.

Specifically, the proposal states that the tank standards shall apply "as appropriate." This may lead to enforcement officials having to demonstrate a particular tank specification is "appropriate," inviting endless debate over a regulatory term. EPA should simply provide that the Subpart CC standards "apply" to this listing.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

1.14 EDF Comment

2. EPA fails to consider air emissions pathway from storage of these wastes.

In its risk assessment, EPA fails to consider other air emissions from these wastes. Perhaps most importantly, EPA did not consider or analyze risk posed by air emissions in the storing of these materials prior to placing these materials in the tanks. While such analysis is not needed if EPA finalizes its proposal to use a standard listing mechanism for K173, EPA must undertake such an analysis if is decides not to do so (i.e., if EPA adopts a concentration-based listing).

Agency Response:

EPA is not exactly sure what particular type of "storage prior to placing these materials in the tanks" to which the commenter is referring, but we presume 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 §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 §3007 questionnaire, such tanks may be used to manage relatively large quantities of chlorinated aliphatic wastewaters, and often are not covered and are aerated.

1.15 EDF Comment

3. Use of concentration-based listing instead of standard listing for K173 would be inappropriate.

On page 64 Fed. Reg. 46504, EPA requests comment on the alternative of using the concentration-based trigger proposed for applicability of the tank air emission rules as a criteria for listing itself. EPA suggests that instead of a standard listing for this waste, EPA could finalize a concentration-based listing based on the 1 ng/L trigger level. For the many of the reasons stated in EDF's comments filed on the July 23 1999 dye and pigment industry listing determination proposal (incorporated by reference here), as summarized briefly below. EPA should not finalize a concentration-based listing for this wastestream.[24]

As an administrative matter, EPA does not provide enough information on this proposal to be considered adequate notice of what EPA is proposing.

EPA does not advance any rationale for this alternative proposal. This leaves the public to guess possible rationales. In the past, EPA has advanced the notion that concentration-based listing will avoid unnecessary regulation of materials that are not hazardous. There is no information in the docket indicating these wastes do not pose hazards in concentrations below the level provided, particularly in light of the deficiencies in the risk assessment noted in these comments. Although it may be true that a standard listing could encompass some wastes that would not be hazardous under a concentration-based listing, the advantages of standard listing far outweigh the risk of over-inclusiveness. Standard listing ensures that wastes that are in fact hazardous do not exit the regulated system as a result of listing by concentration-based listing mechanism. EPA should not compromise human health and the environment merely to allow a greater amount of waste to avoid Subtitle C status.

[24] These comments are available at RCRA Docket No. F-1999-DPIP-FFFFF.

One of the advantages of the standard listing mechanism for identifying hazardous waste is in its ease of implementation, and in particular the clarity of compliance and enforcement. Applying concentration-based listing would create needless confusion for a generator's monitoring its own compliance and creates an extra need for agency oversight. The principal advantage of a listing is removed by concentration-based listing. By using the standard listing EPA is proposing for this waste streams, EPA minimizes confusion, thereby strengthening the ability of the industry to ensure its own compliance and thus increasing public confidence.

Standard listing of these wastestreams would also help EPA and state enforcement programs, thus increasing protection. With concentration-based listing, inspections and sampling by enforcement personnel are critical components for assessing a validity of a generator's determination of whether its wastes are listed. States have widely differing capabilities to manage hazardous waste programs. Some states have well developed programs while others are less so. As stated above, EPA should use a standard listing for this wastestream to ease its own and states' enforcement efforts.

Finally, standard listing creates unrivaled incentives for pollution prevention (P2). Numerous case studies show that traditional environmental regulatory programs, such as RCRA's listing program, create powerful P2 incentives leading to volume reduction and source reduction.[25]

For all the above reasons, EPA should finalize this rulemaking by using the standard listing proposed for this wastestream.

Agency Response:

Given that EPA's revised risk assessment for chlorinated aliphatic wastewaters managed in aerated biological treatment tanks indicates that these wastes pose no significant risks to human health or the environment, the Agency is not finalizing the proposed listing for chlorinated aliphatic wastewaters. Although EPA believes that a concentration-based listing approach is appropriate for some wastestreams, the commenter's concerns regarding the disadvantages of establishing a concentration-based listing approach for chlorinated aliphatic wastewaters is rendered moot by EPA's finding that the wastes do not pose significant risks and therefore do not warrant being listed as hazardous waste.

1.16 EDF Comment

B. VCM-A Wastewater treatment sludges- K175

EPA is proposing two alternative options for listing as hazardous wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-

[25] 5ee US EPA's Draft "Study of Industry Motivation for Pollution Prevention", Office of Pollution Prevention, April 1997. Dorfman, Mark, et al, Environmental Dividends: Cutting More Chemical Wastes, INFORM, 1992. "Evaluation Progress: A Report on the Findings of the Massachusetts Toxics Use Reduction Program Evaluation", prepared by the Massachusetts Toxics Use Reduction Program, March, 1997.

based process (VCM-A sludges). The alternative listing option is to list the VCM-A sludges as hazardous unless the waste is disposed in a Subtitle C landfill. In addition, VCM-A sludges that exhibit the toxicity characteristic of mercury will be listed. For the reasons outlined below, EPA should list this waste stream using the standard listing mechanism rather than using the conditional listing, as the latter is not protective of human health and the environment. The listing of this waste if it exhibits toxicity characteristics is appropriate. We note, however, that the problems EPA identifies with the toxicity characteristic for mercury are broader than just the instant listing: EPA should promptly begin a separate rulemaking to address the issue for all mercury wastes potentially affected.

1. Listing of VCM-A sludges is clearly justified.

This wastestream clearly poses risks to human health and the environment and thus should be listed. Despite the very high concentration of mercury found in sampling of this waste stream, EPA did not do a risk assessment for this waste stream but rather relied upon previously conducted modeling and risk analysis done to support the Hazardous Waste Identification Rule (60 Fed. Reg. 66344, December 21, 1995). While that assessment plainly suffices to support a listing determination, it should be noted that this risk assessment was flawed in many respects, in ways that understate the risks. Those flaws were discussed in comments submitted to the docket of that rulemaking and are incorporated by reference here.[26] As a result, risks posed by these sludges are likely to be greater than predicted by EPA's risk assessment. Even with these flaws, EPA is clearly justified in listing these wastes based on the predicted risks.

Information beyond the HWIR risk assessment further supports listing of K173. The hazardous constituents in the wastestream are numerous; including mercury. Mercury is a widely recognized toxin; its toxicity has been extensively documented.[27] Mercury has been identified by many governmental agencies as a significant human toxicant with serious potential health effects when exposure occurs. In addition, it is well documented that mercury is persistent in the environment, does not degrade and bioaccumulates in wildlife, particularly fish.[28] Mercury is one of the Agency's priorities in its Agency-Wide Multimedia Strategy for Priority PBT Pollutants.[29] EPA is clearly justified in unconditionally listing this wastestream given its significant concentrations of mercury.

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[26] 5ee comments filed by the Environmental Defense Fund and those filed by the Environmental Technology Council in that rulemaking for a full explanation of the significant flaws in that assessment. Comments are found in docket no. F-95-WHWP-FFFFF-.

[27] 5ee EDF's scorecard, at www.scorecard.org for information regarding the toxicity of mercury.

[28] See EPA's December 1997 study of mercury, Mercury Study Report to Congress, EPA-452-R-97-003-009 and its Action Plan for Mercury at www.epa.gov/ttnuatwl/ 112nmerc/mercury.html.

[29] A Multimedia Strategy for Priority Persistent, Bioaccumulative, and .Toxic Pollutants, November 16, 1998, EPA 742/D98/001, www.epa.gov/opptintr/pbt/pbtstrat.htm.

Agency Response:

The Agency acknowledges the commenter's support for the proposed listing determination for wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM-A). This waste stream 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 is finalizing a traditional listing approach for this wastestream. After reviewing the record and comments received in response to the proposed rule, we remain convinced that the disposal of this waste in an untreated form in a subtitle C landfill, even after taking into account landfill controls, can pose significant risk.

With regard to the commenter's suggestion that EPA begin a separate rulemaking to address the leachability issues related to other mercury wastes, we point out that the Agency recently published a Notice of Data Availability (64 *FR* 28949) notifying the public of EPA's consideration of publishing a proposed rule to revise the land disposal restrictions treatment standards for mercury-bearing hazardous wastes as well as provide notice of various options, issues, and data needs related to potential mercury treatment standard revisions. In addition, EPA has established an Agency-wide taskforce that is developing an Agency Mercury Action Plan. The Action Plan includes a number of key activities, including efforts to identify permanent stabilization and disposal options for mercury wastes, potential development of additional MACT rules for hazardous waste combustors, various waste minimization activities, and potential efforts to update the Toxicity Characteristic. The commenter's concerns may be addressed within the context of these Agency efforts.

1.17 EDF Comment

2. Conditional listing relying on land filling is unreasonable and not protective of human health and the environment and is contrary to EPA's acknowledgment that landfilling these wastes poses substantial hazards.

EPA's conditional listing unless the waste is disposed of in a Subtitle C landfill is flawed, unreasonable and not protective of human health and the environment. For the reasons stated below, EPA should list this wastestream without condition.

EPA explicitly recognizes the risks posed by landfilling these very waste in the instant rulemaking. EPA states that it believes that even when disposed of in a landfill that is compliant with Subtitle C landfill standards, this waste is likely to leach significant quantities and concentrations of mercury which would cause unacceptable release of mercury into groundwater

and has the potential to rose a substantial hazard.[30] Given this EPA finding, it makes no sense for EPA to propose as an alternative option that this waste be landfilled.

As EPA itself states, even Subtitle C landfilling of this waste (in its untreated condition) is clearly unsafe considering the inherent limitations in liner/leachate collection systems which EPA so clearly points out in this and other rulemakings. As again discussed earlier in these comments, such systems are expected to degrade over time and thus will cease to operate as the only guard against mercury contamination of the groundwater.

EPA's alternative conditional listing makes no sense in light of the Agency's risk assessment and evaluation of the risks posed by landfilling this waste. EPA should, based clearly on its risk assessment and the criteria for listing, and on its statement that landfilling of this waste poses substantial hazards, finalize a standard listing of this waste.

Agency Response:

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 waste stream 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.

EPA is 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.

1.18 EDF Comment

IV. RISK ASSESSMENT DEFICIENCIES

Due to a series of inadequate assumptions and methodological flaws, EPA's risk assessments substantially understate the risks posed by the chlorinated aliphatic wastes considered in this rulemaking. In many cases, the assumptions and methods are inconsistent with previous Agency actions in RCRA or other programs, and/or lack evidentiary support of any kind. Some of these deficiencies are described above in these comments in the section concerning EDC/VCM sludges. The following section describes additional flaws and issues of concern.

[30] 64 Fed. Reg. 46511-46512 (August *25,* 1999).

A. Possible Constituents of Concern

In the instant rulemaking, EPA's choice of constituents considered is too limited and possible constituents were removed from consideration without sufficient reasons. Given the potential for the constituents in the wastestreams to cause both cancer and non cancer risks of grave concern, EPA should include rather than exclude any constituents of potential concern.

In its risk assessment, EPA found that certain constituents present in K173, K174, and K175 pose unacceptable risks to human health and the environment. EPA proposed the following constituents to be included as the basis for listing these wastes (i.e., proposed for inclusion in 40 CFR Appendix VII):

K173 and K174 (the same constituents are used as the basis for listing for each waste: 1,2,3,4,6,7 ,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7 ,8-HpCDD), 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), 1,2,3,4,6,7,8, 9-Octachlorodibenzo-p-dioxin (OCDD) 1,2,3,4,6,7,8, 9-Octachlorodibenzofuran (OCDF) PeCDDs (All Pentachlorodibenzo-p-dioxins), PeCDFs (All Pentachlorodibenzofurans), TCDDs (All tetrachlorodibenzo-p-dioxins), TCDFs (All tetrachlorodibenzofurans).

K175: Mercury.

Agency Response:

EPA disagrees that the list of constituents considered in the risk assessment was too limited. The Agency is confident that all constituents of potential concern in each of the chlorinated aliphatic wastes studied were identified and that no constituents were eliminated from our analysis without sufficient reason. EPA developed a list of constituents of potential concern (COPCs) by first compiling a complete list of constituents detected in the waste samples collected and analyzed as a result of facility site visits. We then eliminated constituents from the list that occurred at concentrations that were clearly below levels of concern, based on screening analyses developed to maximize risk estimates (*i.e.,* bounding analyses using worst case exposure assumptions).

In the case of chlorinated aliphatic wastewaters and EDC/VCM wastewater treatment sludge, we also eliminated constituents from the list of COPCs if a constituent was detected in only one of the samples and the concentration of the constituent in the one sample was qualified with the "J" qualifier, indicating that the constituent was detected below the quantitation limit and the reported value was estimated. As stated in the proposed listing determination for the wastes from the dyes and pigments industry (59 FR 66072), EPA's policy is to consider constituent concentration "J values" in its analyses supporting listing determinations within the overall context of the Agency's weight-of-evidence approach. However, the Agency also considers the uncertainty associated with waste characterization and constituent concentration

measurements that are below the quantitation level and assesses the potential impact of such uncertainties on the listing decision. In the case of the chlorinated aliphatic listing determination, the Agency only eliminated a constituent "detected" in a waste in cases where the Agency had multiple samples of the waste and a constituent was detected in only one of the samples (and not detected in the other samples) *and* the concentration of the constituent in the one sample was qualified with the "J" qualifier, indicating that the constituent in the one sample was detected at a concentration below the quantitation limit. Given the uncertainty associated with the detection (and potential presence) of such constituents in our waste characterization, EPA believes that it is reasonable to drop such constituents from consideration, and not retain the constituent represented by a single "J" qualifier in our risk assessment.

In cases where the Agency had only one sample of a particular waste (*e.g.,*methyl chloride wastewater treatment sludges), all of the constituents detected in the sample, including those constituents where the concentration of the constituent was qualified with the "J" qualifier, were retained in the risk analysis. These constituents only were eliminated from the list of COPC if the constituents occurred at concentrations that were clearly below levels of concern, based on the screening analyses developed to maximize risk estimates (*i.e.,* bounding analyses using worst case exposure assumptions).

1.19 EDF Comment

Additionally, for K174, EPA found risks for arsenic that were within its discretionary range for using the constituent as a basis for listing. Yet, despite this finding, EPA is not proposing to include arsenic as a basis for listing this waste. Beyond the immediate implications in the instant rulemaking, EPA is urged to consider very cautiously the constituents upon which a listing is based. It is possible EPA will in the future base HWIR exit level exemptions on the constituents which were the basis of a listing. Thus, the failure to include a constituent of concern as the basis of listing, such as arsenic which fit within EPA's listing criteria, could have major implications.

Agency Response:

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 (arsenic was not eliminated from our list of COPCs prior to risk analysis). 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 unlined landfill would result in an increase in the concentration of arsenic in groundwater in a downgradient well (102 meters from the landfill) by only 1.4 ug/L and would add

approximately 2 ug/day of arsenic to the average daily exposure level (about 20 ug/day) for the highly exposed individual.

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 concentration of 1.0 ppb found in groundwater in Texas and Louisiana.[31] The predicted high-end 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

[31]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-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.

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.

With regard to the commenter's concern that EPA may in the future base HWIR exit levels for a particular waste only on the list of constituents for which the waste was listed as hazardous, we point out that the most recently published discussion of the Agency's position regarding for which chemicals a waste would have to be analyzed to obtain an HWIR exemption, includes "all chemicals reasonably expected to be present." As explained in the November 19, 1999 *Federal Register* notice (see 64 *FR* 63397), this list of chemicals may include chemicals detected in any previous analysis of the waste, chemicals known to result from side reactions or are byproducts, chemicals introduced into the process that generates the waste, and chemicals listed in 40 CFR 268.40, *as well as* chemicals identified as the basis for listing a waste. Therefore, even though EPA is not listing EDC/VCM wastewater treatment sludges on the basis of the presence of arsenic in the waste, generators seeking an exemption for their sludges under a future HWIR regulatory scheme most likely will have to test the sludge for arsenic, and demonstrate that the arsenic concentration levels are lower than the HWIR exit level.

1.20 EDF Comment

Also, the elimination of arsenic in the constituent of potential concern (COPC) selection for the groundwater pathway for methyl chloride sludge does not seem consistent with COPC selection for other compounds in the groundwater pathway. The estimated risk of 5 x 10-5 for arsenic screening is 50 times above the screening level of 1 x 10-6. Thus, arsenic should remain a COPC in groundwater and the groundwater pathway should be evaluated.

Agency Response:

EPA disagrees that the approach taken to estimate arsenic risk via the groundwater pathway for methyl chloride sludge, by using a bounding estimate, requires EPA to model the groundwater pathway with arsenic as a COPC. As discussed in the preamble to proposed rule (64 *FR* 46516), EPA conducted a bounding (*i.e.*, worst case) risk analysis to estimate potential risks from methyl chloride wastewater treatment sludges to groundwater consumers. This analysis used the leachate concentration measured from a sample of the facility's methyl chloride wastewater treatment sludge, and assumed the direct ingestion of this leachate by an adult for a period of 58 years. This bounding analysis resulted in a

risk of 5E-5 for one constituent, arsenic. The Agency views this risk level as marginal, given the assumptions made in the bounding risk analysis. In particular, the Agency assumed that an adult receptor would drink leachate generated from the disposal of the methyl chloride wastewater treatment sludges. Additionally, we assumed the adult receptor would continue to drink the leachate for 58 years. Given that the Agency's assumptions were worst case, and nonetheless resulted in an estimate of relatively low potential risk, the Agency determined that there is no significant risk on which to base a decision to list the waste as hazardous.

EPA's policy for listing wastes as hazardous (as outlined in the in 1994 Dyes and Pigments proposal, 59 *FR* 66077) is that wastestreams with risks above 1E-4 are presumptively assumed to pose sufficient risk to require their listing as hazardous waste. Wastestreams with risks below 1E-6 are considered not to pose a substantial present or potential hazard to human health and the environment and therefore generally are not listed as hazardous wastes. Wastestreams with risks in the range of 1E-6 to 1E-4 are evaluated on the basis of a variety of 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 such as certainty, coverage by other regulatory programs, and waste volume.

EPA views the arsenic risk results from the worst-case bounding analysis as marginal, particularly given the assumptions used in conducting the risk analysis (*i.e.,* a person directly ingesting leachate over a period of 58 years). If the Agency assumes a less direct pathway of ingestion (*i.e.,* a person drinks ground water contaminated with leachate), using a DAF of 5 (which would be a reasonable assumption for an *un*lined landfill), the predicted risk becomes 1E-5. However, the Agency determined that assuming a DAF of 5 is 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.

In our assessment of risk from the EDC/VCM wastewater treatment sludge, arsenic was an initial constituent of potential concern. To support our analysis of potential risks from the landfilling of EDC/VCM wastewater treatment sludges, we modeled arsenic releases and obtained estimates of DAFs for arsenic (assuming an *un*lined landfill). That analysis resulted in a DAF of 13 for the high-end risk estimate, and a DAF of 93 for the central tendency estimate. Of course, the actual DAF could be higher than these estimates, given that the landfill in which the methyl chloride sludge is disposed is lined. However, applying a DAF of 13 for arsenic potentially released from an unlined landfill, the potential risk associated with arsenic in the waste is well below the range in which the Agency would deem the risk to be significant.

Given the marginal level of risk associated with a worst-case bounding analysis of risk that assumed direct ingestion of leachate derived from this wastestream, as well as the relatively small volume of the waste that is generated by a single facility, EPA is finalizing a no list determination for wastewater treatment sludges from the production of methyl chloride.

1.21 EDF Comment

It is not clear why some other compounds were eliminated in the COPC selection. The constituents found in the samples taken from these six wastestreams contained numerous compounds of concern. Specifically, the samples showed 141 constituents of concern but EPA only assessed the risks from 86.[32] As an initial matter, it is not clear which compounds were analyzed for in the samples of the wastewaters and sludges. EPA should present all of the data so that the public can see which compounds were analyzed for even if there were only non-detects. In addition, the risk analysis was based on a limited set of samples. It is very possible that this data does not represent the true distribution of contaminant concentrations or the presence of contaminants in the wastestreams. For example, for the four sludge wastestreams, EPA based its analysis on only 11 samples; for methyl chloride (a no-list determination), EPA based its analysis on only 1 sample.

Agency Response:

EPA analyzed all wastewater and sludge samples for the list of target analytes which were identified in several places in the proposed rulemaking record, including the Quality Assurance Project Plan (QAPP) for this listing effort. EPA presented all sampling and analysis data for public review and comment in the rulemaking record, and information on how to obtain and review the data was provided at the beginning of the August 25, 1999 *Federal Register* notice. The QAPP for the listing determination includes the Agency's data quality objectives, sampling objectives, lists of target analytes, and a summary of the analytical methods used for analyzing collected samples. Also included in the rulemaking docket and available for public review and comment were the Engineering Site Visit Reports and the Sampling and Analysis Plans for each of the facility visits conducted by the Agency, including all sampling visits made in support of the rulemaking. All analytical data also was presented in the rulemaking docket in the form of Analytical Data Reports for all samples collected and analyzed, and in the Listing Background Document.

The Agency is confident that all constituents of potential concern in each of the chlorinated aliphatic wastes studied were identified and that no constituents were eliminated from our analysis without sufficient reason. As explained above

[32] EPA's sampling showed 69 constituents of concern in the chlorinated aliphatics wastewater and EPA eliminated 28; for EDC/VCM sludges, the sampling showed 53 and EPA eliminated 16; for methyl chloride, the sampling showed 19 and EPA eliminated 11.

and in the background documents placed in the public docket for the proposed rulemaking, EPA developed a list of constituents of potential concern (COPCs) by first compiling a complete list of constituents detected in the waste samples collected and analyzed as a result of facility site visits. EPA developed the COPC list by taking the complete list of detected constituents and removing the following constituents: 1) constituent groups (for example, TOC, oil and grease, total PeCDF); 2) for chlorinated aliphatics wastewaters and EDC/VCM sludges, constituents which were detected in only one of the samples, and the constituent concentration in that sample was an estimated ("J") value; 3) constituents that are essential nutrients and only pose risk at very high concentrations; 4) for evaluations of risks or hazards that result from the emission of vapors into the air (the air vapor pathway), we excluded all metals, except mercury; 5) for evaluations of risks or hazards that result from release of contaminants to groundwater (the groundwater pathway), we excluded constituents that occurred at concentrations that were clearly below levels of concern, based on screening analyses developed to predict the risk or hazard associated with drinking the "leachate" from the waste. A complete discussion of method for eliminating COPCs from the list of detected compounds is provided in Section 2.3 of the 1999 Risk Assessment TBD.

Regarding the commenter's statement suggesting that the Agency relied on an inappropriately limited number of samples in the analysis supporting each listing determination, EPA believes that the sampling program provided representative information from each waste grouping under review, and that the criteria used to select samples for use in the risk assessment was also appropriate for this evaluation. Please see the Agency's responses to comments below in Sections 2.1 and 2.2 in this Response to Comment document for more explanation.

1.22 EDF Comment

The rationalizations EPA puts forward for removing many of the constituents from the initial list are very general for many compounds. This is especially true for the groundwater pathway for EDC/VCM sludge in the landfill. There are a number of compounds detected in EDC/VCM sludge that were eliminated for this pathway with no explanation. Similarly, vinyl chloride is a constituent in a number of these waste streams. In EPA' s recent Revised Risk Assessment for the Air Characteristic Study, EPA ranks vinyl chloride as in the top ten of chemicals posing the greatest risk across all waste management unit types.[33] Yet, EPA did not consider this constituent in its risk assessment and did not specifically state why the concentrations present in the samples were not of concern.

[33] U5 EPA's Revised Risk Assessment for the Air Characteristic Study, August 1999, Volume 1, page 4-5.

In addition, several metals of concern were found in these waste streams yet were not assessed in any risk assessment. These include nickel, barium, magnesium, manganese, lead, and copper. EPA should assess the risks posed by these metals or at least provide appropriate reasons for not doing so.

Agency Response:

Rationale for Removing Constituents from the Initial List of Detected Constituents – Development of the List of COPCs

EPA's rationale for removing contaminants from the list of COPCs is stated very explicitly in both the preamble to the proposed rule and in the Risk Assessment Technical Background Document for the proposed rule:

"Based on the results of the analysis of waste samples and the evaluation of the contaminant exposure scenarios, EPA developed a list of "constituents of potential concern" (COPCs) for the chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges. The COPCs, presented in Table 2-8 [of the 1999 Risk Assessment Technical Background Document], are the constituents which were the subject of EPA's risk analysis. EPA developed the COPC list by taking the complete list of detected constituents and removing the following constituents:

- Constituent groups (for example, TOC, oil and grease, total PeCDF).
- For chlorinated aliphatics wastewaters and EDC/VCM sludges, constituents which were detected in only one of the samples, and the constituent concentration in that sample was an estimated ("J") value.
- Constituents that are essential nutrients and only pose risk at very high concentrations (that is, calcium, iron, magnesium, manganese [*see discussion of manganese, below], potassium, and sodium).
- For evaluations of risks or hazards that result from the emission of vapors into the air (the air vapor pathway), we excluded all metals, except mercury, from the COPC list. We excluded metals from the evaluation of air vapor pathway risks because metals, with the exception of mercury, are not volatile at ambient temperatures. Metals that we eliminated from the COPC list for the air vapor pathway were retained on the COPC list for the other pathways.
- For evaluations of risks or hazards that result from release of contaminants to groundwater (the groundwater pathway), we excluded all constituents which pass a screening analysis that predicts the risk associated with drinking the "leachate" from the waste. We describe the screening analysis in more detail below. Any constituents that we eliminated from the COPC list for the groundwater pathway were retained on the list for the other pathways.

To determine if we could eliminate constituents from evaluation for groundwater pathway risks, we conducted a screening analysis that maximizes risk or hazard from the direct ingestion of waste leachate. We conducted this screening analysis as follows:

- For carcinogens, we calculated the carcinogenic risk for a 70 kilogram (kg) adult who ingests 1.4 liters/day (L/day) of waste leachate 350 days/year for 58.4 years. 70 kg is the generally accepted mean body weight for an adult; 1.4 L/day is the mean drinking water ingestion rate for an adult; 350 days/year, which accounts

for the receptor being elsewhere on vacation for 2 weeks/year, is the exposure frequency; and 58.4 years is the 95th percentile exposure duration for farmers (U.S.EPA 1997a,b,c).

- For noncarcinogens, we calculated non-cancer hazard quotients (HQs) for a 21.4 kg child who ingests 0.74 L/day of waste leachate 350 days per year for 9 years. 21.4 kg is the mean body weight for children 1 to 10 years in age; 0.74 L/day is the mean drinking water ingestion rate for 1 to 10 year old children; 350 days/year, which accounts for the receptor being elsewhere on vacation for 2 weeks/year, is the exposure frequency; and 9 years represents an exposure duration for a child whose exposure begins at age 1 and ends at age 10 (U.S.EPA 1997a,b,c).

We retained in our groundwater pathway analysis all constituents for which the adult's carcinogenic risk exceeded $1x10^{-6}$ or for which the child's HQ exceeded 1. For the landfill waste management scenarios, the leachate concentrations we evaluated for the screening analysis are the maximum detected TCLP concentrations. EPA developed the TCLP analysis to simulate the concentrations of contaminants in municipal landfill leachate. For the land treatment unit waste management scenario, we predicted the leachate concentrations using a waste partitioning analysis that is described in Section 3.1 [of the 1999 Risk Assessment Technical Background Document]. The results of the groundwater pathway screening analysis are presented in Appendix B [of the 1999 Risk Assessment Technical Background Document]. Some of the sample data for three of the TCLP constituents in EDC/VCM sludges were qualified with the "B" qualifier, indicating that these constituents also were detected in sample blanks (Section 2.1.3 [of the 1999 Risk Assessment Technical Background Document). The constituents that carried the "B" qualifiers were acetone, 4-methyl-2-pentanone, and methylene chloride. Acetone and 4-methyl-2-pentanone were screened out of the groundwater pathway analysis. The two samples with the highest methylene chloride concentrations were not "B"-qualified (Table 2-2 [of the 1999 Risk Assessment Technical Background Document]), therefore, we retained the "B"-qualified data in the analysis as they were reported." (p. **2-39 through 2-45**, 1999 Risk Assessment Technical Background Document)

For each detected contaminant that was eliminated from the list of COPCs, EPA provided a rationale. Because the commenter did not state which of "the rationalizations EPA puts forward" they felt were "very general," it is difficult to provide additional explanation other than what was provided in the 1999 Risk Assessment Technical Background Document. Nevertheless, below we provide additional explanation of how the contaminants specifically questioned by the commenter were evaluated in the risk assessments conducted for EDC/VCM sludge, chlorinated aliphatics wastewater, and methyl chloride sludge.

Vinyl Chloride

The commenter contends that EPA "did not specifically state why the concentrations [of vinyl chloride] present in the samples were not of concern." On the contrary, the text on pages 2-29 through 2-45, as well as Table 2-8 provides the Agency's specific reasons for eliminating vinyl chloride from the risk assessment. In fact, vinyl chloride inadvertently was retained in three of the Agency's analyses, even though the Agency provided adequate justification for screening it out. Specifically,

- Vinyl chloride was not detected in dedicated chlorinated aliphatics wastewaters.
- Vinyl chloride was not detected in TCLP analyses of dedicated EDC/VCM sludge, and, therefore, did not warrant evaluation in the EDC/VCM landfill groundwater pathway analyses.
- Vinyl chloride was detected in only one of the dedicated EDC/VCM sludge samples, and the constituent concentration in that sample was an estimated ("J") value. Therefore, vinyl chloride was screened out of the analysis of EDC/VCM sludge under the land treatment unit scenario, and out of the nongroundwater pathway analysis of EDC/VCM sludge under the landfill scenario. However, vinyl chloride was inadvertently evaluated under these scenarios, and the results of our analyses are as follows:
    - Vinyl chloride was further screened out of the land treatment unit groundwater pathway analysis by assuming that a 70 kg adult consumes 1.4 L of land treatment unit leachate 350 days per year for 58.4 years. The risk resulting from this exposure is 1E-07 (See Appendix B of the 1999 Risk Assessment Technical Background Document).
    - Vinyl chloride was further evaluated under the EDC/VCM land treatment unit and landfill scenario nongroundwater pathways. For the EDC/VCM land treatment unit nongroundwater pathways, the highest risk estimates were 6E-11 (ingestion) and 8E-11(inhalation). For the EDC/VCM landfill nongroundwater pathways, the highest risk estimates were 1E-16 (ingestion) and 1E-11(inhalation)
- Vinyl chloride was not detected in methyl chloride sludge, either in total or TCLP analyses.

Metals

The following sections discuss the metals (nickel, barium, manganese, magnesium, lead and copper) with which the commenter was concerned.

Nickel. Nickel was identified as a COPC for the EDC/VCM land treatment unit nongroundwater pathways and the EDC/VCM landfill groundwater pathways. For the EDC/VCM land treatment unit nongroundwater pathways, the highest hazard quotient for nickel was 0.01 (ingestion) and the highest risk estimate was 2E-08 (inhalation). For the EDC/VCM landfill groundwater pathways, the highest hazard quotients for nickel were 0.3 (ingestion) and 0.004 (dermal). As noted in Table 2-8 of the 1999 Risk Assessment Technical Background Document:

- Nickel was screened out of the land treatment unit groundwater pathway analysis. (The analysis assumes that a 21.4 kg child consumes 0.74 L of land treatment unit leachate 350 days per year. The hazard quotient resulting from this exposure is 0.5. [See Appendix B of the 1999 Risk Assessment Technical Background Document]).
- Nickel was not evaluated in the wastewater analysis or in the EDC/VCM or methyl chloride landfill non-groundwater pathway analyses because nickel is not volatile, and only volatile emissions were relevant to these analyses.
- Nickel was not evaluated in the methyl chloride landfill groundwater pathway analysis because nickel was not detected in the TCLP analyses of the dedicated methyl chloride sludge.

Barium. Barium was identified as a COPC for the EDC/VCM land treatment unit nongroundwater pathway analysis. The highest hazard quotients associated with this pathway were 0.0008 (ingestion) and 0.0003 (inhalation). As noted in Table 2-8 of the 1999 Risk Assessment Technical Background Document:

- Barium was screened out the EDC/VCM sludge land treatment unit groundwater pathway analysis. (The analysis assumes that a 21.4 kg child consumes 0.74 L of land treatment unit leachate 350 days per year. The hazard quotient resulting from this exposure is 0.1. [See Appendix B of the 1999 Risk Assessment Technical Background Document]).
- Barium was not evaluated in the wastewater analysis or in the EDC/VCM landfill non-groundwater pathway analysis because barium is not volatile, and only volatile emissions were relevant to these analyses.
- Barium was not evaluated in the EDC/VCM landfill groundwater pathway analysis because barium was not detected in the TCLP analyses of the dedicated EDC/VCM sludge.
- Barium was not detected in dedicated methyl chloride sludge.

Magnesium. As stated on page 2-39 of the Risk Assessment Technical Background Document, we did not evaluate magnesium because it is an essential nutrient. The commenter does not provide any rationale for why they believe that this is not the case. For our purposes, essential nutrients are those elements that are required by the body for proper function that are toxic only at very high doses. For example, the highest concentration of magnesium detected in chlorinated aliphatics sludges is 23,300 mg/kg (methyl chloride sludge). However, even at the high end soil ingestion rate for their age group (see Section 4 of the 1999 Risk Assessment TBD), a 1 to 3-year old child could consume residential soil with up to 162,500 mg/kg magnesium before they exceeded the Tolerable Upper Intake Level (UL) for 1 to 3-year old children, 65 mg/day (65 mg/day is the most protective UL developed for any age group; NAP, 1997). A UL is the maximum level of daily nutrient intake that is likely to pose no risk of adverse effects to members of the healthy general population. In the case of magnesium, the UL is for magnesium consumed *in addition* to that obtained from food sources. Similarly, the highest concentration of magnesium detected in TCLP leachate from chlorinated aliphatics sludges is 154 mg/L (EDC/VCM sludge). A 1 to 3 year old child, ingesting drinking water at a high end (90^{th} percentile) ingestion rate could consume tap water with a magnesium concentration of 51.5 mg/L, without exceeding the UL for magnesium. (This analysis protectively assumes an average 90^{th} percentile body weight of 15.4 kg for 1 to 3 year olds [Tables 7-6 and 7-7 of the Exposure Factors Handbook] and a 90^{th} percentile drinking water ingestion rate of 82.1 mL/kg/day [Table 3-7 of the Exposure Factors Handbook].) In other words, given an individual in the most sensitive age group who consumes water at a high end ingestion rate that has been maximized by also assuming a high end body weight, the maximum detected TCLP leachate concentration we evaluated would only have to be diluted in groundwater by a factor (DAF) of 3 to still be within the UL for magnesium. EPA expects that a DAF of at least 3 is reasonable for magnesium since all of the DAFs for metals under the landfill scenario evaluated for the proposed Hazardous Waste Identification Rule (HWIR; 60 FR 66344) were greater than 3.

Manganese. On page 2-39 and in Table 2-8 of the Risk Assessment Technical Background Document we incorrectly stated that we did not evaluate manganese because it is an

essential nutrient. Although manganese is an essential nutrient (for example, it activates several enzymes), it was, in fact, evaluated in the risk assessment, as shown in Appendix H of the 1999 Risk Assessment Technical Background Document. We provide a corrected version of Table 2-8 in the 2000 Addendum to the Risk Assessment Technical Background Document, where manganese is included as a COPC for the EDC/VCM landfill groundwater pathways and the EDC/VCM land treatment unit nongroundwater pathways. As shown in Appendix H of the 1999 Risk Assessment Technical Background Document, the high end EDC/VCM landfill groundwater hazard quotient was manganese was 0.2 and the high end EDC/VCM land treatment unit nongroundwater pathway hazard quotient was 0.024 (summed ingestion and inhalation hazard quotients)

Lead. Lead was identified as a COPC for the EDC/VCM land treatment unit groundwater and nongroundwater pathways. Section 4 of the 1999 Risk Assessment Technical Background Document explains that we do not have health benchmarks for lead; consequently, lead was not carried through the risk assessment. However, as explained on page 4-19 of the 1999 Risk Assessment TBD, we have action levels for lead in soils and drinking water. The concentrations of lead in EDC/VCM and methyl chloride sludges, 13 mg/kg and 7 mg/kg, respectively, are well below the 400 mg/kg concentration that is considered protective for children's exposure to residential soils (Goldman and Fields, 1998). Moreover, these concentrations are below 54 mg/kg, the 95% upper tolerance limit of background lead concentrations in soils reported by Hunter (1998). Furthermore, the leachate concentration predicted for the land treatment unit based on the dry weight concentration of lead in EDC/VCM sludge, 0.005mg/L (USEPA 1999, Appendix B, Table B-1), is well below the action level for lead in drinking water, 0.015 mg/L. Consequently, lead in chlorinated aliphatics wastes is not expected to pose a concern.

Copper. Copper was identified as a COPC for the EDC/VCM landfill, EDC/VCM land treatment unit, and methyl chloride landfill groundwater pathways, and the land treatment unit nongroundwater pathways. The evaluation of copper was not relevant to the chlorinated aliphatics wastewater analysis or the nongroundwater pathway analysis for EDC/VCM sludge managed in a landfill because copper is not volatile and would not be released to the air from a wastewater tank or volatilized from a landfill. Section 4 of the 1999 Risk Assessment Technical Background Document explains that because we do not have health benchmarks for copper we did not carry copper through the risk assessment. Nevertheless, we can provide some context for the copper concentrations reported/estimated for chlorinated aliphatics wastes. For the nongroundwater pathway analyses for the land treatment unit, the maximum high end concentrations in various media were as follows: 22 mg/kg in soil, 9 mg/kg (dry weight) in fruits and vegetables (gardener), 7 mg/kg (dry weight) in fruits and vegetables (farmer and child of farmer), 4.4 mg/kg in root vegetables, 0.2 mg/kg (wet weight) in beef, 5.9E-02 mg/kg (wet weight) in dairy, and 0 mg/kg in fish. Assuming high end ingestion rates, and that receptors obtain 100% of their beef, dairy, fruits, and vegetables from a contaminated source, these high end concentrations would equate to a total daily intake of less than 1 mg/day for each receptor. This intake is well below the Estimated Safe and Adequate Daily Dietary Intake (1.5-3.0 mg/day) for copper (NAS, 1989). The high end copper concentration in air was estimated to be 3.8E-06 mg/m^3. For reference, this concentration is almost an order of magnitude below a *draft* (labeled "do not cite or quote") 1997 CalEPA chronic inhalation reference exposure level for copper, 2.0E-05 mg/m^3, which is based on cold-like symptoms (warmth or chills and head stuffiness

[signs of metal fume fever]) reported among workers exposed to copper dust. The copper concentration predicted for the EDC/VCM land treatment unit leachate would be 4.75 mg/L, corrected for the difference in wet weight and dry weight waste concentrations. The highest copper concentration reported in EDC/VCM TCLP analyses was 22.3 mg/L, and the concentration reported in methyl chloride TCLP analyses was 5.3 mg/L. Applying the 1995 Hazardous Waste Identification Rule (HWIR; 60 FR 66344, December 21, 1995) 90th percentile dilution attenuation factor (DAF) for copper, 7000, to the highest of these leachate concentrations (the EDC/VCM landfill leachate concentration) would result in a receptor well concentration of 0.003 mg/L, which is almost 3 orders of magnitude below the MCLG for copper, 1.3 mg/L.

References:

Goldman, L. and T. Fields. 1998. Memorandum. Proposed TSCA §403 Soil Lead Hazard and OSWER's Lead-in-Soils Policy. United States Environmental Protection Agency. December 1.

Hunter, P.M. 1998. Air-Force Wide Background Concentrations of Inorganics Occurring in Ground Water and Soil. Proceedings of the 14th Annual Waste Testing and Quality Assurance Symposium. July.

CalEPA (California Environmental Protection Agency). 1997. Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels. Draft for Public Review. October.

NAP (National Academy Press). 1997. Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine. Washington, D.C., pp 242-248.

NAS (National Academy of Sciences). 1989. Recommended Dietary Allowances, Tenth Edition, NAS, Washington, DC.

1.23 EDF Comment

In addition, when EPA does consider the risks of these metals, it should take into account recent evidence from case studies of groundwater contamination which indicate that the model used by EPA to predict the behavior of metals in groundwater has serious flaws.[34] Specifically, case studies indicate that the model underestimates the potential for dissolved metals, such as lead, to reach receptor wells at unacceptable concentrations. This model is listed as part of the basis for the decision to not include metals in the list of constituents for the instant waste streams.

[34] For further information, please see Use of MINTEOA2 and EPACMTP to Estimate Groundwater Pathway Risks from the Land Disposal of Metal-Bearing Wastes, June 1999, prepared by Charles Norris and Christina Hubbard on behalf of EDF. Friends of the Earth, Hoosier Environmental Council and Mineral Policy Center.

Agency Response:

EPA disagrees with the commenter's claim that the model EPA uses to predict the behavior of metals in groundwater has serious flaws in that it underestimates the potential for dissolved metals to reach receptor wells at unacceptable concentrations. Data collected by EPA demonstrate that, in fact, the component of the model to which the majority of the commenter's report refers actually may have underestimated subsurface sorption of the two relevant metals, therefore potentially overestimating the risk of noncancer health effects from these metals.

The report cited by the commenter, "Use of MINTEQA2 and EPACMTP to Estimate Groundwater Pathway Risks from the Land Disposal of Metal-Bearing Wastes," originally was submitted to EPA in response to comments on EPA's regulatory determination for fossil fuel combustion wastes (FFCW). Much of the report focuses on issues related to how EPA conducted groundwater fate and transport modeling to support the FFCW regulatory determination, and in a number of cases the issues raised are targeted at specific aspects of that study. The report also references the hazardous waste identification rule (HWIR) and cement kiln dust (CKD) analyses conducted by EPA. The report was not updated or modified to address specific results, analyses, or assumptions of the chlorinated aliphatics evaluation, and in no case is there mention of the chlorinated aliphatics analyses, or a challenge to specific assumptions used in the chlorinated aliphatics analyses. Nevertheless, in the paragraphs that follow, EPA provides responses to the issues raised in the report that potentially could be relevant to the groundwater fate and transport analyses conducted for the chlorinated aliphatics listing determination.

The issues presented in the document cited by the commenter were summarized in two tables provided to EPA. These issues are as follows:

Chemistry of the Basic Groundwater

Issue 1: Basic groundwater has a significant ion charge imbalance
Issue 2: Median values for concentrations of secondary variables from STORET database bear no geochemical relationship to one another
Issue 3: Carbon, sulfur, iron, and nitrogen are present exclusively in oxidized state
Issue 4: Iron is present exclusively in oxidized state
Issue 5: Mineral phases are not in equilibrium with groundwater
Issue 6: Input concentrations for calcium, magnesium, phosphorus, and sulfur are inappropriately low
Issue 7: Presence of iron and aluminum as mobile colloidal phases is ignored.

Leachate Chemistry

Issue 8: Overall chemistry of the leachate not considered in isotherm calculations

Issue 9: Possible presence of other contaminant metals in leachate is ignored

Issue 10: Subsurface system assumed to be buffered with respect to pH, regardless of the chemistry of the leachate and location of the waste.

USEPA Master Variables

Issue 11: pH cutoff values for CMTP arbitrarily set at boundaries with no geochemical significance.

Issue 12: Lack of isotherm set for carbonate-dominated waters (pH greater than 10.33)

Issue 13: Surface area for iron substrate inappropriate for soil particles and soil environments

Issue 14: Concentration range for iron substrate may be unrepresentatively high

Issue 15: Unexpectedly small relative influence of LOM on K_d values

Issue 16: POM [particulate organic matter] and DOM [dissolved organic matter] are inappropriately assumed to have equivalent sorption site densities

Issue 17: Charge balance of all POM species is arbitrarily forced to zero, increasing the reactivity of POM relative to DOM.

Issue 18: POM variable is behaving incorrectly, exhibiting a relative decrease in sorption with increasing particulate organic matter

Calculation Errors

Issue 19: Programming error in treatment of particulate organic substrate (see Issue 15)

Issue 20: Miscalculation of the saturated zone values of K_d [distribution coefficient] for lead (incorrect soil-liquid ratio).

Shaky Assumptions

Issue 21: Geochemistry of subsurface has no connection to physical and climatic setting of waste unit

Issue 22: Soil-water partitioning is linear in the saturated zone

Unreasonable Program Requirements

Issue 23: K_d for saturated zone is selected based on steady-state water table breakthrough concentration

Issue 24: CMTP program reads all isotherms as monotonic
Issue 25: CMTP's algorithm for interpreting isotherms is inappropriate

Implementation Errors

Issue 26: Master variable values in CMTP isotherm file headers do not match those used to generate isotherms in MINTEQA2.
Issue 27: Master variable ranges used in CMTP do not always have counterpart in MINTEQA2 runs

Counter-Intuitive Input

Issue 28: CMTP isotherm use is very homogeneous. For example, of 81 choices, two isotherms account for more than half the selections in site-based Monte Carlo runs for CCW [coal combustion waste].
Issue 29: Median CCW infiltration rate is half that of HWIR. Median thickness of CCW unsaturated zone is 2m greater than that of HWIR.
Issue 30: In CCW case, median input values actually used by CMTP do not always match median values specified in input files.

Inadequate or Confusing Output

Issue 31: CMTP occasionally produces negative time-to-peak values
Issue 32: Output provides the time taken for peak concentration, rather than HBN [health-based number], to reach receptor well
Issue 33: Peak water-table concentrations are provided for the steady-state condition, but not the transient case.

In some cases issues raised in the commenter's report are not applicable to the chlorinated aliphatics listing determination because they deal specifically with characteristics of, or data describing, wastes or management units evaluated by EPA to support the FFCW regulatory determination and/or the cement kiln dust (CKD) study. These issues are identified as numbers 8, 10, 11, 12, 28, 29, and 30. Issue 8 refers to fossil fuel combustion waste leachates "that have extremely high concentrations of a wide list of components" (p. 20). EDC/VCM and methyl chloride sludge leachates cannot be characterized this way (see Tables 2-2 and 2-3 of the Risk Assessment Technical Background Document [USEPA, 1999]). Issues 10, 11, and 12 refer to the high alkalinity and high pH of certain CKD and FFC wastes. The EDC/VCM wastewater treatment sludges are generated in aerobic biological treatment systems, where influent wastewaters are typically pH adjusted (as needed) and otherwise equalized prior to treatment. Therefore, based upon EPA's understanding of the wastewater treatment processes observed during

engineering site visits and sampling events, the resultant sludges would not be expected to have elevated pH or high alkalinity. Issue 28 (p. 47, p. 55) pertains to a comparison that was made between the set of isotherms chosen for specific modeling runs conducted for HWIR95 and FFCW. The issue deals with the number of different isotherms used for the unsaturated zone in an evaluation of CCW landfills. Issue 29 refers to a comparison of the median infiltration rates and median unsaturated zone thicknesses evaluated for CCW landfills and HWIR landfills (p. 61). Issue 30 concerns an apparent discrepancy in CCW input files, specifically that median input values used by CMTP do not always match median values specified in the input files.

The vast majority of the comments presented in the subject report (Issues 1 through 28) are technical issues concerning 1) EPA's methodology for developing the nonlinear sorption isotherms that are used in EPACMTP to model the fate and transport of metals in the saturated and unsaturated zones, or 2) the way that the EPACMTP model uses the nonlinear sorption isotherms. Specifically, for those metals for which EPA had sufficient understanding of the relevant adsorption reactions, EPA used a geochemical speciation model called MINTEQA2 to develop a series of nonlinear isotherms that represent the variation of the soil/water distribution coefficient (K_d) with contaminant concentration under different geochemical conditions. EPA's groundwater fate and transport model, EPACMTP, is programmed to select the most appropriate isotherm for use in modeling metals sorption in the unsaturated and saturated zones. At present, EPA has no alternative to using MINTEQA2 to derive nonlinear sorption isotherms for metals. EPA is in the process of investigating alternatives for revising the MINTEQA2 model, conducting additional MINTEQA2 modeling, and revising EPACMTP's use of the nonlinear sorption isotherms in response to public comment received on the FFCW regulatory determination. However, this effort is time-consuming and could not be performed in the timeframe required by Congress for making final listing determinations for chlorinated aliphatics, as well as other, wastestreams. Nevertheless, given the recent criticism of our methodology for developing nonlinear sorption isotherms using MINTEQA2, and the application of those isotherms in EPACMTP, we recently began implementing an alternate approach for establishing K_ds for those metals for which we traditionally used MINTEQA2-generated K_ds. This approach involves using values for K_d that are experimentally-derived and are published in the scientific literature ("laboratory-derived K_ds") in our groundwater fate and transport analyses rather than using the MINTEQA2-generated isotherms (see the proposed listing determination for inorganic chemical manufacturing wastes at 65 FR 55683).

To assess whether employing our alternate approach of using laboratory-derived K_ds would have changed our characterization of groundwater pathway risks for the chlorinated aliphatics listing determination, EPA compared the MINTEQA2-derived nonlinear sorption isotherms that we used in the chlorinated aliphatics analyses with the laboratory-derived K_ds. In the chlorinated aliphatics

groundwater fate and transport analyses, we used MINTEQA2-generated nonlinear sorption isotherms for nickel. We also used nickel isotherms to describe the sorption of manganese. Nickel was selected as a surrogate for manganese because the manganese binding constants for the primary sorbent used in MINTEQA2 were closer in magnitude to those of nickel than to those of the other candidate metals. In addition, the MINTEQA2 K_d values computed for nickel were considerably lower than those of other metals that we could have used as surrogates. We believed that it was most appropriate to choose from among the metals with lower (more protective) K_ds.

In support of the 1999 Proposed Hazardous Waste Identification Rule (HWIR) and the Inorganics Listing Determination, EPA conducted a literature review to compile a database of laboratory-derived K_d values for a range of environmental systems. K_d values, as well as the system parameters most likely to influence the K_d (e.g., pH, soil type, total metal concentration, dissolved organic carbon content, particulate organic carbon content, iron oxide content), were included in our database if the experimental system parameters met the following criteria:

- Natural aquifer systems (as opposed to contaminated sites)
- Low ionic strength solutions (< 0.1 M)
- Dilute metal concentrations
- pH values in the range of 4 to 10
- Low humic material concentrations (< 5 mg/L)
- The absence of organic chelates (e.g., EDTA).

The criteria are important in establishing a basis for comparing laboratory-derived K_d values published in the scientific literature to K_d values generated using a computer model such as MINTEQA2. The K_d is metal-specific as well as system-specific. Depending upon the metal and the system parameters, the K_d can range over many orders of magnitude and we can only accomplish a meaningful comparison if the experimental system closely approximates the model-simulated system. This requires knowledge of the environmental setting of interest. Therefore, we only considered literature K_d values in our comparison if the experimental system parameters closely approximated natural aquifer settings.

Table 1 presents, for manganese and nickel, both the MINTEQA2(model)-generated K_d values used in the chlorinated aliphatics analysis and the laboratory-derived (literature) K_d values. The literature values are in bold, italics typeface. The table also presents the median K_d values from the literature. The manganese laboratory-derived values presented in Table 1 represent nine aquifer samples as reported in one reference (Miettinen, J. K., et al., 1982). The nickel laboratory-derived values represent 19 values as reported in two references (Baston, G. M. N., et al.,1992; Christensen, T. H., et al., 1996).

Figures 1 and 2 graphically compare the laboratory-derived K_ds and model-generated K_ds for manganese and nickel. The triangles represent K_d values from the nonlinear isotherm generated for the unsaturated zone and the circles represent the K_d values for the saturated zone. The squares represent laboratory-derived K_d values. The y-axis of the plots represents the log value of the K_d. Although K_ds frequently are plotted against concentration, the metal concentrations used in the experiments were not provided. Hence, the plots can only illustrate the magnitude of K_ds in comparison to one another.

For manganese, the K_d values from the literature range from 34 L/kg to 4100 L/kg, with a median value of 130 L/kg. Two of the nine K_d values published in the literature for manganese fall within the range of values generated by the MINTEQA2 aqueous speciation model. The remaining seven literature values exceed the model-generated K_d values. The laboratory-derived K_d values of 1000 L/kg and 4100 L/kg correspond to heavy clay aquifer systems in which sorption would likely be an important contributing factor. Although heavy clay aquifer systems exist in the natural environment, sand and sandy silt aquifer systems are more common, and thus the MINTEQA2 modeling runs were based on this type of system. The values of 49 L/kg, 86 L/kg, 130 L/kg and 160 L/kg represent a sandy till aquifer system with pH ranging from 6.2 to 6.8. All but one of the laboratory-derived values for these aquifer environments exceed the model-generated K_d values.

For nickel, the K_d values reported in the literature range from 3 L/kg to 7250 L/kg, with a median value of 420 L/kg. These values represent sand aquifer systems with pH ranging from 5.28 to 8.87. Experimental system parameters are similar to those generally used in model simulations and the two sets of K_d values can be compared. As shown in Figure 2, two of the literature values are less than the range of model-generated values. One literature value falls within the lower end of the range and the majority exceed the model-generated values.

In summary, the laboratory-derived K_d values for manganese generally exceed the model-generated K_d values. The two highest K_d values for manganese are correlated with experimental system parameters that are not necessarily relevant to the chlorinated aliphatics analysis. The laboratory-derived K_d values for nickel are even less comparable to the model-generated K_d values, with the majority of the literature values exceeding the range of model-generated values. However, this lack of agreement is not unexpected given the extreme sensitivity of K_d to system parameters. In conclusion, the majority of the MINTEQA2-derived K_d values used in the chlorinated aliphatics analysis are lower (allow for less sorption of metals in the subsurface) than the K_d values we likely would have selected based on a review of the literature. As a result, we conclude that for the analyses we conducted to support the chlorinated aliphatics listing determination, we did not overpredict, and may have underpredicted, sorption of nickel and manganese in the subsurface.

Three issues raised in the commenter's report were not related to either of the topics described above, and were generally applicable to the groundwater fate and transport analysis conducted for the chlorinated aliphatics listing determination. One issue (number 7) was raised in terms of EPA's method for calculating the nonlinear sorption isotherms, but also is generally applicable to the groundwater modeling assumptions used for the Chlorinated Aliphatics analysis.

Issue 7: The report states: "To accurately portray the associated risks at a receptor well, the isotherm calculation must include the concentration of contaminant adsorbed onto entrained colloids. To ignore the enhanced mobility underestimates risks."

EPA agrees that colloid-facilitated transport of metals in groundwater may be a significant process in some environments. We believe that colloidal transport can be addressed as a site-specific process, but that the current understanding of the mechanisms controlling colloidal transport of metals prohibits its evaluation under more general modeling constructs such as EPACMTP, which is used for regional- and national-scale evaluations, or the sorption component of MINTEQA2. We acknowledge the potential occurrence of colloidal transport as an uncertainty in our analysis (p. 5-42; USEPA, 1999). Nevertheless, we believe there are sufficient protective assumptions incorporated into the EPACMTP model and its input data (for example, our assumption that individuals use the uppermost aquifer as a source of domestic drinking water, our assumption that the landfill is unlined and that the cover will fail) that our current inability to evaluate this phenomenon does not result in significant underestimation of risk in the majority of geochemical environments.

Issue 31. The report states: "Occasionally, the CMTP program produces a negative value for the time to peak. This occurs at most in one or two realizations out of 2000, and in many runs it does not occur at all. We are not certain why a negative time-to-peak value is occasionally produced, and there is no obvious pattern related to isotherm sets or source scenarios used for input."

EPA investigated this issue after initially receiving this comment in response to the FFCW regulatory determination. EPA's investigation revealed that in rare instances, the search algorithm for the time to peak determination did indeed generate a negative time to peak value. This error only occurs when the time to peak is very short, and has since been corrected. The error did not occur in either the deterministic or probabilistic model runs for the chlorinated aliphatics analysis.

Issue 32. The report states: "For future risk calculation comparisons it would be useful to program CMTP to provide time-to-HBN [health-based number] in its output files."

While the diagnostic output suggested by the commenter may provide useful information in cases where a health-based number and the peak concentration are very different, this is not the case in the chlorinated aliphatics analysis. In the chlorinated aliphatics analysis the groundwater pathway risk estimate for arsenic under the EDC/VCM landfill scenario was 3E-05. The groundwater pathway risk estimates for all other contaminants were 1E-05 or below (all hazard quotients were less than 1). The receptor well concentration that corresponded to the 3E-05 arsenic risk estimate was estimated to occur approximately 8800 years in the future. For reasons described in the final rule, EPA determined that the arsenic risk results were not of concern. In addition to the time it would take the peak arsenic concentration to reach the modeled receptor well, 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. The predicted high-end 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). Therefore, calculating the time required for the groundwater concentration in the receptor well to reach a concentration corresponding to a health-based number would not have been relevant in the case of the chlorinated aliphatics listing determination since the peak arsenic concentration was determined to not to be of concern.

The following issue (Issue 33) was not presented by the commenter in the referenced report, but was included on a list of comments that subsequently was provided to EPA. Consequently, little detail was provided to describe the commenter's concern.

Issue 33: Peak water-table concentrations are provided for the steady-state condition, but not the transient case. The relative contributions of the unsaturated zone and saturated zone to metal attenuation cannot be properly assessed without the transient peak concentration at the water table.

If we assume that the commenter is referring to incorporating into EPACMTP the capability to output the contaminant concentration at the water table, we agree this may be a useful diagnostic tool, but maintain that modifying the model to provide such an output would have no effect on the performance of the model or the magnitude of the estimated receptor well concentrations. If we assume that the commenter is referring to the water table concentration that is used to choose the Kd to be used in the aquifer (we always use a single Kd value per realization in the aquifer because the model is linear; to model nonlinear transport in the aquifer would be too computationally demanding to allow Monte Carlo modeling). To be protective, EPACMTP currently is programmed to use the peak water table concentration to choose this aquifer Kd value. When the source duration is very long (such as is commonly the case for the landfill scenario) or when using a

square pulse (that is, a constant concentration for a finite time period; as required by the unsaturated zone sub-module of EPACMTP for metals using MINTEQA2, non-linear isotherms), the peak concentration can be identical to the steady state concentration. For this reason, the commenters may have mistakenly believed that it was the steady-state concentration that was being used. However, for the modeling conducted for the Chlorinated Aliphatics analysis (as for all EPACMTP modeling), the transient peak water table concentration was used to choose the aquifer Kd. For this reason, this comment is not relevant to the groundwater modeling conducted for the Chlorinated Aliphatics listing determination.

References:

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Christensen, T. H., Lehmann, N., and Jackson, T. 1996. Cadmium and nickel distribution coefficients for sandy aquifer materials. In: Journal of Contaminant Hydrology, Volume 24,10p.

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-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.

Miettinen, J. K., Nikula, A., and Leskinen, S. 1982. Distribution coefficients of radionuclides between finnish soils and groundwater. In: Proceedings of an International symposium on migration in the terrestrial environment of long-lived radionuclides from the nuclear fuel cycle. International Atomic Energy Agency. Vienna, Austria. 8p.

Table 1. Comparison of Empirical K_d Values to MINTEQA2-Generated Values

Manganese		***Nickel***	
Kd (L/kg)	***Log Kd (L/kg)***	***Kd (L/kg)***	***Log Kd (L/kg)***
13.57	1.13	***3***	***0.48***
16.78	1.22	***7***	***0.85***
18.00	1.26	8.77	0.94
19.75	1.30	11.61	1.06
21.83	1.34	11.73	1.07
23.58	1.37	11.88	1.07
25.72	1.41	11.99	1.08
27.87	1.45	***12***	***1.08***
30.44	1.48	12.02	1.08
33.28	1.52	12.12	1.08
34	***1.53***	12.14	1.08
36.20	1.56	12.22	1.09
39.13	1.59	12.22	1.09
42.81	1.63	12.29	1.09
46.25	1.67	12.32	1.09
48.00	1.68	12.34	1.09
49	***1.69***	12.35	1.09
49.61	1.70	12.35	1.09
51.41	1.71	12.38	1.09
53.04	1.72	12.38	1.09
53.94	1.73	12.39	1.09
54.95	1.74	12.39	1.09
55.62	1.75	12.39	1.09
56.00	1.75	12.39	1.09
56.29	1.75	12.39	1.09
56.62	1.75	12.39	1.09
57.01	1.76	12.39	1.09
57.34	1.76	12.39	1.09
57.34	1.76	12.39	1.09
57.59	1.76	12.39	1.09
57.71	1.76	12.39	1.09
57.90	1.76	12.39	1.09
57.90	1.76	12.39	1.09
57.90	1.76	12.39	1.09
57.99	1.76	12.39	1.09
57.99	1.76	***18***	***1.26***
58.24	1.77	***24***	***1.38***
58.24	1.77	35.93	1.56
58.31	1.77	***40***	***1.60***
58.31	1.77	***40***	***1.60***
58.31	1.77	***250***	***2.40***
58.31	1.77	***310***	***2.49***
58.31	1.77	***420 (median)***	***2.62***
58.31	1.77	***440***	***2.64***
58.31	1.77	***450***	***2.65***
58.31	1.77	***1430***	***3.16***
58.31	1.77	***1510***	***3.18***
58.31	1.77	***2750***	***3.44***
58.31	1.77	***4370***	***3.64***
58.31	1.77	***4510***	***3.65***
86	***1.93***	***4750***	***3.68***
96	***1.98***	***7250***	***3.86***
130 (median)	***2.11***		
160	***2.20***		
430	***2.63***		
1000	***3.00***		
4100	***3.61***		

bold/italic type = literature value
normal type = MINTEQA2 value

Figure 1. Comparison of MINTEQ-Generated Kd Values to Literature Values
Manganese -- High End Distribution

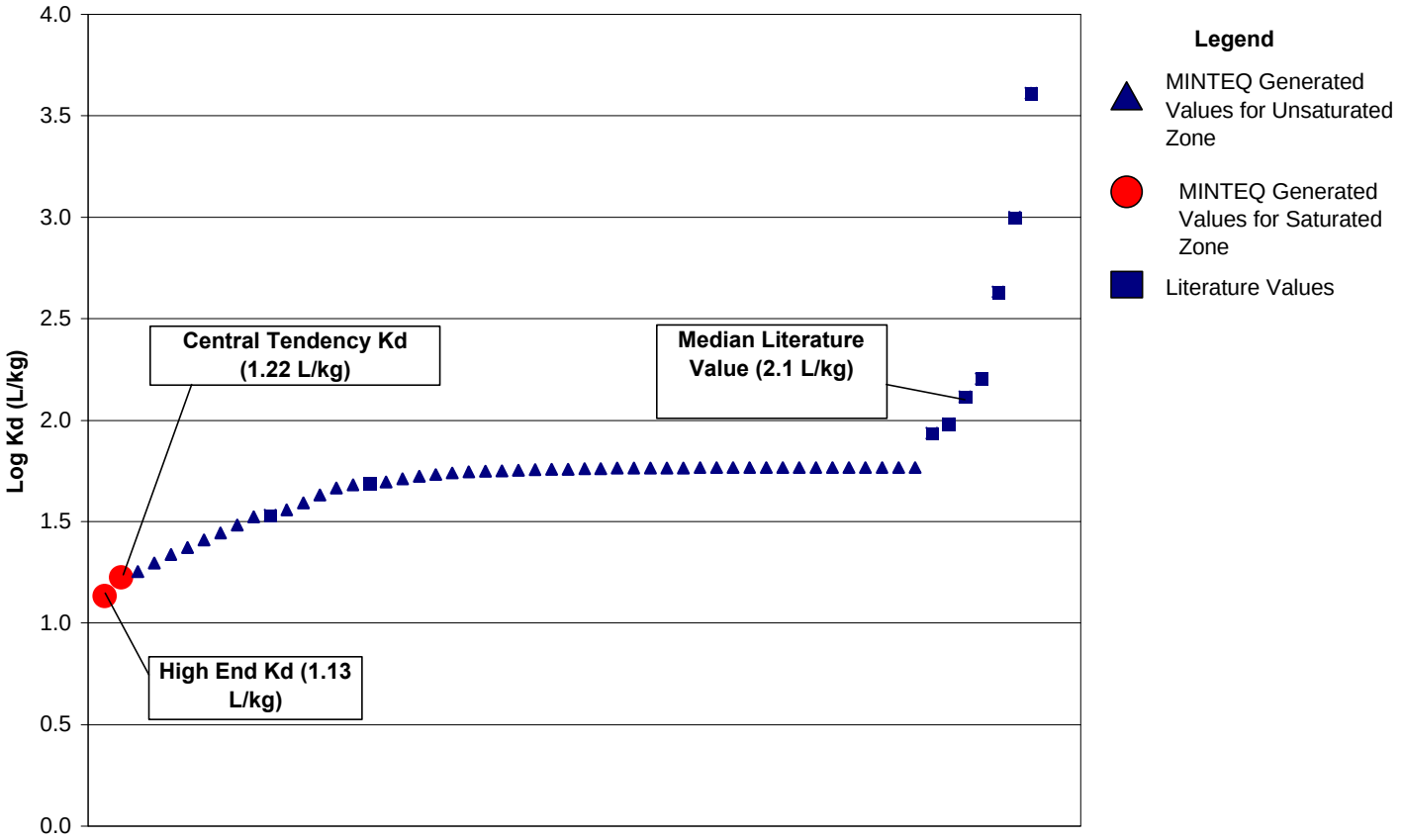
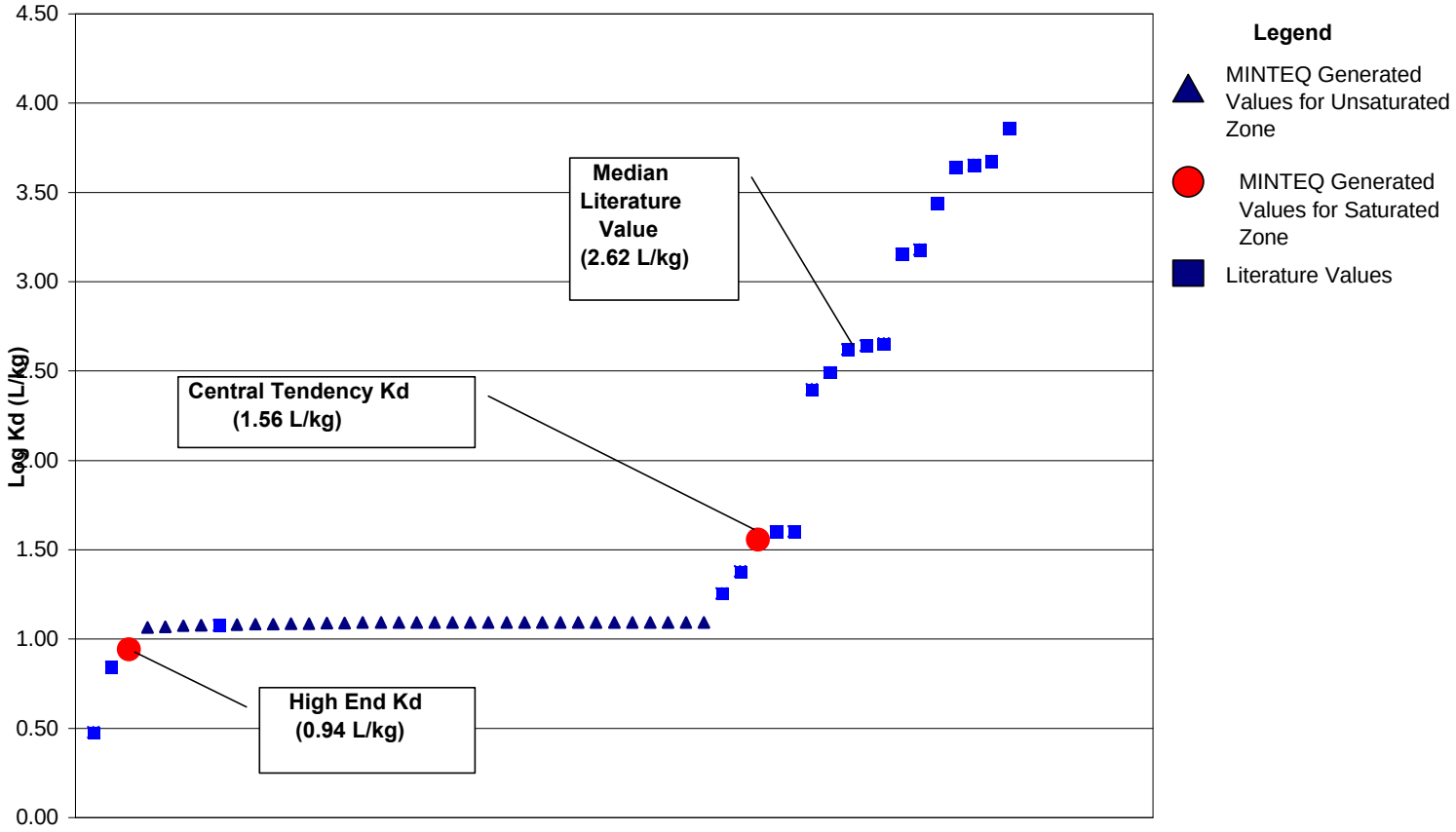


Figure 2. Comparison of MINTEQ-Generated Kd Values to Literature Values
Nickel -- High End Distribution



1.24 EDF Comment

B. EPA should use a-risk target level of 1 x 10-6 as this risk target level is appropriately protective of human health and the environment.

For the overall risk presented by a wastestream, EPA is using in its risk assessment a risk target of l x 10-5. For the following reasons, EPA is urged to use a risk target of 1 x 10-6.

A risk target level of 1 x 10-5 for cancer risk is not consistent with HWIR waste approach recently reproposed. In the most recently proposed HWIR waste rulemaking (signed in October, 1999), the Agency stated that it believes that risk targets - i.e., values that are used in calculating waste concentrations at which wastes will no longer be considered hazardous - must minimize threats to human health and the environment. In calculating waste concentration exit levels in the recent HWIR waste proposal, EPA proposes using as a cancer risk target of one-per-million (1 x 10-6) and 1 x 10-5.[35] Here the goals are the same - if emissions under the concentration level are not to be subject to Subtitle C regulation, the Agency must strive to be sure that the materials are well below hazardous levels.[36]

Secondly, a risk target level of 1 x 10-5 is not appropriate to the extent risks are not summed by constituent as in the present case; thus, EPA should use a risk target level of 1 x 10-6. EPA's failure to consider additive risks increases the uncertainties in its risk assessment and is a reason that a target risk level of 1 x 10-5 is not an appropriate risk target for this waste. EPA's listing policy states that the Agency is to consider unknown or unquantified risk in setting its target risk level, but has failed to do so here.

Thirdly, given the very limited sampling (particularly of the sludges), there is increased uncertainty as to the characterization of these wastes, i.e., what constituents are present and the concentrations of these constituents. As stated above, in cases of unknown or unquantified risk, it is more appropriate to base risk target on 1 x 10-6. Even more importantly, grouping of wastes in the instant rulemaking significantly underestimates waste volumes, further increasing the unknown or unquantified risk for these streams.

Lastly, given that EPA is proposing conditional and contingent listings that would be self-implementing, there are increased risks of noncompliance and added difficulties with enforcement. EPA should base its risk assessment on the more conservative of risk levels - 1 x 10-6.

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[35] See Internet document, pre-publication version of EPA's proposed HWIR waste rule, signed October 29, 1999, page 226.

[36] The use of 1 x 10-5 will most likely end up with risk-based concentration levels set inconsistently with any future HWIR exit levels.

Agency Response:

The EPA disagrees that it should use a "risk target" of 1E-6 for identifying hazardous wastes as suggested by the commenter. EPA reiterates that although generally the cancer risk level of 1E-5 is a benchmark in listing determinations, EPA initially looks at the estimated risks in the range from 1E-6 to 1E-4.

In Section 1.11 above, EPA has already addressed the comment regarding consistency between cancer risk levels used in EPA's hazardous waste listing policy and the recently re-proposed HWIR rule.

The commenter also pointed to various uncertainties as reasons for basing listing determinations on a cancer risk level of 1E-6, such as EPA's failure to consider additive risks, the inadequacy of the sampling program including volume data used in the risk analysis, and the conditional listing approach for some wastestreams.

Regarding additive risks, EPA's listing policy states that "In the cases where some constituents are present but no risk levels can be assigned to them, the Agency considers the potential for these constituents to be hazardous." (December 22, 1994 *Federal Register*, 59 *FR* at 66078). EPA believes that after reviewing the constituents that were identified to be of potential concern, and the resultant risk estimates generated for each constituent, there is no reason to change its decision regarding the listing determinations being finalized.

EPA disagrees that the sampling program was inadequate to support the listing determinations under the approach described in the proposed rule, or that there were significant underestimates of waste volumes. See EPA responses to comments in Section 1.2 above, and Sections 2.1 and 2.2 below, regarding these issues.

EPA also disagrees with the commenter's assertion that the conditional listing approach for EDC/VCM wastewater treatment sludges will increase risks of non-compliance. According to information provided by generators to EPA in responses to the RCRA §3007 questionnaires, all but two generators of EDC/VCM wastewater treatment sludge currently are managing their sludges by disposing of them in a landfill. EPA sees no reason to anticipate that generators will not comply with the conditional listing, given that most generators need not change their waste management practices to remain in compliance with the regulations after the effective date of the final rule.

In addition, we note that the conditional listing is not entirely self-implementing. Generators must be able to demonstrate, by maintaining records, contracts, or other documentation, that they are in compliance with the conditions of the listing. Given that the Agency foresees little in the way of implementation

concerns, since most generators will not be required to change their management practices, and given that the final rule contains a demonstration requirement, EPA does not anticipate "added difficulties with enforcement" of the final listing determination.

1.25 EDF Comment

C. Risk Characterization

EPA's analysis failed to account for the additivity of risk from codisposal of these wastes. EPA recognizes in this rulemaking that these wastes are co-disposed, yet does not take this into account in evaluating overall risks. Co-disposal includes the following scenarios: disposal of wastewaters together, disposal of all sludges together and disposal at an offsite facility of all chlorinated aliphatics wastes together with similar wastes from other generators.

The present and potential for codisposal in this industrial sector must be taken into account as part of assessing the risks presented by the waste management options for these wastes. The volume difference when co-disposal is taken into account are very significant: for example, the volume of allyl chloride is 380,000 TPY when mixed sludge flows are included (which is what actually occurs) versus 5900 TPY when looking at "dedicated" flows; for EDC/VCM wastes the volume is 104,606 TPY when considered as mixed vs. 9600 TPY when looking at "dedicated" flows. As a legal matter, failure to consider actual or potential codisposal of wastes violate Section 1004(5) of RCRA, which defines "hazardous waste" as wastes posing a present or potential hazard to human health and the environment based upon quantity and other factors. Similarly, the failure to consider this codisposal violates EPA's criteria for listing determinations, which requires an assessment of "plausible types of improper management." In addition, failing to take into account risks presented by codisposal is also inconsistent with previous Agency practice and policy. For example, EPA considered the codisposal of solvents and other oily wastes in petroleum refining waste management units as part of its 1990 listing determination for wastewater treatment sludges. This inconsistency with previous practice had significant impacts on the modeling results.

Please see the description of this issue in the section of these comments regarding EDC/VCM sludges, which are equally applicable here and thus are incorporated by reference to apply to comments concerning the other waste streams.

Agency Response:

The commenter provides three "definitions" of co-disposal in their comments, and stated that EPA failed to account for the additivity of risk associated with each of these scenarios: 1) the commingling of chlorinated and non-chlorinated aliphatic wastewaters in the same wastewater treatment system; 2) the resultant generation of sludges derived from these mixed wastewaters, and

3) the management of chlorinated aliphatic sludges from different generators in the same landfill.

With respect to the first two "definitions," EPA has already explained in response to comment in Section 1.2 above its reasoning behind calculating and using apportioned sludge volumes in those instances where chlorinated aliphatic wastewaters represented only a portion of the total wastewater producing a sludge; and using only sample data from sludges representing dedicated (100%) chlorinated aliphatic wastewater treatment. EPA believes that the approach used was appropriate for isolating the risk from the specific industry wastes under review, and disagrees that this was inconsistent with the prior listing rulemaking mentioned by the commenter. In that listing (F037/F038; November 2, 1990 *Federal Register*, 55 *FR* 46354), EPA limited its assessment to wastewater treatment sludges from a specific industry sector as well (petroleum refining).

EPA has also already explained in its response to comment in Section 1.2 above that with respect to the third "definition," EPA was able to 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. In both cases, the Agency used the combined sludge volume in assessing the quantities of sludges managed in off-site landfills. EPA did not identify any other co-disposal scenarios for any of the other wastewater treatment sludges.

1.26 EDF Comment

D. Ecological Risk

EPA conducted an ecological risk screening analysis for the tank scenario for chlorinated aliphatics wastewaters, for land treatment units and the land fill scenarios for EDC/VCM sludges and for the landfill scenario for methyl chloride sludges.[37]

EPA' s ecological risk assessment must be viewed as what it purports to be - a screening level risk assessment. Such an analysis does not rise to the level of a risk assessment but rather provides an initial insight into chemicals and pathways that might pose a risk and which should be given greater attention. Because of the screening-level nature of the analysis and because some key exposure pathways are excluded, this analysis is not sufficient to rely upon for management decisions. It does, however, provide a basis for exploring specific chemicals and pathways further, which EPA should pursue.

[37] See for example Appendix J Screening Ecological Assessment of Chlorinated Aliphatics Waste Management Scenario.

While the screening is in many ways conservative, there are two major problematic areas of this screening which should be addressed in order to assess the risks posed by these wastestreams. These include:

The assessment of amphibians is based on acute toxicity data with lethality as an endpoint (see Table 3 of appendix J and page J-37); these animals are likely to be among the more sensitive receptors in aquatic and wetland systems and could be exposed to chlorinated compounds and other constituents of concern through dermal contact, ingestion of prey items, and through contact with water as larvae (i.e., as tadpoles). The chronic endpoints important for these animals could be considerable lower than the acute toxicity data on which the assessment relies. The screening level risk assessment could have explored the implications of this through a sensitivity analysis. This is especially important because the report notes that the region of interest (Gulf coast area) contains many sensitive wetland environments (page J-6).

EPA correctly points out that inhalation exposures could be very important to burrowing animals (e.g., see page J-68) but excludes quantitative analysis of this pathway (page J-5). There is sufficient data for small mammals on the effects of the constituents of concern via inhalation. While it is true that this has not been commonly considered in the past, this exposure pathway could be very important for a number of vertebrates because of the volatile nature of many of these compounds, particularly volatile and semi-volatile organic compounds. This pathway could have been considered and might have been the most important exposure pathway for the VOC and SVOC compounds..

Agency Response:

Acute Data for Amphibians

EPA recognizes the importance of evaluating the potential risks to amphibian species due to their high sensitivity and their potential presence in wetland habitats located near waste management facilities. In fact, the Ambient Water Quality Criteria (AWQC), selected as surface water CSCLs for the ecological risk analysis, are intended to be protective of a wide range of aquatic biota, including amphibians. For many constituents of concern, ecotoxicity data for amphibians are generally unavailable for chronic exposures; however, data from acute exposures to chemical stressors are frequently available and were used to assess the potential risks to amphibians from direct exposure to contaminated surface waters. The purpose of developing acute chemical stressor concentration limits (CSCLs) for amphibians was to provide a “flag” to indicate the potential for adverse effects for this receptor group. Despite the protective intent of the AWQC, EPA regards the data gaps on chronic effects in amphibians as a limitation of the state-of-the-science.

As part of the screening ecological risk assessment (SERA), EPA evaluated the potential for adverse ecological effects associated with chemical releases from three waste management units: (1) land treatment unit, or LTU, (2) landfills, or (3)

wastewater tanks. For both the central tendency and high end management/use scenario for the LTU, the hazard quotients (HQ) for ecological receptors exposed in aquatic systems were above, or close to, levels of concern. These HQ values represent potential risks to aquatic biota, mammals, birds, and amphibians associated with freshwater ecosystems. Because the amphibian CSCLs were based on acute effects, EPA calculated "chronic" CSCLs for amphibians by dividing the acute CSCLs by an acute-to-chronic uncertainty factor of 100, and compared the "chronic" CSCLs to the CSCLs used in the analysis. The results of this comparison suggested that the potential for adverse effects in amphibians may be greater than for other ecological receptors for two constituents: cobalt (HQ increased by a factor of 46) and 1,2-dichloroethane (HQ increased by a factor 28). However, the HQ values for both these constituents were still below levels of concern (i.e., the adjusted HQ was below 1). From this analysis we may conclude that, while it is not possible to dismiss the potential for chronic effects in amphibians, the CSCLs for other ecological receptors appear to afford substantial protection to amphibian populations. As noted in the TBD, the ecological risk results are above levels of concern for certain constituents, supporting EPA's decision to list wastes managed in the land treatment unit.

For the landfill and wastewater tank, EPA also compared the "chronic" CSCLs for amphibians to the CSCLs used in the analysis. Only one constituent (1,2-dichloroethane) had an amphibian CSCL below the lowest CSCL for surface water (the original CSCL was based on the AWQC). However, the HQ values for both waste management units were well below an HQ of 0.0001, and the use of a "chronic" amphibian CSCL did not suggest that the potential for adverse ecological effects was significant for either the high end or central tendency exposures. Consequently, we conclude that the ecological risks associated with the landfill or tank scenarios are below levels of concern for amphibian populations as well as for other ecological receptors included in the SERA.

Inhalation Pathway for Burrowing Animals

EPA did not evaluate inhalation exposures to burrowing mammals and birds that may be exposed to volatile organic compounds in subsurface air. The decision not to evaluate this exposure pathway was based on the paucity of data on burrowing animals (particularly avian species) and the technical complexity of evaluating this exposure route in a representative (rather than site-specific) environmental setting. Predicting burrow concentrations would be highly sensitive to the site characteristics (e.g., soil composition; distance of burrow from waste management unit) as well as the characteristics of the species of interest (e.g., depth of burrow; circulation of air in burrow; fraction of time spent in burrow). In addition, the inhalation benchmarks for animals generally reflect continuous exposures rather than the intermittent exposures that are likely to occur in burrowing animals. As a result, the ecotoxicological data on adverse

effects from inhalation exposure are not consistent with the likely patterns of exposure in the burrow. The fate and transport modeling framework could be modified to predict the concentrations in the subsurface air; however, given the uncertainties described above, the value of risk results produced in such an exercise would be highly questionable. EPA recognizes that, for some environmental settings and for some receptor species, this is a limitation of screening analyses that are not site-specific.

1.27 EDF Comment

E. Population Risk

EPA states that although it believes that certain risks presented by these waste streams are significant and justify listing of three of the six wastestreams, EPA states that the population risk, i.e., the actual number of people subject to an increased risk, is small. EPA further states that EPA does not believe it is appropriate to allow individuals to be substantially at risk simply because there are few individuals exposed to the risk, EPA requests comment on this analysis and whether it is appropriate to give weight to this in its determination to list these wastes. For the reasons outlined below, it is not appropriate to give weight to population risk in conducting a risk assessment in listing determinations.[38]

Even assuming arguendo the number of people "actually at risk" is indeed small, we strongly support EPA's position that environmental policy should not allow unacceptably high risks even for small populations. Pursuant to Executive Order 12898, EPA is directly required to ensure that no segment of the population bears disproportionately high and adverse human health and environmental effects as a result of EPA's policies, programs and activities. Moreover, nothing in RCRA or in EPA's implementing regulations authorizes EPA to ignore serious risks to "small" numbers of people. Indeed, EPA's listing regulations found at 40 CFR 261.11 clearly state that EPA is to list wastes if the wastes are capable of posing a substantial present or potential hazard.[39] There is not a limitation on this mandate based on the number of people at risk. EPA's Guidance for Risk Characterization (EPA 1995) states that when small populations are exposed, population risk estimates may be very small, and "in such situations, individual risk estimates will usually be a more meaningful parameter for decision-makers." Consequently, EPA's decision regarding whether to list wastes should focus of the risk posed to the individual (as well as to the environment) and not on whether there are many such individuals at risk.

If EPA does conduct an assessment of the population at risk, it should do so according to clearly articulated guidelines and methodologies, which it did not do so for the instant rulemaking. EPA

[38] There is no basis in the record of this rulemaking for assuming the population at risk is small.

[39] 40 CFR 261.1 1(a)(3)(xi).

should conduct an full analysis of the populations at risk before it assumes the number of people at risk is small.[40]

This analysis must not be based solely on current land use patterns but on future land use patterns as well. EPA must consider present and future population growth in the areas surrounding the facilities. According to news reports, census information from the areas around Baton Rouge and Lake Charles reflects that the population in this area is booming. This growth must be included in any analysis of the population at risk.

Agency Response:

EPA agrees with the commenter that individual risk is an appropriate decision parameter. EPA notes that the use of "population risk" is not explicitly required 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 cause substantial risk to nearby residents simply because there are few individuals or wells in the immediate area. Our final listing determinations for chlorinated aliphatic production wastes are based solely on our assessments of individual risk. Our decision to list EDC/VCM and VCM-A wastewater treatment sludges is based on the concern over risks to those individuals who are 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, the Agency must protect against potential, as well as present, risks that may arise. EPA's authority to base its hazardous waste listing decisions upon 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).

1.28 EDF Comment

If EPA were to analyze the populations at risk, EPA should look at the <u>actual</u> populations at risk. EPA should assess and consider the aggregate presence of multiple environmental hazards in communities (TSDFs, TRI reporting facilities, municipal landfills, major highways, and other potential hazards) in order to understand the populations susceptibility to the health risks posed

[40] Review of all background documents contained in this rulemaking has not uncovered any examination EPA conducted of the population surrounding the relevant chlorinated aliphatics industry facilities, or the population along the transportation route to off-site waste disposal sites. or the population surrounding the waste management facilities. Review of the background documents did not uncover any calculations of the human population by census defined units or other larger units to approximate the demographics of the relevant areas. Certainly, this is essential to determine the number of people living close by or along the transportation routes.

by the waste management practices.[41] Even assuming arguendo that expected daily releases reaching neighboring communities from this particular industry's waste management may be small, the aggregate impacts may be great and high importance must be placed on these multiply impacted communities. Thus EPA must consider this population not only in light of the risks posed by the instant wastestream but also other past and existing environmental and health hazards.[42]

This is particular so in the Lower Mississippi Corridor, otherwise referred to as "cancer alley."[43] The population of this area - primarily people of color and poor communities - has been and continues to be subject to the cumulative presence of and exposure to multiple sources of pollution. It is well recognized that this area has disproportionately high number of facilities.[44] In the Lower Mississippi Corridor, there are more than 136 facilities that manufacture plastics, gasoline, paints, fertilizers, etc.[45] In just two communities, Geismar and St. Gabriel, there are 18 plants in just 9.5 square miles.[46] The preexisting disproportionate toxic burden borne by the communities impacted by this rulemaking (from Freeport, Texas to Geismar, Louisiana and

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[41] EPA is directed to consider this by Clinton's Executive Order No. 12,898, 3 CFR 859 (1995).

[42] For support of this, see Kelly Colquette and E. Robertson, Environmental Racism: The Causes, Consequences and Commendations, 5 TuI.Envtl. L. Rev, 153 (1992)(listing health hazards face by poor people through disproportionate exposure to chemicals).

[43] "Cancer Alley" is an 85 mile stretch of the Mississippi River between Baton Rouge and New Orleans where annually more than 900 million pounds of toxins are released into the air, ground and water. See Environmental Protection Agency Cabinet Elevation- Environmental Equity Issues: Hearings Before the Subcomm. on Legislation and National Security of the House Comm. on Governmental Operations, 103 Cong. 21, 23 (1993).

[44] Bullard, Robert, Mississippi River Symposium, Building Just, Safe and Healthy Communities, 12 Tul. Envtl L.J. 373, at 397, Spring, 1999. There are many examinations of the disproportionate burden borne by the Gulf Coast area and vicinity. For argument outlining why this disproportionate impact should not continue, see David Laws and Lawrence Susskind, Changing Perspectives on the Facility Siting Process, 29 Me Pol'y Rev. Dec. 1999. See also ethical analysis as to why strategies disproportionate impact in Bullard article, Building Just, Safe and Healthy Communities, cited above in this note.

[45] Id. At 43

[46] Id.

beyond) has been extensively documented.[47] The evidence from existing facilities is overwhelming:

** In 1994, Condea Vista in Lake Charles, Louisiana was reported to have had 39 chemical accidents, releasing a total of 129,500 pounds of toxic chemicals. In 1995, Condea Vista reported 90 accidental chemical releases.[48]

** On December 24, 1997, a 500,000-gallon storage tank at Borden Chemicals & Plastics in Ascension Parish, Louisiana "blew off its top with a detonation heard for miles around, forcing the closure of Louisiana Route 1 and the voluntary evacuation of some neighbors." Over a year before (August 22, 1996), equipment failure during the restart of Borden's facility caused 8,000 pounds of "hazardous materials" to be released.[49]

** On June 24, 1997, a five-minute leak caused by an overpressured vent in a new ethylene dichloride reactor at the Dow Chemical Canada plant in Fort Saskatchewan, Alberta caused 38 workers to be treated for chlorine inhalation.[50]

While the industry might suggest that major problems in this area are a thing of the past, problems continue to surface. For example, in March 1998, Borden Chemicals and Plastics and the federal government reached a settlement under which Borden would pay a $3.6 million penalty and clean up groundwater pollution at its plant in Geismar. The fine was described by a U.S. Attorney as "the largest ever for hazardous-waste law violations in Louisiana." The settlement ended a case in which the U.S. Environmental Protection Agency claimed Borden failed to investigate and clean up contamination at its site, failed to report toxic spills, and ran an incinerator without the proper license. Borden said in a news release that the penalty is "less than 1 percent of the $800 million judgment sought by the government.[51]

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[47] 5ee, e.g., Commission for Racial Justice, United Church of Christ, Toxic Wastes and Race in the United States (1987); US Gen. Accounting Office, Siting of Hazardous Waste Landfills and Their Correlation with Racial and Economic Status of Surrounding Communities (1983); Office of Policy Planning and Evaluation, US EPA, Environmental Equity: Reducing Risk for All Communities (1992).

[48] Id. See also Toxic Release Inventory information through EPA's web site and available at www.scorecard.org.

[49] Id.

[50] Id.

[51] There are other examples. For instance, in late 1997, a Louisiana jury found Condea Vista Chemical Company, a large PVC producer in Lake Charles, Louisiana liable for "wanton and reckless disregard of public safety' for one of the largest chemical spills in U.S. history. Vista was charged (in what observers described as one of the largest environmental damage suits in Louisiana history) for dumping an estimated 19-47 million pounds of ethylene dichloride. a suspected human carcinogen, into the local estuary. Without yet offering equitable compensation, Vista has also contaminated the groundwater in the neighboring poor, African-American community of Mossville.

In summary, in accordance with RCRA and EPA regulations and policies, EPA should consider risks posed to the individual regardless of the number of individuals facing that risk. If EPA attempts to calculate populations, it should do so according to a clear methodology with an opportunity for public input.

Agency Response:

EPA acknowledges the commenter's concerns regarding what EPA should evaluate should the Agency were to analyze populations at risk in a listing determination. As explained in more detail in response to the commenter's previous comment in Section 1.28 above, our final listing determinations for chlorinated aliphatic production wastes are based solely on our assessments of individual risk.

1.29 EDF Comment

F. Other Risk Assessment issues

1. EPA must consider nonroutine exposures.

Virtually the entire risk modeling effort is confined to long-term chronic risk exposures, i.e., primarily indirect exposures offsite of a management facility. Activities at the waste management unit itself are ignored and thus risks to workers and others at the waste management facilities. EPA should also consider acute exposure risks through accidents and other "non-routine" waste management conditions.

There are a set of climatological and operating conditions at a land treatment unit or landfills which are non-routine but clearly happen at predictable intervals. EPA asserts that dioxin particulate distribution is unlikely because the wastes are wet and the materials covered. However, EPA is apparently not considering a dry day when the winds blow from 40-60 miles per hour. Under such windy conditions, it would be possible for substantial amounts of dioxin-contaminated solids to be moved out of an exposed landfill. In fact, just such a situation occurred recently a Region 8 RCRA facility (land treatment) because of unusual windy conditions.[52] Since the amount of particulate movement varies with wind speed, the mass of dioxin-particulate moved under these conditions in one day might exceed the amounts predicted for a year or more if wastes in an landfill are uncovered. Once dispersed beyond the unit boundary, the particulates are subject to resuspension and further movement. EPA should consider this type of plausible waste management. This kind of situation could also occur more easily under drought conditions, and certainly often for a landfill located in the more arid areas.

Another example of a non-routine situation would be very heavy rainfall. For an unbermed land treatment area, fairly, substantial amounts of dioxin-laden surficial soils could be moved both

[52] 0ra1 communication with US EPA Region 8 employee involved in RCRA programs.

overland and into nearby surface streams. A similar situation could also affect landfills, generating excessive amounts of leachate, eroding berms, etc. It seems likely that such a not unusual events might result in much wider distribution of contamination than the current modeling predicts. A hurricane is also not an unusual event on the Gulf coast.

This type of analysis has long been used for a long time by the AEC and DOE for nuclear materials. The key to the appropriateness of this kind of analysis is the relative toxicity and persistence of the waste streams. The dioxin wastes fit both categories as ones deserving of further consideration.

Agency Response:

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).

1.30 EDF Comment

2. Wet vs. dry weight waste sludge measurements

Although not clearly discussed in the rule preamble, the background document "Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination" mentions on page 2-14, that "analytical results for wastewater treatment sludges … are reported on a 'wet weight' basis". EPA suggests on the same page that, wet weight concentrations most accurately reflect the concentrations of the constituents in the sludges because the sludges are not subjected to further drying after the point in the facilities' process at which samples were collected; that is, the sludges are generated and disposed in the 'wet' form in which we sampled them (the sludges contain from 41 to 74 percent moisture).

This rationalization represents poor chemistry. Use of a "dry-weight" measure is a standard practice for soils and solids, precisely because the moisture content can vary. While it may remain constant in a given sample, it becomes extremely difficult to compare concentration measurements between samples, and especially for risk assessment following various mass transfer model mechanisms. One good example is the "maximum concentrations" provided in

Table VIII- 1 of the preamble for CERCLA Reportable Quantities calculations in the instant rulemaking The maximum 2,3,7,8-TCDD value for K174 is shown at 39 ng/kg (3.9 x 10-7 mg/kg). This is a wet weight value. The comparable dry weight maximum value was reported as 150 ng/kg, roughly four times higher.

Use of wet weight measurements poses interpretation problems. In Table VIII- 1, for example, how should one compare these measurements to the listed maxima? These were provided as wet weights: any given sample may have a different amount of moisture in the sample. Use of wet weight concentration data also implies that there is no absolute concentration-- change the moisture content and the same dry weight concentration has a different wet weight value.

It is also unclear how these wet weight concentrations were used in risk modeling. So long as risk models account for the amount of moisture (in effect standardizing at a dry weight concentration), it may not be problem. However, if wet weights were used instead of dry weights throughout the modeling exercise, the overall risk may have been underestimated for K174 in proportion to the moisture content.

Agency Response:

EPA disagrees with the commenter that using wet weight analytical data in the risk assessment modeling represents "poor chemistry." As explained on pp. 2-14 through 2-15 of the Risk Assessment Technical Background Document, the sludge volumes that we evaluated in our risk assessment are the volumes of the sludges as generated, that is, the "wet" volumes. Therefore, in order to correctly determine the mass of hazardous constituent which is disposed (and which is the key element of the risk assessment), it is necessary to use the concentration corresponding to that volume, which is the wet weight concentration.

1.31 EDF Comment

V. IMPLEMENTATION ISSUES

A. Implementation of the Contingent/Conditional listings[53]

EPA requests comment on certain aspects regarding the implementation of the contingent management listing for EDC/VCM sludges, which will be addressed in this section of the comments. EPA does not provide any information regarding the implementation of the conditional listing of VCM-A sludges. Thus, it is not clear at all what EPA intends in this regard. As a legal administrative matter, this failure to provide information on the optional conditional listing approach for VCM-A sludges fails to provide adequate notice for public comment.

[53] EPA seems to be using the term "contingent' interchangeably with "conditional."

1. Assuming arguendo EPA promulgates contingent/conditional listings, the contingent management waste should remain hazardous waste until all contingent management conditions are met.

EPA requests comment regarding its proposal that waste that does not meet the contingent management conditions is to be considered hazardous from the point of generation. EPA states that since the contingent management conditions are conditions for the waste to be not listed and thus "exempt" from RCRA Subtitle C standard, then if the contingent management requirements are not met, the waste generator and transporter and disposal facility have violated the full range of RCRA requirements and has been illegally managing a "hazardous waste" as a"nonhazardous" waste. Any thing less than this would cut a huge whole through RCRA's requirements and enforcement and would not ensure adequate legal remedies for violations of the conditional requirements. More fundamentally, failure to expressly provide for full enforceability against all parties in the waste management chain (generator, transporter, disposer) will cripple enforcement by allowing pass-the-blame games. A "written commitment" from a generator who consigns wastes to a transporter or disposal facility for offsite landfilling is meaningless unless it is enforceable and EPA's only available enforcement tools are provided by RCRA hazardous waste status.

Assuming arguendo EPA is to go forward with the contingent management proposal despite the arguments presented in these comments, EPA should require the contingent management waste be covered by Subtitle C until the waste is disposed of in compliance with the contingency. Prior to actual disposal, the waste should be managed as a hazardous waste according to all applicable RCRA provisions, including 40 CFR Parts 262 (for generators) and 263 (for transporters) and Part 268 (regarding treatment prior to land disposal). These requirements include compliance with the waste manifest provisions of 40 CFR Part 262, subpart B, and the pre-transport provisions of 40 CFR Part 262, subpart C, which contains, among other provisions, the provisions governing hazardous waste accumulation. Treatment and storage prior to disposal would remain subject to Parts 264, 265, and 270.

Agency Response:

Under the contingent management listing approach finalized today for EDC/VCM wastewater treatment sludges, EDC/VCM sludges will be hazardous wastes unless they are managed in a subtitle C or a non-hazardous waste 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. If the waste is not disposed of in a landfill as described in the listing description, then the waste meets the listing description and must be managed in compliance with subtitle C management standards from the point of generation.

The Agency disagrees with the commenter's contention that EDC/VCM wastewater treatment sludges should be identified and managed as hazardous wastes until all conditions of the conditional exclusion are met (*i.e.,* sludges should be listed as hazardous wastes until disposed of in a landfill). The Agency's risk analysis indicates that this waste does not pose a substantial hazard to human health or the environment when managed in a landfill. Therefore, the Agency has determined that it is appropriate to finalize a conditional listing for this waste. The waste is *not* hazardous when disposed in a landfill (and not placed on the land prior to being landfilled). Therefore, EDC/VCM wastewater treatment sludges destined for management in a landfill are not subject to RCRA subtitle C management requirements, as is the case with all other solid wastes for which EPA has made a determination not to list the waste as hazardous.

1.32 EDF Comment

2. EPA should require manifests.

EPA requests comment on how generators should demonstrate that their wastes are managed in accordance with the contingent management requirement. Assuming EPA promulgates contingent management/conditional management listings despite the arguments above, EPA should require a waste manifest (and all the related RCRA required notices and descriptions) for these materials sent off site, as set out in 40 CFR 262.20-262.23.[54] The purpose of a manifest is to ensure that hazardous waste destined for off-site treatment, storage and disposal actually reaches its destination. The manifest is a blueprint of accountability in the event of improper disposal of the waste. This is exactly what EPA needs here, as in fact these materials are hazardous, and the procedures are already set up.[55] In addition, EPA should require that the generator to send a notice to the off-site disposal facility (as required by 40 CFR 268.7) stating the disposal requirements for this waste. For generators that dispose of these wastes on-site, EPA should require a certification statement (added to the already required generator reports -the biennial report) that the materials where managed in a landfill.

In addition, these contingent management approaches can not be considered "minimize threat" levels because risks to human health and the environment would not be minimized if the waste ended up in the wrong type of management unit. This is particularly likely as EPA is not even proposing to require a waste manifest system.

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[54] This approach is in line with the above suggestion that the waste be considered hazardous until it is landfilled.

[55] In EPA's recently proposed HWIR waste rules, EPA is proposing to require a manifest in similar situation.

Agency Response:

The Agency thanks the commenter for their suggestion. However, given that the Agency's risk analysis indicates that this waste does not pose a substantial hazard to human health or the environment when disposed in a landfill, the Agency is not listing this waste as hazardous when managed in this manner. The waste is not hazardous. As the commenter points out, the manifest is " to ensure that *hazardous waste* ... reaches its destination." Since the Agency has found that the waste is not hazardous, except in those circumstances where it is not managed by being disposed of in a landfill, EPA sees no reason to require a manifest. Generators and other handlers of non-hazardous wastes are not required to comply with the hazardous waste manifesting requirements for shipments of non-hazardous waste. The Agency sees no reason to make an exception here. EPA notes that based upon information in the record, all but one generator of EDC/VCM sludge sends this waste to a licensed landfill (the exception being one facility that manages the waste on-site in a land treatment unit). EPA disagrees that imposing the hazardous waste manifesting requirements will provide any additional assurances that the waste will continue to be managed at licensed landfills. See also EPA's response to Section 2.19 of this Response to Comment Document (comments from ETC) on this last point.

EPA also disagrees that the notification requirements of 40 CFR 268.7 should be "required" for EDC/VCM wastewater treatment sludges going to a landfill under the conditions of today's K174 listing determination. EDC/VCM wastewater treatment sludges destined for disposal in a landfill are <u>not</u> hazardous wastes, therefore, the LDR requirements do not apply to the waste.

1.33 EDF Comment

3. Dry vs. Wet Weight Data Considerations

In the development of BDAT, EPA used wet weight maximum values for comparison with existing and proposed LDR treatment concentration limits. The final columns of Tables 3-1, 3-2, and 3-3 in the BDAT background document reflect these maximum wet weight values. EPA should instead base its numbers on dry weights to standardize comparisons. In reviewing the basic sludge sample data from the background listing document, the percent solids ranged from as low as 16.9% to as high as 59.9% for the 12 sludge samples analyzed. The range for the four EDC/VCM sludge samples was from 25.9 to 59.9%. Clearly, for comparison with fixed LDR standards, dry-weight values should be used. This is only relevant to K174 and K175 sample data.

Agency Response:

The commenter correctly notes the presentation of a comparison of wet weight values. We agree with the commenter that a presentation against dry weights would have been more appropriate for the reasons stated, and because

nonwastewater treatment standards for organics were developed largely from testing of dry incinerator ash. The final LDR Background Document has been modified to also reflect waste results on a dry weight basis.

The subject comparison did not significantly impact the identification of constituents for which treatment would be required. In addition to the constituents proposed, only di-n-butyl phthalate in K175 would exceed its UTS on a dry weight basis, but not on a wet weight basis. It is not clear how di-n-butyl phthalate contaminates K175, as it is not directly used in the VCM-A process, and we do not anticipate that incineration, upon which the UTS standard for di-n-butyl phthalate was based, would be used to treat this high mercury content waste, or would be appropriate without effective capture controls. Consequently, we find that the UTS of 28 mg/kg is not appropriate in this instance and have not added di-n-butyl phthalate to the list of constituents for which treatment of K175 will be required.

1.34 EDF Comment

4. pH effects with TCLP metals

Despite the importance the Agency places on pH effects with TCLP metals (highlighted in the K175 discussions), no pH data for either the wastewater or sludge samples was collected. The Agency failed to consider in its treatment standard and technology development discussions whether pH would be a significant variable (except for non-wastewater K 175). It is also noteworthy that in Tables D-l and D-2 of Appendix D to the Background Listing document, a fair number of waste streams already carried a D002 (corrosivity) code. While this could mean waste streams of < 2 or > 12.5 pH, the latter is probably more likely given the use of caustics in production. This could affect the TCLP values for any of the measured constituents.

Agency Response:

For K174, arsenic was identified for treatment. For these wastes, the Agency choose to transfer the identical standards applicable to all other arsenic metal-bearing wastes (the exception being K088). K174 sludges if less than or equal to pH 2 or greater than or equal to pH 12.5 must be neutralized prior to disposal. The resulting K174 sludge wastes are not expected to exhibit extreme pH properties, at the time of disposal, that could impair the predictions of mobility by the TCLP as was observed with K088. The Agency is undertaking a further review of the behavior of treated arsenic-bearing wastes, which may support broader changes to the treatment standards for all arsenic-bearing wastes. (See also 65 FR 37940-37947, June 19, 2000.) Should changes to the current standards be warranted, they will be the subject of a future proposal.

SECTION 2
Environmental Technology Council
CALP-00015

The Environmental Technology Council (ETC) submits these comments on EPA's proposed Identification and Listing of Chlorinated Aliphatics Production Wastes, 64 Fed. Reg. 46,476 (Aug 25, 1999).

Interest of the ETC

The ETC is a national trade association that represents the commercial hazardous waste management industry. ETC members are companies that provide their customers with the technologies, facilities, and services for source reduction, treatment, recycling and secure disposal of industrial and hazardous wastes throughout the United States. These ETC companies are the nation's infrastructure for the proper management of the byproducts and waste materials that result from industrial and manufacturing activities.

As a result, ETC companies are directly and substantially affected by EPA's proposed listing and non-listing determinations under RCRA for these aliphatic production wastes. In particular, EPA's rulemaking will have significant impacts on the ETC companies' research and development, current and planned investments in technologies and facilities, and most importantly the opportunity to provide safe and protective management of hazardous wastes. In addition, the ETC has substantial expertise to comment on the technical and policy issues raised in EPA's proposed rulemaking.

In this document, the ETC responds to many of EPA's requests for comment in the proposal However, in the time available, the ETC was not able to obtain all of the data and information that would be most useful to EPA, or to fully consider and develop support for all of the highly significant policy issues raised in this rulemaking. We understand that EPA has been working on the chlorinated aliphatic wastes rulemaking for a number of years, but due to the deadlines in the consent decree in Civ. No. 89-0598 between EPA and another party, the comment period on this rule was 90 days. The ETC intends to continue its efforts to fully respond to EPA's requests for data and information, which we will provide in supplemental submissions to the Agency in the near future.

2.1 ETC Comment

Comments on EPA's Information Collection Activities

The ETC urges the Agency to carefully re-think, both for this rulemaking and for future waste listing actions, the purpose for the agency's information collection efforts and how the resulting information is used. In some recent listing actions, such as the Solvent Waste Rule, EPA purported to perform a comprehensive and complete survey of all waste generation and management practices. Such an approach is impractical, indeed impossible, for wastes that are generated from multiple activities in a wide range of industries. In such cases, the Agency should utilize a statistically valid random sampling program, both for the survey questionnaire and the sampling efforts, rather than attempt to conduct a complete survey of all affected industries. In addition, EPA should always include a waste sampling and analysis component to its information collection effort. It simply makes no sense for EPA to make listing determinations without actual data on toxic constituents and properties from representative waste samples.

On the other hand, some of EPA's listing actions focus on a specific industry. Where the definition of the affected industry is clear and the number of facilities is manageable, EPA should obtain survey information and waste samples from all affected facilities. In that way, the agency will obtain a more accurate and reliable information base for the listing actions.

In EPA's Response to Comments for this rulemaking, please explain whether the agency has a policy regarding the use of a random sampling vs. a complete survey approach for the purpose of listing determinations.

Importantly, EPA must supplement its industry survey investigation with information on historic and possible future waste management practices. EPA's survey questionnaires only obtain information that relates to a narrow time period, often just the year of the industry survey. For example, in this chlorinated aliphatics waste rulemaking, the survey was conducted in 1992 and updated in 1997. That survey period is inadequate, however, for making hazardous waste determinations that will be effective, and as a practical matter will be the final decision, for years and decades into the future.

In the Response to Comments for this rulemaking, please describe the information collection efforts that EPA undertook to determine past waste disposal practices for these chlorinated aliphatic wastes, including pre-RCRA practices, and to evaluate the possible future management practices. For example, EPA decided not to list allyl chloride sludges because the generator currently disposes of that waste in an on-site incinerator. What information did EPA obtain on this generator's disposal practices before the on-site incinerator was used? Did EPA consider the potential future impact of MACT standards for waste combustors, or the likelihood that the generator will replace waste combustion with landfill disposal due to economic or political concerns? It would appear that there are no legal, technical, or economic barriers to this generator changing its current waste management practice in the future.

EPA should not rely solely on its industry survey questionnaires to determine plausible improper management of the wastes. First of all, the agency must recognize that respondents are unlikely to report when and how they may have improperly managed their wastes. Although false statements on a Section 3007 survey response may be legal grounds for penalties, EPA should be concerned that survey responses can be "true" but still not fully disclose all waste management practices. EPA must use other available information, including the Superfund and RCRA corrective action databases, the TRI and BRS report databases, state agency and news media databases to determine the plausible improper management practices.

Agency Response

Strategies for the collection and analysis of data to support each listing determination are developed separately and depend upon factors such as the scope of the industrial waste category that has been targeted for the listing effort, the characteristics of the wastes to be collected and analyzed, and the universe of generators and waste management scenarios associated with the waste(s) under review. In every case EPA endeavors to collect the appropriate amount of information to support its hazardous waste listing determinations, while taking into account a variety of factors including those pointed out by the commenter. EPA believes that the records supporting the proposed and final chlorinated aliphatic listing determinations contain adequate and representative information with which to make informed and reasonable conclusions regarding whether or not the subject wastes should be listed as hazardous.

The commenter suggested that in cases where a specific industry is under review, "EPA should obtain survey information and waste samples from all affected facilities. In that way, the agency will obtain a more accurate and reliable information base for the listing actions." No specific information was provided by the commenter indicating that the information EPA collected was not representative or adequate to support the proposed and final chlorinated aliphatic listing determinations.

In the case of the chlorinated aliphatics listing determination, we did not visit nor did we sample every facility. Section 2 (Industry Description) of the Listing Background Document for the Chlorinated Aliphatics Listing Determination describes in detail the process the Agency used to evaluate this industry. This process included 1) the collection of RCRA 3007 survey information from *all* generators potentially affected by the listing determination for two time periods (1992 and 1996 update); 2) information on waste generation, management practices, and waste characteristics from engineering site visits to 16 of 23 facilities; and 3) record sampling events at 12 of 23 facilities selected using the criteria presented in Section 2.2.4 of the Listing Background Document.

EPA identified potential 'subcategories' of wastewater and wastewater treatment sludges within the larger universe of 'chlorinated aliphatic wastes' based upon survey responses and engineering site visits. In some cases, such as wastewater treatment sludges from the production of methyl chloride and allyl chloride, the Agency found only one facility that generates the waste and manages it as a non-hazardous waste, and in this case EPA collected samples from each of these facilities. Both wastes are generated from continuous production processes and information available to the Agency provides no reason to believe that the physical and chemical characteristics of the waste varies over time. Similarly, in the case of the VCM-A wastewater and wastewater treatment sludges, EPA found only one facility that generated this waste and made sure to collect samples from the facility.

In the case of EDC/VCM manufacture (which represents greater than 85% of the total chlorinated aliphatic chemicals produced) EPA believed it was reasonable to collect waste samples from some (but not all) facilities, and still treat the data as representative of this segment of the industry. Using RCRA 3007 survey information, engineering site visits, and EPA's best professional judgement, EPA reasoned that adequate similarities existed between EDC/VCM facilities to allow for less than 100% sample coverage where 1) multiple facilities use similar production processes used to make the same product(s) and are operated in a continuous fashion (i.e., are not batch processes that would tend to produce more varied or heterogeneous products), and 2) the resultant generation and management of wastewater and wastewater treatment sludges appear similar (e.g., wastewater is treated in biological treatment tanks, wastewater treatment sludges from biological treatment are removed and dewatered prior to disposal in landfills). As shown in Table 2-10 in the Listing Background Document, for EDC/VCM manufacturers EPA sampled 8 of 13 (62%) wastewater treatment facilities, which EPA believes provides adequate coverage of this segment of the EDC/VCM manufacturers given the factors described above.

In addition, to ensure that samples taken are representative, prior to individual sampling trips EPA contacted each generator to ensure that at the time of the sampling event the generator plant would be operating under normal operating conditions, and this fact was confirmed in all cases again, immediately prior to collection of samples. Following sampling and analysis, EPA reviewed and compared analytical data across sampling events. If split samples were taken and provided to the generator, EPA reviews and compares each set of analytical results for the split samples. Should extreme and/or unexpected variations occur in the presence or concentration of constituents across samples taken from similar production processes, the Agency may decide to re-sample, or minimally to discuss such variations with personal from the generating plants. In the case of analytical results obtained from chlorinated aliphatic

samples, no such unexpected or extreme variations in analytical results caused the Agency to be concerned about sample validity.

Regarding the commenter's statement that EPA must supplement the RCRA 3007 Survey information with information on historic and possible future waste management practices, and their request that EPA describe what types of information collection was undertaken to identify these practices, the Agency points out that there are several places in the RCRA 3007 Questionnaire (see Appendix A, Listing Background Document) that solicit this type of information. For example, Question 7.10 asks the respondent to indicate any planned changes in residual management methods, the anticipated date of the change, and to provide information on any changes they foresee in future. In Section 8.0 of the Questionnaire respondents are required to submit information on specific waste management practices that provide information on potential changes in future management practices. For example, information is solicited on current operating capacity versus maximum design capacity for combustion units in Sections 8.4 and 8.5 (an indication of how close a unit may be to reaching its capacity, which may require the facility to obtain additional capacity in the future, possibly through a different waste management practice). Section 8.7 (surface impoundments) requests information on anticipated closure of the management unit, and whether tanks will be installed to replace the capacity. Section 8.8 requests specific information for any on-site landfills that have closed.

EPA does not necessarily rely soley on RCRA 3007 Survey information to determine plausible mismanagement practices, however these instruments are an important part of the process. Nevertheless, while EPA is not (as the commenter suggests) going to assume that the survey respondent is providing incorrect or misleading information, EPA does perform a rigorous quality assurance review of the survey responses. As described in Section 2.2.2 of the Listing Background Document, after receiving the chlorinated aliphatic survey responses, EPA's contractor SAIC performed an exhaustive engineering review of each facility's response, and followed up with letters and phone calls to clarify, correct, and add data where needed. As already described above, EPA visited many of these sites which provided an additional opportunity to confirm information obtained in the surveys. In addition, if the Agency feels it is necessary to obtain more information on any particular facility's waste management practices, either past or future, EPA will contact State and EPA Regional offices to learn more about a particular facility, or seek out information from commercial, federal, and State databases now widely available through the internet (examples of which were included in the record to the proposed rule).

In summary, EPA disagrees with the commenter that the survey results represent "too narrow" a time frame to determine plausible management practices,

considering the types of information EPA solicits in the survey regarding current waste management practices and potential changes in these practices. The RCRA 3007 Survey results, the exhaustive follow-up quality assurance reviews, numerous site visits, and any additional information EPA finds necessary to obtain to better understand industry practices, all help determine how the wastes are presently being managed and identify any potential changes that may occur. Absent evidence from this information that practices will change in the future, the Agency cannot merely speculate that a new waste management practice will be used. In Dithiocarbamate Task Force v. EPA (No. 95-1249), the court held that the EPA must have a factual basis for determining that mismanagement may occur. (See Opinion at 8-10, 14, 15-16). Likewise, EPA has to make some reasonable judgements on the plausibility of someone using a waste management practice that has been discontinued within the industry (i.e., a "historic" practice), and there is no indication from the information EPA has that this will change.

2.2 ETC Comment

Comments on EPA's Approach to
Conducting the Human Health Risk Assessment

Insufficient analytical data was used in the risk assessment. The sampling effort EPA undertook appeared to be comprehensive, yet little of this data was used in the risk assessment. A total of 15 "familiarization" samples and 52 "record" samples were collected, making a total of 67 samples (see 64 FR 46481/3). Yet of these 67, EPA only used data from 6 wastewater samples and 3 sludge samples as input to the risk assessment (64 FR 46483/3). EPA's rationale for doing so is that these 9 samples could be considered "dedicated" in that the processes contain no other sources of other types of wastewaters. The ETC disagrees with this arbitrary criterion for rejection of 86% of the valuable analytical data obtained. The purpose of the sampling was to identify constituents of concern (COCs) and concentrations to use in the risk assessment. It is highly likely that the samples not used contained higher concentrations of COCs or other COCs specific to this listing that were not evaluated because EPA did not utilize this data. EPA does not even compare the data for "dedicated" versus non-dedicated samples, to justify the validity of excluding the non-dedicated samples. The key first step to a valid risk assessment is to adequately characterize the hazardous constituents of concern and concentrations as inputs to the model. EPA failed to do so because an arbitrary screen was applied to the data.

Because of this, the COC's evaluated in the risk assessment may have been far from complete. On page 46484/1 of the preamble, EPA states that 16 of the constituents detected in EDC/VCM sludges were eliminated and 11 constituents in methyl chloride sludge were eliminated from consideration in the risk assessment, simply because the detected levels were below the quantitation limit. Yet this was based on only 3 samples, and it is possible that many of the other 20 samples had significant levels

above the quantitation limit for these constituents. There is no evaluation of this possible scenario, even though the data is at EPA's fingertips.

In addition, the ETC objects to the arbitrary exclusion of certain hazardous constituents in the sampling and analysis program. For example, on page 46484/2 EPA states that PCBs were not analyzed, and provides no rationale for this decision. What other constituents were not analyzed that are not discussed in the preamble? The sampling and analysis program for any listing determination must include all Appendix VIII constituents. In the Response to Comments in this rulemaking, please compare the constituents and constituent concentrations in the samples that were not used to the samples that were used for the risk assessment.

Agency Response

As explained in the preamble to the proposed rule (see 64 *FR* at 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 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. In addition, samples from wastes that were currently defined and managed as hazardous waste at the time of sampling were also not used, because the Agency chose to limit its assessment to wastes not already regulated as hazardous by the Subtitle C system. Given that the scope of the listing determination was limited to wastes from chlorinated aliphatic manufacture, EPA believes that it was appropriate to limit the analytical data used in the risk assessment for the listing determination to those wastes that are most clearly representative of chlorinated aliphatic manufacture (i.e., "dedicated" samples), and wastes not already regulated as hazardous.

Once EPA had identified the samples that were to be used in the risk analysis, EPA then determined what are the "Constituents of Potential Concern," or COPCs, for those samples. (See EPA's response to EDF in Section 1.18 of this Response to Comment Document for discussion of this process). EPA did not determine the COPCs for waste samples that it had already determined would not be used in the risk analysis as described above.

EPA developed a list of constituents of potential concern (COPCs) by first compiling a complete list of constituents detected in the waste samples collected and analyzed as a result of facility site visits. We then eliminated constituents from the list that occurred at concentrations that were clearly below levels of concern, based on screening analyses developed to maximize risk estimates (*i.e.,* bounding analyses using worst case exposure assumptions).

In the case of chlorinated aliphatic wastewaters and EDC/VCM wastewater treatment sludge, we also eliminated constituents from the list of COPCs if a constituent was detected in only one of the samples and the concentration of the constituent in the one sample was qualified with the "J" qualifier, indicating that the constituent was detected below the quantitation limit and the reported value was estimated. As stated in the proposed listing determination for the wastes from the dyes and pigments industry (59 FR 66072), EPA's policy is to consider constituent concentration "J values" in its analyses supporting listing determinations within the overall context of the Agency's weight-of-evidence approach. However, the Agency also considers the uncertainty associated with waste characterization and constituent concentration measurements that are below the quantitation level and assesses the potential impact of such uncertainties on the listing decision. In the case of the chlorinated aliphatic listing determination, the Agency only eliminated a constituent "detected" in a waste in cases where the Agency had multiple samples of the waste and a constituent was detected in only one of the samples (and not detected in the other samples) *and* the concentration of the constituent in the one sample was qualified with the "J" qualifier, indicating that the constituent in the one sample was detected at a concentration below the quantitation limit. Given the uncertainty associated with the detection (and potential presence) of such constituents in our waste characterization, EPA believes that it is reasonable to drop such constituents from consideration, and not retain the constituent represented by a single "J" qualifier in our risk assessment.

In cases where the Agency had only one sample of a particular waste (*e.g.,* methyl chloride wastewater treatment sludges), all of the constituents detected in the sample, including those constituents where the concentration of the constituent was qualified with the "J" qualifier, were retained in the risk analysis. These constituents only were eliminated from the list of COPC if the constituents occurred at concentrations that were clearly below levels of concern, based on the screening analyses developed to maximize risk estimates (*i.e.,* bounding analyses using worst case exposure assumptions).

EPA disagrees that it arbitrarily excluded constituents from the chlorinated aliphatics sampling and analysis program, and that the list of constituents should have included *all* constituents in 40 CFR Part 261, Appendix VIII. Section 10.1 of the Quality Assurance Project Plan and Section 7 of each facility-specific Sampling and Analysis Plan (all of which were in the record of the proposed rule) present the approach EPA used in developing the list of constituents that were analyzed in the waste samples. As described in those documents, EPA first developed a target analyte list based on compounds detected during familiarization sampling, the currently-regulated compounds under the F024 and F025 hazardous waste listings, and compounds that were known or suspected to be present in the wastes under review.

EPA then selected the appropriate analytical methods to use that would ensure that all target analytes would be included. Because analytical methods may include many additional constituents beyond the target analyte list (as was the case for this rulemaking), EPA ended up obtaining analytical data for many more constituents than were in the initial target analyte list. EPA believes this is a more appropriate and efficient approach when there is existing information about the wastes being studied, than to simply try to analyze for all Appendix VIII constituents (many of which cannot be readily analyzed, or are clearly not going to be present in the waste).

The commenter stated that EPA did not provide a rationale in the proposed rule as to why PCBs were not analyzed; in fact, EPA did state that ""..we do not expect PCBs to be constituents of the chlorinated aliphatics wastes that are the subject of today's listing determination." This merely reflects the approach to deriving the target analyte list described above and outlined in the record for determining the target analyte list.

For additional clarification on EPA's approach for selection of COPCs, see EPA's responses to comment in Sections 1.21 and 1.22 of this Response to Comment Document (comments from EDF).

2.3 ETC Comment

Comments on Groundwater Model

EPA used the Composite Model for Leachate Migration with Transformation Products (EPACMTP) for the risk assessment. In June 1999, EPA received a report entitled "Use of MINTEQA2 and EPACMTP to Estimate Groundwater Pathway Risks From The Land Disposal Of Metal-Bearing Wastes" (June 1999) prepared by Geo-Hydro, Inc., Denver, CO ("Geo-Hydro Report"). A copy of this report is attached and incorporated herein by reference (Attachment 1). The Geo-Hydro Report concluded that the nonlinear isotherms generated by EPA for input into the CMTP should not be relied upon to provide an accurate or even relative measure of risk. In detail after detail, there were conceptual or implementation errors that made the resulting MINTEQA2 calculations unreliable for risk assessment. Before using the CMTP to evaluate the fate and transport of inorganic contaminants, substantial changes were required in the methodology for using MINTEQA2 to calculate the requisite nonlinear isotherms.

It is not clear in the record below whether EPA made the necessary corrections and improvements called for in the Geo-Hydro Report before conducting the risk assessment for the chlorinated aliphatic production wastes. **The ETC requests that EPA ensure that all the points raised in the Geo-Hydro Report are fully addressed in this rulemaking, or provide a detailed justification for not doing so with respect to each particular point raised in the Report.**

Agency Response:

The Agency disagrees that modifying our methodology to address the commenter's concerns about MINTEQA2 and EPACMTP would alter the results of the risk analyses conducted to support the chlorinated aliphatics listing determination. The Agency's complete response to this comment is provided in Section 1.23 of this Response to Comment document (responses to EDF, CALP-00008).

2.4 ETC Comment

The ETC also has previously submitted to the Agency a report entitled "Analyses Using EPACMTP To Estimate Groundwater Pathway Risks From Disposal Of Petroleum Refinery Wastes" (July 7, 1997) prepared by King Groundwater Science, Inc., Pullman, WA (KGS Report). A copy of this report is attached and incorporated herein by reference (Attachment 2). The KGS Report evaluated four important model variables: receptor well location (constrained to the center of the downgradient plume), waste quantity (reflecting available data and longer active life of disposal units), landfill capacity (to standardize onsite landfill sizes), and leachate concentrations. The KGS Report indicated that higher receptor well concentrations and risk factors were obtained than reported by EPA.

It is also not clear in the record below whether EPA made the necessary corrections and improvements called for in the KGS Report before conducting the risk assessment for the chlorinated aliphatic production wastes. **The ETC requests that EPA ensure that all the points raised in the KGS Report are fully addressed in this rulemaking, or provide a detailed justification for not doing so with respect to each particular point raised in the Report.**

Agency Response:

The commenter submitted, in response to the proposed rule to list wastes from the production of chlorinated aliphatic chemicals, a report titled "Analyses Using EPACMTP To Estimate Groundwater Pathway Risks From Disposal Of Petroleum Refinery Wastes" (July 7, 1997). This report originally was submitted in response to the Agency's proposed rule to list wastes from the petroleum refining industry, and as a result, is written in terms of issues associated with the evaluation of the petroleum refining process wastes. EPA fully responded to these issues in conjunction with completing the final rule for the petroleum refining process waste listing determination. These responses may be found in RCRA Docket No. F-98-PRLF-FFFFF and at http://www.epa.gov/epaoswer/hazwaste/id/petroleum/. The commenter did not provide any comments or analyses that were developed specifically for the chlorinated aliphatics listing determination, but noted four topic areas from the KGS report that they suggest are relevant to the Agency's analysis of chlorinated aliphatics wastes: "receptor well location (constrained to the center of the downgradient plume), waste quantity (reflecting available data and longer active life of disposal units), landfill capacity (to

standardize onsite landfill sizes), and leachate concentrations." EPA has reviewed the KGS report and addressed these areas of concern as they might apply to the chlorinated aliphatics risk analyses.

"Receptor well location (constrained to the center of the downgradient plume)"

The KGS report contends that EPA should always locate a receptor well on the centerline of the contaminant plume for the following reasons: 1) to compensate for the effects of local heterogeneity which could produce higher contaminant concentrations in groundwater than modeled by EPACMTP; and 2) to reduce the importance of dispersivity values in controlling contaminant concentrations at the receptor well.

While EPA may have placed the receptor well on the plume centerline in modeling analyses in some past rulemakings, the Agency's risk assessment methodology has evolved. In the two-high end parameter deterministic analyses for the chlorinated aliphatics listing determination, well placement on the plume centerline was designated as a high end parameter and well placement one-half the distance from the centerline to the edge of the plume was designated as a central tendency parameter. In our probabilistic analyses, the receptor well was allowed to be randomly placed anywhere within the contaminant plume. We believe that well placement should not be constrained to a high end location on the plume centerline because the group of individuals we are attempting to characterize in our assessment of individual risk is the entire population of individuals who are exposed to groundwater contamination from the waste management unit. Such an evaluation includes those individuals who are impacted to a greater extent, such as those who we would characterize as being at the high end of the distribution of exposures, as well as those who are impacted to a lesser extent, including those who we would characterize as being at the middle of the distribution of exposures. This approach is consistent with the Agency's Guidance for Risk Characterization (USEPA, 1995).

The Agency currently uses homogeneous flow and transport models to simulate contaminant migration in the vadose and saturated zones. In these models, average or 'effective' properties are used. By using effective properties, the plume geometry is symmetric about the centerline with the maximum concentration occurring along the centerline. Some of the effects of heterogeneity have been indirectly incorporated into the model, for example, macro-hydrodynamic dispersion due to macro-scale spatial variability of hydraulic conductivity. EPA is surprised by the commenter's suggestion that the influence of dispersion should be minimized under EPA's groundwater modeling construct. Dispersion is a natural phenomenon and is an important migratory process

that results in spreading of contaminant plumes. For the macro-dispersion phenomenon, which reflects the dependency of hydrodynamic dispersion on spatial scales, Gelhar's scale-dependent relationship for hydrodynamic dispersivity is employed in EPACMTP.

On the contrary, under the influence of local heterogeneities, plume geometry may no longer be symmetric and the maximum concentrations will not necessarily occur along the plume centerline. Furthermore, local heterogeneity could cause either higher or lower concentrations of contaminants at a receptor well as compared to a homogeneous subsurface environment. For instance, the commenter refers to accounting for the presence of highly fractured subsurface zones. However, not all fractures are hydraulically conductive. Some fractures may be clay-filled or plugged due mineralization, thus actually serving to impede groundwater flow. Furthermore, contaminant transport through fractured rocks can be retarded by inter- and intra-granular matrix diffusion into the background rock matrix. In addition, because many preferential pathways are very narrow, the probability that these pathways would in reality be intercepted by a receptor well is relatively small. Lastly, we maintain that an adequate degree of protectiveness already has been incorporated into our groundwater pathway analyses. For example, we do not account for biodegradation of contaminants in the subsurface; we assume that individuals use the uppermost aquifer, rather than a deeper aquifer, as a domestic source of drinking water; and we assume that the thickness of the saturated zone remains constant, which causes groundwater to migrate faster, the peak concentration to arrive at the receptor well more quickly, and contaminant concentrations to be greater due to decreased dilution.

Reference:

USEPA. 1995. Guidance for Risk Characterization. U.S. Environmental Protection Agency Science Policy Council. February.

"Waste quantity (reflecting available data and longer active life of disposal units)"

The commenter referred to two issues that were raised in response to the Agency's evaluation of petroleum refining process wastes: 1) that the average life of a landfill should be assumed to be 40 years, not 20 years, and 2) that the waste quantities evaluated by EPA in the petroleum refining process waste listing determination do not correctly reflect waste codisposal.

As explained in the response to the same issue raised in the petroleum refining process waste listing determination, the Agency calculated that the average offsite landfill active life should be 30 years, rather than 40 years as suggested by the commenter. EPA believes that the commenter simply summed the reported average age of the landfills (19 years) and the average remaining life (21 years) to obtain 40 years. This calculation, however, is not accurate because it would overestimate the active life for existing units. This is because the average age in the report included *closed* units, not only existing units, and thus does not reflect merely the average life for units still in operation. Likewise, the average remaining life in the report included *planned* units, as well as existing units, and this also would tend to increase the apparent active life for existing units. Correcting for this, EPA calculated a 30 year active life, based on corrected values of 16.5 years for the average age of active units, and 13.3 years for the average remaining life (see *Additional Listing Support Analysis,* 1998 in the docket for the petroleum listing determination final rule). EPA used the 30-year active life in the risk assessment for EDC/VCM sludges. For the methyl chloride sludge, we had data for the specific landfill, and, based on its capacity, we estimated it would have an active life of 90 years.

In response to ETC's concerns regarding co-disposal of sludges, the Agency wishes to clarify that we did, in fact, account for co-disposal of wastes where information provided in the RCRA 3007 questionnaire responses showed that multiple generators dispose of wastes in the same waste management unit. As documented in the Listing Background Document, the Agency accounted for two instances where EDC/VCM sludges generated by two generators are disposed in the same landfill.[1] In both cases, the Agency used the combined sludge volume in assessing the quantities of sludges managed in off-site landfills.

"Landfill capacity (to standardize onsite landfill sizes)"

The commenter's concern, as expressed in the KGS report, is that in the petroleum refining process waste listing determination EPA evaluated a standard landfill size for offsite landfills, but varied the size ranges of onsite landfills by wastestream. The commenter did not take issue with EPA's approach for evaluating offsite landfills, but commented that the onsite landfill sizes should be modified to incorporate a standard size distribution consistent with EPA's approach for offsite facilities. Therefore, this comment is not relevant to the chlorinated aliphatics listing determination. In the chlorinated aliphatics listing determination, EPA evaluated only one on-site landfill, the landfill in which methyl chloride sludge is disposed. The modeled size of this landfill was

[1] See page 54 of "Listing Background Document for the Chlorinated Aliphatics Listing Determination."

based on the actual permitted area of the landfill in which the methyl chloride sludge is disposed, 600ft by 1,500ft (83,610m^2).

"Leachate concentrations"

The commenter's concerns with regard to leachate concentrations evaluated for petroleum refining process wastes, as expressed in the KGS report, focus on: 1) the measurement of benzene in TCLP analyses of the petroleum wastestreams, specifically, "benzene capture" for oily versus non-oily wastes; 2) the sample collection protocol for the petroleum refining process waste listing determination, specifically, whether sample compositing may have caused volatilization losses of benzene; and 3) the benzene leaching concentration evaluated for co-disposed wastes.

The commenter's concerns are specific to the petroleum refining process waste listing determination and are not relevant to the evaluation of chlorinated aliphatics wastes. First, and most importantly, the wastewater treatment sludges evaluated by EPA did not contain any detectable benzene, either in totals or TCLP analyses. Second, the wastewater treatment sludges EPA evaluated were not identified as oily. Third, the sampling protocol employed by EPA for the chlorinated aliphatics listing determination did not include compositing the aliquots designated for volatile organics analysis, rather, aliquots designated for volatiles analysis were collected as "grab" samples (see the facility-specific Record Sampling Trip Reports provided in the docket to the proposed rule). Lastly, the method we used for evaluating co-disposed wastes for the chlorinated aliphatics listing determination involved summing the waste volumes from individual facilities that generate EDC/VCM sludges that are co-disposed in the same off-site landfill, and using the summed waste volumes instead of the individual waste volumes in our probabilistic and deterministic risk analyses. The high end and central tendency contaminant concentrations evaluated in the risk analyses are presented in the Risk Assessment Technical Background Document (USEPA, 1999). As described in the risk assessment background document, for each iteration of the probabilistic analysis, we randomly selected a contaminant concentration from the four available samples with equal probability. Thus, the KGS report did not include any issues with respect to leachate concentrations that are applicable to the chlorinated aliphatics listing determination.

2.5 ETC Comment

Comments on EDC/VCM Sludges

EPA has proposed a "contingent management" listing for EDC/VCM sludge that would apply only when such waste is not disposed in a Subtitle C or D landfill (64 FR 46,506). The justification for this novel "contingent management" approach to listing hazardous wastes is flawed in every possible respect.

The RCRA statute mandates that EPA list hazardous wastes that may pose a significant threat to human health and the environment when improperly managed. 42 U.S.C. §§ 6903(5), 6921(b). The purpose of the statute is to include within the RCRA cradle-to-grave system those wastes that may be pose significant health and environmental threats if released into the environment. In this rulemaking, EPA determined that EDC/VCM sludge may pose such a substantial risk from dioxin and arsenic releases to the environment. That is clearly sufficient for listing purposes. **The RCRA statute does not authorize EPA to say that a hazardous waste, which is clearly a significant health risk, will only be listed based on how the waste is or is not managed**. Indeed, the whole purpose of bringing a hazardous waste into the RCRA system is to ensure that it will then be safely managed so as not to pose significant risks.

Agency Response:

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 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.

2.6 ETC Comment

EPA found based on its Section 3007 survey that generators currently manage EDC/VCM sludge in land treatment units and nonhazardous industrial landfills. EPA's risk assessment of land treatment found that airborne releases and deposition of dioxin, and surface erosion and leaching of arsenic to groundwater, pose significant risks to human health. Yet for the landfill disposal scenario, EPA evaluated a municipal landfill that assumed daily cover and run-on/runoff controls, rather than the types of onsite and offsite industrial waste landfills that are typically used by generators. Most nonhazardous industrial landfills, even those licensed or permitted under state law, are not required to have daily cover, run-on/runoff controls, or similar design and operating standards that may apply to municipal landfills. See "Nonhazardous Industrial Landfills" prepared by Environmental Information, Ltd. (1996), enclosed herewith and incorporated into these comments (Attachment 3). **Thus, EPA eliminated from its risk evaluation of landfill disposal the very exposure pathways - airborne deposition and surface erosion - that were shown to cause significant risks from land treatment**. Thus, EPA's decision to make the listing of EDC/VCM sludge contingent upon disposal in units other than Subtitle D landfills is arbitrary and capricious.

Agency Response:

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 nonetheless being implemented through operating 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 the assumptions made in the risk analysis regarding the landfill scenario were reasonable and representative of actual disposal conditions, and not arbitrary and capricious.

2.7 ETC Comment

EPA has incorrectly cited *Military Toxics Project v. EPA,* 146 F.3d 948 (D.C. Cir. 1998), as legal support for its contingent management approach. In that case, the court held only that EPA can defer to another comprehensive regulatory program, such as the DOD munitions regulations. Here, EPA has made no showing that Federal or state standards for onsite and offsite industrial waste landfills provide the same comprehensive controls as RCRA Subtitle C.

Agency Response:

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 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, and upon consideration of information collected by the Agency that indicates EDC/VCM wastewater treatment sludges are managed in landfills that are lined, have daily cover, and have runon and runoff controls, 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.

2.8 ETC Comment

The ETC further objects to the conditional listing decision for the EDC/VCM sludges on the ground that many incorrect assumptions were used in the risk assessment, that led to the erroneous conclusion that the landfill disposal scenario does not present risks. These are summarized below:

On page 46485/1 EPA states that wet and dry deposition of vapors onto plants was not evaluated, yet this is an important pathway for dioxin risk assessments.

Agency Response:

EPA agrees with the commenter that vapor phase transfer to plants is an important pathway for dioxin risk assessments; however, we do not agree that the wet deposition of vapor-phase dioxins to plants is a significant contributor to plant loadings. More importantly, we believe that the commenter may have misunderstood our statements regarding dry deposition of vapor. As explained in EPA's "Methodology for Assessing Heath Risks Associated with Multiple Pathways of Exposure to Combustor Emissions" (USEPA, 1998):

> "The term "vapor deposition" can be misleading for some bioaccumulating contaminants such as the highly lipophilic dioxin compounds. Evidence has shown that these compounds can be essentially stripped from the air simply by coming in contact with vegetation. In other words, the visual image of deposition can be misleading. An alternative model for the dry deposition of these vapor-phase lipophilic compounds is termed the "transfer" approach. As noted above, wet deposition of vapor-phase lipophilic compounds can be considered negligible. ***Therefore, this transfer approach can be used to model the overall vapor-phase impacts to plants*** [emphasis added]."

As indicated by this passage, the mechanism by which plants accumulate vapor-phase dioxins is appropriately described in terms of air-to-plant transfer rather than physical deposition to plant surfaces. This mechanism was modeled for the landfill as well as the land treatment unit (64 FR 46485). In fact, this was the primary mechanism driving our risk estimates for dioxin in our land treatment unit analysis. The dioxin risk estimates for the EDC/VCM landfill air pathway are less than 1E-09, therefore are not significant. The equations that we used to model vapor-phase transfer into plants are provided in Tables E-2.11, E-3.11, and E-3.17 in Appendix E of the 1999 Risk Assessment TBD.

Reference:
USEPA. 1998. Methodology for Assessing Heath Risks Associated with Multiple Pathways of Exposure to Combustor Emissions. National Center for Environmental Assessment. EPA 600/R-98/137. December.

USEPA. 1999. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Office of Solid Waste. July.

2.9 ETC Comment

On page 46486/2 EPA states that TCLP data was used to predict the mass of constituents that would leach to the subsurface. The total constituent analysis data was not used. This is not valid, and the total constituent data combined with partitioning equations should have also been used. The TCLP would under-predict the concentration of mobile constituents leached to the subsurface, since organic constituents do not dissolve sufficiently in the aqueous leachate test medium. The constituents could exist in LNAPL and DNAPL phases, which are highly mobile in a groundwater release scenario. By ignoring the total constituent data and not using partitioning equations, EPA is missing a large amount of the mass of these hazardous constituents that can be released in a landfill scenario. The risk assessment therefore greatly underestimates the risk of the landfill scenario, and does not support the contingent management exclusion in the listing of K174 wastes. Likewise, the non-listing conclusion for methyl chloride sludge is invalid for the same reasons.

Agency Response:

The Agency disagrees that use of the TCLP data in the landfill modeling was inappropriate. 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 the EDC/VCM and methyl chloride wastewater treatment sludges under review in this rulemaking. In addition, during observation and handling of the EDC/VCM and methyl chloride sludges during sampling and laboratory analysis, no discrete oily phase, or NAPL, was observed. Moreover, none of the samples analyzed via the TCLP in this investigation were found to have oily phases. The sludges

evaluated under this listing determination are sludges that result from biological wastewater treatment, and should not contain sufficient free oil to result in non-aqueous phase liquid (NAPL) generation. Consequently, EPA asserts that our use of the TCLP data to represent landfill leachate is appropriate for the evaluation of chlorinated aliphatics wastes.

2.10 ETC Comment

The risk assessment also grossly underestimates risk because EPA assumed that contaminant leaching does not occur until after the landfill closes, at a period assumed to be 30 years after disposal (64 FR 46487). Yet the greatest potential for release is during the operating period of the landfill. During this period the landfill face is open, and the waste is exposed directly to storm water. Leachate migration of contaminants is at its highest level during this period, since the storm water is percolating through the waste in the landfill. Also, EPA states that they did no consider any air pathways in the landfill scenario. Yet volatilization of organic constituents would be significant during the operating period of the landfill. The risks are therefore understated because EPA ignored the operating period in its risk assessment.

Agency Response:

The commenter has clearly misunderstood the Agency's discussion in the preamble to the proposed rule regarding how the air pathway was addressed in the landfill scenario. EPA did in fact evaluate air pathway risks in conjunction with our landfill scenario analyses. We evaluated risks due to vapor emissions from landfills that occur during both the operating life of the landfill and after the landfill is capped (see 64 FR 46484, and Sections 2.2.2 and 3.1 of the 1999 Risk Assessment Technical Background Document). All of the nongroundwater pathway risk estimates that are presented in the 1999 Risk Assessment Technical Background Document are air pathway risk estimates. EPA's discussion of the groundwater modeling methodology in the preamble to the proposed rule pointed out that we potentially overestimated groundwater pathway risk under the landfill scenario because in the landfill post-closure period we allowed the volatilized contaminant mass to be available for leaching to the subsurface.

EPA also disagrees that our simplifying assumption that contaminant leaching from a landfill does not occur until after the landfill closes (that is, after 30 years) underestimates groundwater risk for EDC/VCM sludges managed in landfills. The Agency's complete response to this comment is provided in Section 1.7 of this document (responses to EDF, CALP-00008).

2.11 ETC Comment

The ETC also objects to EPA's decision not to sum the carcinogenic risks and non-carcinogenic hazard indices, as stated on page 48489/2. EPA's rationale is that risks and HQs are not summed for hazards that do not occur in the lifetime of an individual. This is wrong for two reasons. First, the risks are highly understated because the operating period of the landfill was ignored. Second, the individual risk of each COC contributes to the overall exposure of the individual. Even if a given COC is not expected to have a health impact for 80 years, when summed with other COCs the combined impact could very well be within the lifetime. Many hazardous constituents have synergistic effects that are not evaluated by current risk assessment science. As a conservative measure to counter-balance this deficiency, the risks should always be summed, and the combined risk evaluated against the criteria for listing.

Agency Response:

In evaluating contaminant risk and hazard for the EDC/VCM landfill, EPA assumed that all nongroundwater exposures are "current," and could occur during the lifetime of a currently existing individual. For groundwater pathways, exposures may occur concurrent with nongroundwater pathway exposures, or may not occur for up to 10,000 years in the future depending on contaminant time of travel in the subsurface (we truncate our groundwater pathway analysis at 10,000 years). Clearly in this case we are talking about a different affected individual, so it is not appropriate to add current and distant future (e.g., hundreds or thousands of years) risks to come up with the risks to a particular potential individual, which is the basis for our listing decisions. As described in the Addendum to the Risk Assessment Technical Background Document (USEPA, 2000), even if we had added the risk estimates as the commenter suggested, the results would not have been significant.

Reference:

USEPA. 2000. *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, Addendum*. Office of Solid Waste. September 30.

2.12 ETC Comment

EPA states on page 46489/2 that "EPA typically considers a decision to list a waste when carcinogenic risks are 1E-05 or greater or when the noncancer HQ is 1 or greater". If this is so, then EPA has ignored this criteria in deciding to grant a contingent exclusion for management in a landfill. Table III-5 of the preamble, for example, shows risk levels for the EDC/VCM sludge greater than 1E-05 for arsenic. (Note that Table III-5 was not provided in the preamble even though it is cited and the data from this table is discussed on page 46492/3.) Likewise, page 46496/1 states that the risk levels for

methyl chloride sludge were 5E-05 for arsenic. Yet EPA ignores its risk criteria, and decides to contingently exclude the landfill scenario for the EDC/VCM sludge and not to list the methyl chloride sludge. The conclusions run counter to the data that shows the landfill scenario and both the EDC/VCM and methyl chloride sludges are hazardous.

In the case of the EDC/VCM sludge, EPA argues that the arsenic risk in the landfill scenario is marginal, even though it exceeds the risk criteria for listing by a factor of 3. Their conclusion is based on the health impact occurring at a point in time greater than the lifetime of an individual. Yet this would not have been the case if the landfill scenario was modeled during the 30 year operating period (see comment above). Therefore, it is not appropriate to ignore the arsenic risk as "marginal".

Agency Response:

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 (arsenic was not eliminated from our list of COPCs prior to risk analysis). 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 unlined 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 concentration of 1.0 ppb found in groundwater in Texas and Louisiana.[22] The predicted high-end 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).

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[2] 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-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.

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.

EPA notes that Table III-5 referred to by the commenter was inadvertently left out of the *Federal Register* notice published on August 25, 1999 due to an error by the Government Printing Office. However, the information in this table was in the Risk Assessment background document in the proposed rulemaking docket, and a correction notice adding the missing Table III-5 was published in the *Federal Register* on September 9, 1999 (64 *FR* 49052).

2.13 ETC Comment

Likewise with the methyl chloride sludge, EPA concludes the arsenic risk is "marginal" even though it exceeds the risk criteria for listing by a factor of 5. The risk criteria for listing must not be a moving target that EPA can rationalize away on a whim. Given the uncertainties in risk assessments, and given the fact that there are no controls on the proper management of wastes that are not listed, it is prudent to adhere firmly to the 1E-05 criteria in listing determinations.

Agency Response:

EPA disagrees. As discussed in the preamble to proposed rule (64 *FR* at 46516), EPA conducted a bounding (*i.e.*, worst case) risk analysis to estimate potential risks from methyl chloride wastewater treatment sludges to groundwater consumers. This analysis used the leachate concentration measured from a sample of the facility's methyl chloride wastewater treatment sludge, and assumed the direct ingestion of this leachate by an adult for a period of 58 years. This bounding analysis resulted in a risk of 5E-5 for one constituent, arsenic. The Agency views this risk level as marginal, given the assumptions made in the bounding risk analysis. In particular, the Agency assumed that an adult receptor would drink leachate generated from the disposal of the methyl chloride wastewater treatment sludges. Additionally, we assumed the adult receptor would continue to drink the leachate for 58 years. Given that the Agency's assumptions were worst case, and nonetheless resulted in an estimate of relatively low potential risk, the Agency determined that there is no significant risk on which to base a decision to list the waste as hazardous.

EPA's policy for listing wastes as hazardous (as outlined in the in 1994 Dyes and Pigments proposal, 59 *FR* 66077) is that wastestreams with risks above 1E-4 are presumptively assumed to pose sufficient risk to require their listing as hazardous waste. Wastestreams with risks below 1E-6 are considered not to pose a substantial present or potential hazard to human health and the environment and therefore generally are not listed as hazardous wastes. Wastestreams with risks in the range of 1E-6 to 1E-4 are evaluated on the basis of a variety of 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 such as certainty, coverage by other regulatory programs, and waste volume.

EPA views the arsenic risk results from the worst-case bounding analysis as marginal, particularly given the assumptions used in conducting the risk analysis (*i.e.,* a person directly ingesting leachate over a period of 58 years). If the Agency assumes a less direct pathway of ingestion (*i.e.,* a person drinks ground water contaminated with leachate), using a DAF of 5 (which would be a reasonable assumption for an unlined landfill), the predicted risk becomes 1E-5. However, the Agency determined that

assuming a DAF of 5 is 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 even 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.

In our assessment of risk from the EDC/VCM wastewater treatment sludge, arsenic was an initial constituent of potential concern. To support our analysis of potential 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). That analysis resulted in a DAF of 13 for the high-end risk estimate, and a DAF of 93 for the central tendency estimate. Of course, the actual DAF could be higher than these estimates, given that the landfill in which the methyl chloride sludge is disposed is lined. However, even if the DAF for arsenic potentially released from the lined landfill where the methyl chloride sludge is disposed is 13, the potential risk associated with arsenic in the waste is well below the range in which the Agency would deem the risk to be significant.

Given the marginal level of risk associated with a worst-case bounding analysis of risk that assumed direct ingestion of leachate derived from this wastestream, as well as the relatively small volume of the waste that is generated by a single facility, the decision not to list wastewater treatment sludges from the production of methyl chloride is a reasonable one.

2.14 ETC Comment

We also make the following comments on the contingent exclusion as it relates to landfill management:

Although the listing exclusion for EDC/VCM sludge states that the landfill must be licensed or permitted, there is nothing in the criteria regarding the design standards of the landfill. Many old Subtitle D landfills may be permitted, but may lack adequate design and operating controls. This could particularly be the case with older on-site landfills.

Agency Response:

As discussed above, 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 nonetheless being implemented through operating 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. 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.

2.15 ETC Comment

The inadequate risk assessment and limited sampling and analytical data used in the characterization of EDC/VCM sludge does not support the contingent exclusion for the landfill management of these wastes.

Many on-site landfills may be open for years and may actually more closely resemble the risks modeled in the land treatment scenario. Note that EPA did not model the landfill scenario during its operating life, when the air exposures and groundwater releases would be greatest. Therefore, the exclusion for K174 wastes managed in landfills is not justified.

Agency Response:

EPA has already responded to the commenter's concerns regarding the adequacy of the risk assessment, sampling, and analysis for the EDC/VCM wastewater treatment sludges in this section (Section 2) of the Response to Comment document, and in Section 1.6 in this Response to Comment Document (EDF comments, CALP-00008).

2.16 ETC Comment

The exclusion creates an illogical discontinuity in the LDR program, that is not protective of human health and the environment. K174 wastes that go to protective treatment options (such as incineration, biological treatment) must meet stringent treatment standards applied to the residue before disposal in Subtitle C landfill units. Yet the raw untreated K174 waste can go directly to Subtitle C landfills. Stated more simply; if the waste goes to a treatment option, it has to be treated to a high degree of protection,

yet if it goes directly to landfill disposal, it can be dumped to a less degree of protection. This is a dangerous precedent to set, and will undermine the protection provided by the LDR program

Agency Response:

Under the contingent management listing approach finalized today for EDC/VCM wastewater treatment sludges, EDC/VCM sludges will be hazardous wastes unless they are managed in a subtitle C or a non-hazardous waste 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. If the waste is not disposed of in a landfill as described in the listing description, then the waste meets the listing description and must be managed in compliance with subtitle C management standards from the point of generation.

The Agency disagrees with the commenter's contention that EDC/VCM wastewater treatment sludges should be identified and managed as hazardous wastes (including subject to the LDR treatment requirements) until all conditions of the conditional exclusion are met (*i.e.,* sludges should be listed as hazardous wastes until disposed of in a landfill). The Agency's risk analysis indicates that this waste poses no significant risks when managed in a landfill. Therefore, the Agency has determined that it is appropriate to finalize a conditional listing for this waste. The waste is *not* hazardous when disposed in a landfill (and not placed on the land prior to being landfilled). Therefore, EDC/VCM wastewater treatment sludges destined for management in a landfill are not subject to RCRA subtitle C management requirements (including the LDR requirements), as is the case with all other solid wastes for which EPA has made a determination not to list the waste as hazardous.

2.17 ETC Comment

In the case of the K175 listing determination, EPA concluded that treatment of the waste under the LDR standards of Subtitle C was vital to reduce potential risks from the disposal of this waste over the long-term, given in particular the uncertainties of engineered landfill liners and containment systems (see page 46511/3). This is true also for K174 wastes, and no contingent exclusion should be allowed for K174 wastes. The LDR treatment standards must apply also to K174 wastes, given the uncertainties of engineer landfill design and control and liner protection as stated on page 46511 of the proposed rule. The hazardous constituents in K174 wastes are PBTs also, and must be treated to the levels proposed in part 268 prior to landfill disposal.

Agency Response:

EPA disagrees with the commenter. The Agency conducted a risk analysis of EDC/VCM wastewater treatment sludges disposed in an *unlined* landfill and concluded that the waste presents no significant risks when managed in this manner. Given that the Agency's finding is that the waste is not hazardous, the land disposal restrictions requirements do not apply.

The Agency points out that all landfills currently accepting EDC/VCM wastewater treatment sludges are equipped with liners and leachate collection systems, therefore the risks posed by this waste, as currently managed are lower than the risks predicted by the Agency's risk analysis.

2.18 ETC Comment

The documentation provisions for K174 wastes managed in landfills, as stated on page 46509 are inadequate. The provisions must also document the design parameters and information for on-site landfills. The documentation must support that these landfills meet minimum technology requirements, including double liners and leachate collection systems.

EPA should apply the same logic here, as was used in the listing determination for K175 wastes. In specific, on page 46510/3 EPA states that "there is considerable uncertainty about the performance of engineered landfills". Further EPA states "in the long-term there is considerable uncertainty as to how well engineered systems will operate and whether there will continue to be long-term care and maintenance after the regulatory post-closure period ends." Because of this uncertainty, EPA considered it important to list K175 wastes without any contingent exclusions. Presumably mercury is enough of a PBT to warrant such protection. However, the same is true of arsenic and dioxin, and no landfill exclusion should be allowed for K174 wastes either. In justifying the listing of K175 wastes, EPA states that "EPA is unable to quantitatively assess the potential risk this waste poses when disposed in a subtitle C landfill without prior treatment". The same is true of K174 waste, and this uncertainty should result in listing K174 without an exclusion for landfill disposal.

Agency Response:

The Agency disagrees with the commenter. Our risk assessment results show that the EDC/VCM wastewater treatment sludge does not pose significant risks when disposed in an unlined landfill. The waste is not hazardous, therefore the subtitle C management requirements, including the LDR treatment standards do not apply to the waste.

On the other hand, our analysis of the VCM-A wastewater treatment sludge indicated that the waste could pose a significant risk, particularly due to the leachability of mercury in landfill environments with high pH levels. Our assessments of the two wastes (EDC/VCM and VCM-A) are not analogous. EPA disagrees with the commenter's assertion that the uncertainties with regard to the leachability of mercury from the VCM-A waste apply to the other waste. In addition, the Agency points out that we do not assess a potential landfill "liner system failure" scenario for all wastes that are listing candidates that are landfilled. In the case of the VCM-A waste, we undertook such an assessment because of the potential for the waste (and the constituent of concern) to potentially cause significant risks to human health and the environment when managed in an unlined landfill.

2.19 ETC Comment

Finally, the ETC believes that the contingent management listing approach will create an implementation nightmare. Generators and TSD facilities claiming that K174 sludge is not listed must be able to demonstrate that the sludges are being managed in accordance with all of the conditions of the contingent listing through contracts, shipping papers, and other records. Yet EPA refuses to prescribe a certification document that would provide a standard mechanism for supporting such claims. Moreover, what happens if a generator or TSD facility cannot make a convincing demonstration to a Federal, or more likely a state, enforcement official? EPA says the sludge "may" then be a hazardous waste from the point of generation. Does that mean that every broker, transporter, treater and disposer that was involved in the waste management is guilty of a violation of RCRA? When "may" the sludge be deemed a hazardous waste and when not? We believe that EPA and the states cannot reasonably ensure compliance with such a contingent listing.

Agency Response:

EPA disagrees that the contingent management approach will create an "implementation nightmare" as suggested by the commenter, and EPA also disagrees that the Agency must prescribe a specific certification document to demonstrate that the waste was or will be managed in accordance with the conditions of the listing description. EPA sees no reason why existing documentation (already routinely used in non-hazardous waste management transactions) would provide any less adequate information on the status of prior waste shipments than an EPA-prescribed document, particularly in this situation where the Agency has documented that these wastes are routinely disposed in landfills by virtually every generator of this waste.

Regarding the status of wastes not yet shipped to their ultimate destination, as EPA described in the proposed rule (64 *FR* at 46509), an approach similar to the current implementation approach for secondary materials under 40 CFR 261.2 would

be appropriate in this case as well. Therefore, the Agency is finalizing as part of the K174 listing description a flexible performance standard similar to the requirements in 40 CFR 261.2(f) for documenting claims that materials are not solid wastes, when they are managed (or will be managed) in certain ways. This provision in the RCRA regulations, which has been in existence for the past 15 years, has not created an implementation nightmare. For example, records of past shipments are one way that a generator may demonstrate a pattern of practices indicative of where the "next shipment" will be sent. However, because EPA does not believe that landfills would typically accept industrial waste shipments on short notice, without having some type of agreement, contract, or other arrangement already in place that require some lead time (*e.g*., where confirmatory chemical analysis is required on a waste sample by the landfill owner/operator, or where certain purchasing arrangements must be made first, etc.) EPA believes that there will likely be other types of information, other than demonstrations of prior shipments, that would serve to demonstrate where EDC/VCM sludge *will be* sent.

2.20 ETC Comment

Comments on the Role of Population Risks

The ETC supports EPA's conclusions regarding the greater importance of individual risks over population risks in listing evaluations (46 FR 46496/3). We agree with EPA's rationale, and also note that there are still many uncertainties in population risk assessments that are magnified even greater than those in individual risk assessments.

Agency Response:

See EPA's response to comment in Section 7.4 of this Response to Comment Document (comments from API).

2.21 ETC Comment

Comments on the Exclusion of Sludges From K173 Wastewaters

On page 46502, EPA proposes to exclude wastewater treatment sludges derived from the treatment of Kl73 wastewaters. EPA does not present any risk assessment results, analytical data, nor other information to support this conclusion. The ETC objects to this arbitrary exclusion from the derived-from rule

Furthermore, there is no need to exclude these sludges, given that EPA is working on promulgating the HWIR rule, which will provide a quantitative analytical approach for wastes to exit RCRA and the derived-from rule. This arbitrary conclusion for K173 wastewater sludge precludes this HWIR rule, and does not provide any quantitative criteria for hazardous constituents to be protective of the environment. Given that these wastewaters contain high levels of arsenic, chlorinated organic constituents and dioxin, a blanket exemption from the derived-from rule is not warranted. In time, HWIR will provide an exit for the K173 wastewater sludge, based on quantitative analysis of hazardous constituents. There is no need to promulgate an arbitrary exemption now.

Agency Response:

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. Therefore, sludges derived from the treatment of these wastewaters would not be derived-from the proposed K173 listing, thus the Agency is not finalizing the proposed exemption from the derived-from rule at 40 CFR 261.3(c)(2)(ii)(F).

2.22 ETC Comment

Wastewater Treatment Tank Criteria for Subpart CC Controls

The ETC concurs with EPA's conclusion to establish a 1 ng/L threshold for dioxin for Subpart CC controls. However, the volatile organic content should also be used as a threshold, consistent with current Subpart CC standards. The ETC also applauds EPA for requiring generators and wastewater treatment operators to test the waste, as opposed to using process knowledge (see 46505/1). This concept should be carried through to other parts of the RCRA program, where there is over-reliance on process knowledge, such as waste characterization and LDRs.

While we support he use of the 1 ng/L threshold for Subpart CC controls, the ETC does not support this threshold as a criteria for listing K173 wastes.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

2.23 ETC Comment

Comments on VCM-A Wastewater Treatment Sludges (K175)

The ETC supports EPA's decision to list the VCM-A Wastewater Treatment Sludge as Hazardous Waste K175. The ETC particularly applauds EPA's rationale expressed on pages 46510 and 46511 regarding the need to control these wastes under RCRA, given the PBT nature of mercury and the uncertainties inherent in any form of landfill disposal. The ETC supports EPA's conclusion to list the waste without any contingent management exclusions, given all of the factors discussed on pages 46511 to 46513. The ETC agrees that the fact that the one generator manages the waste in a landfill designed to subtitle C standards, is not a sufficient basis to exclude this waste. The ETC also agrees that the dramatic increase in leachability of mercury under alkaline conditions is sufficient grounds to list K175 waste without any contingent exclusions. Many landfill leachates are above pH 6.0 (see discussion notes from the TCLP roundtable meeting held by EPA last summer).

In addition, the management practices of the one generator of this waste should not be used to exclude the waste from management under Subtitle C. New generators of this waste could exist at any time, as new or existing companies install the process producing this waste. The waste warrants subtitle C control, regardless of the current management practices of generators surveyed.

Agency Response:

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 waste stream 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.

2.24 ETC Comment

The ETC is opposed to the alternative listing description proposed for K175 wastes on page 46514. Again, EPA's detailed discussion of concerns for Subtitle C engineering controls expressed on pages 46511 to 46513 are justification not to allow a contingent management option involving landfill disposal for this or any other waste.

Agency Response:

The Agency acknowledges the commenter's support for the standard listing approach for K175, and as described in Section 2.23 above, 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.

2.25 ETC Comment

Comments on Methyl Chloride Wastewater Treatment Sludges

The ETC is opposed to EPA's decision not to list the methyl chloride sludges. EPA conclusion that these wastes do not pose significant risk is erroneous for reasons cited in our comments above on the risk assessment. In addition, despite the understated risks in EPA's assessment, the methyl chloride sludges still resulted in a risk level 5 times the listing criteria of 1E-05 as a result of the arsenic level in these wastes. The EPA also based its conclusion on the results of a survey to the one generator of the stream, who stated that the waste is managed in a lined on-site landfill. Yet this is not a valid reason not to list the waste, as new generators can come along at any time, and the current generator could decide to dispose the waste in a less protective fashion given that it is not regulated under RCRA. EPA instead should be concluding that the waste needs to be managed under RCRA, and that the costs of this would not be significant given that the one generator of this waste is already managing it in a lined landfill. Given the other flaws in the landfill model, and the concerns with landfill design expressed on pages 46511 to 46513 for K175 wastes, the methyl chloride sludges should also be listed as hazardous wastes.

Agency Response:

EPA disagrees with the commenter's conclusion that methyl chloride sludges should be listed as hazardous wastes. EPA's policy for listing wastes as hazardous (as outlined in the in 1994 Dyes and Pigments proposal, 59 *FR* 66077) is that wastestreams with risks above 1E-4 are presumptively assumed to pose sufficient risk to require their listing as hazardous waste. Wastestreams with risks below 1E-6 are considered not to pose a substantial present or potential hazard to human health and the environment and therefore generally are not listed as hazardous wastes. Wastestreams with risks in the range of 1E-6 to 1E-4 are evaluated on the basis of a variety of 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 such as certainty, coverage by other regulatory programs, and waste volume.

As discussed in the preamble to proposed rule (64 *FR* 46516), EPA conducted a bounding (*i.e.*, worst case) risk analysis to estimate potential risks from methyl chloride wastewater treatment sludges 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. Using this bounding analysis, which the EPA views as extremely conservative, the estimated risk is 5E-5 for one constituent, arsenic. This estimated risk is within the risk range where EPA has previously stated would be considered using a "weight of evidence" approach.

Even if the Agency assumes a less direct pathway of ingestion (*i.e.,* a person drinks groundwater contaminated with leachate), and does not give any credit for any type of liner system, using a DAF of 5 (which would be a reasonable assumption for an *unlined* landfill) results in a predicted risk of 1E-5. Furthermore, as discussed in the Agency's comment response in Section 2.13 above, a better estimate of the arsenic DAF (using the high-end risk estimate calculated from the EDC/VCM wastewater treatment sludges disposed in an unlined landfill) is 13. Assuming a DAF of 13 for arsenic potentially released from the landfill where the methyl chloride sludge is disposed, the potential risk associated with arsenic in the waste is well below the range in which the Agency would deem the risk to be significant.

The Agency's decision not to list this wastestream as hazardous is based upon a weight of evidence approach, including the consideration of disposal in a landfill that is lined with leachate collection (described above) as plausible mismanagement. Should new generators appear or the generator described above chooses to manage the sludge in a less protective fashion as the commenter suggests, e.g., in an unlined landfill, the EPA still views the estimated risk results as an indication that this wastestream would not pose significant risks.

2.26 ETC Comment

Comments on Allyl Chloride Sludges

The ETC also is opposed to EPA's decision not to list the allyl chloride sludges. One of the rationales used in EPA's decision is that this waste is generated at only one location, and this one generator currently treats this waste in a non-hazardous waste incinerator. On page 46482/2 EPA states that a risk analysis was therefore not necessary for the allyl chloride sludges. Yet the risk of non-hazardous incineration, as well as landfill disposal in an unlined landfill should have been evaluated. A survey completed by one generator must not preclude a thorough risk evaluation of the waste. In addition, other new generators of the waste can come along at any time, as processes do change and new plants

are built. EPA's focus should not be on what current generators do, but instead on what hazards are posed by the toxic constituents in the waste.

Furthermore, the analytical work performed on this waste was inadequate, based on the discussion at 46516/2 of the preamble. Only one sample of the sludge was collected. Since only one sample was collected, there is no accounting for the variability of the process generating the waste. This one sample was analyzed only for TCLP constituents, and dioxin and furan on a total constituent basis. There was no full characterization on a total constituent basis of all Appendix VIII constituents. Therefore, the analytical information is not sufficient to support a no-listing conclusion.

Agency Response:

EPA disagrees. Part of the Agency's rationale for not listing allyl chloride wastewater treatment sludge is that, because the single facility the Agency identified as producing allyl chloride is highly-integrated and uses a centralized wastewater treatment system, the relative contribution of wastewater from producing allyl chloride (versus non-chlorinated aliphatic production wastewaters) is very small, about two percent. The Agency originally identified this facility to sample because EPA wanted to ensure that at a minimum the coverage of chlorinated aliphatic manufacturers was as complete as possible. Given the very small contribution of allyl chloride wastewaters to this sludge, and the lack of any other facilities for EPA to obtain a more 'dedicated' sample of this waste grouping, the Agency chose to make an assessment based on the best information it had, including the analytical results and the waste management scenario represented by this facility.

Although as EPA has already pointed out that this wastestream does not fully represent a sludge from allyl chloride production, for the reasons discussed in the Agency's comment response above in Section 2.1, EPA is confident that best efforts were made to ensure that the conditions under which this sludge sample was collected were representative of the facility's normal operating conditions. EPA also notes that the allyl chloride sludge sample was analyzed for all of the target constituents as specified in the Quality Assurance Project Plan and the facility-specific Sampling and Analysis Plan, with complete analytical results presented in the Listing Background Document and the facility-specific Sampling and Analytical Data Report, all of which were in the record for the proposed rule. EPA did not discuss *all* of the analytical results in the preamble in the proposed rule (64 *FR* at 46516) but only those that were important in other chlorinated aliphatic wastewater treatment sludges under review (*e.g.*, arsenic, dioxin, TCLP constituents). Nonetheless, EPA did not identify any other constituents in this waste at levels that would pose significant risk.

2.27 ETC Comment

Proposed LDR Treatment Standards for K173 and K174 Wastes

The ETC supports the use of existing UTS standards for establishing treatment standards for K173 and K174 wastes. However, the ETC does not feel that the five additional dioxin and furan congeners are needed. The existing dioxin and furan congeners covered under the UTS standards are sufficient to serve as surrogates for the effective treatment of the 5 new congeners. In the interest of minimizing testing requirements and streamlining the analytical burden under the LDR program, we encourage EPA to consider allowing the existing UTS congeners for dioxin and furan to serve as treatment surrogates for the K173 and K174 wastes. This is also justified in that the most toxic dioxin and furan congeners are currently covered under the UTS. The proposed five new congeners are of substantially lower toxicity, therefore the use of surrogates for these 5 congeners would not present any significant risk.

Agency Response:

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 (dioxin/furan) congeners. Much of the labor and cost of analysis of the currently regulated congeners can not be separated form the costs associated solely with the hepta and octa congeners, because the analysis of these additional isomers is accomplished as part of the overall method in that these congeners are isolated and introduced for analysis concurrently with the other congeners. Hence, sample preparation labor and instrument time are not increased

Commenters also suggest that control of the existing regulated dioxin/furan congeners provides adequate protection. Because the hepta-and octa- dioxin/furan congeners contribute to the overall carcinogenic activity of dioxin/furans found in wastes and waste treatment residues, they also must be controlled if human health and the environment are to be protected. Commenters, by making the argument they have, appear to concede this point. We differ with these commenters, however, in terms of the solution. They would have us make assumptions for all situations about the ancillary impacts of controlling certain dioxin and furan congeners, but not others. We are not in a position to be so cavalier. Our obligation is to provide standards that must be met and that, when met, ensure that long-term threats to human health and the environment are minimized (RCRA § 3004(m)). The absence of the existing regulated isomers in a waste being evaluated for treatment alone can not assure that further treatment of the waste should not required, because photolysis of octa isomers may result in the formation of more toxic congeners at the exposed waste surface within days of

exposure, [3] and because even though less carcinogenic than the currently regulated congeners the hepta and octa congeners still have significant carcinogenic activity in there own right.

2.28 ETC Comment

In addition, as was allowed for F024 wastes, the ETC encourages EPA to allow an alternative treatment standard of CMBST. This was done for F024 waste in recognition of the limited laboratory capacity and the excessive costs of dioxin analysis. The CMBST standard is sufficient to ensure that the toxic constituents in these wastes are destroyed to the maximum extent feasible. The CMBST standard would also eliminate the need to frequently analyze combustion residuals for dioxin and furan, which would add excessive unnecessary costs to the treatment of these wastes.

Agency Response:

The Commenter requests that a CMBST be allowed as an alternative treatment for the newly identified wastes in the same manner of F024 wastes. We agree and are promulgating the requested change.

Combustion is the basis for the dioxin/furan numerical limits, and properly conducted combustion should effectively destroy dioxin/furan constituents. If this method of treatment is used to treat K174 in certain specified combustion devices, there is no need to monitor compliance with the numerical limits established for dioxin/furan constituents. However, all other organic and metal constituents will require monitoring prior to disposal. This approach is patterned after EPA's promulgation of a similar alternative treatment standard for dioxin/furan in F024 (wastes from production of chlorinated aliphatics). See 55 FR22580-81, June 1, 1990. See also 62 FR 26000-3, May 12,1997.

In general, EPA is providing a method of treatment as an alternative to actual dioxin/furan measurement that will be equally protective, and will assure availability of effective treatment for these wastes. The alternative, namely not providing the alternative treatment standard, leaves open the real possibility of these wastes being refused treatment, an environmentally worse result. EPA also notes that its experience with F024 waste treatment, for which there is a parallel treatment regime, has been satisfactory: these wastes are effectively treated by combustion technology, and sufficient treatment capacity has remained available once EPA promulgated the

[3]Chemosphere, Vol.18., pp 1265-1274, 1989.

alternative treatment standard which did not require analysis of dioxin/furan in treatment residues.

Thus, if this method of treatment is utilized, combustion residues would not have to be analyzed for dioxin/furan constituents. The alternative is only available for residues from units subject to the standards in Part 264 subpart O or Part 266 subpart H, or from interim status incinerators which have made a specific demonstration that they operate in a manner equivalent to a Part 264 or Part 266 combustion unit. The practical effect of this change will be to limit somewhat the type of facilities that can combust K174.

2.29 ETC Comment

Proposed LDR Treatment Standard for K175 Wastes

For K175 wastes, we encourage EPA to adopt a numerical treatment standard that will allow the use of a variety of treatment technologies for mercury, including stabilization. The ETC is opposed to limiting the treatment standard for K175 wastes to roasting and retorting (RMERC). EPA recently proposed to revisit the current treatment standards for mercury wastes due to concerns with emissions from retort operations, and the increased amount of mercury placed into commerce (see ANPRM May 28, 1999, 64 FR 28958). The overall environmental impact of increased amounts of mercury in commerce was viewed in this ANPRM as negative, and a stabilization/disposal option removes mercury from commerce. Overall, this meets the goal of toxic use reduction, as alternatives to mercury are forced to be used, as the amount of mercury available in commerce declines. It is also important to note that the one commercial RMERC operator that EPA contacted was uncertain as to whether these wastes can be treated by RMERC (see 64 FR 46521/3 and footnote 54). EPA has not established, therefore, that the RMERC treatment standard is applicable to this waste. For this reason, it is vital that EPA allow for other treatment options, such as stabilization.

Agency Response:

The subject waste leached between 0.116 and 0.406 mg/L at pH 8, but only 0.00582 at pH 6. Therefore, we selected pH 6.0 as the highest level tested that maintained immobility. The commenter requests that the standard should only require that the pH of the residue be restricted to a level that is consistent with maintaining the mercury leachate below 0.025 mg/L. We believe that level is pH 6.0, as proposed.

The mobility of mercury in the subject waste has been determined to be a function of pH and the presence of excess hydrogen sulfide (64 FR 46522). Absence an excess of sulfide in the waste, lower mercury solubility would be expected. In the process, under addition of sodium sulfide may leave soluble unreacted mercuric

chloride, and over addition results in formation of mercury sulfide and hydrogen sulfide complexes soluble at higher pH. Due to the difficulty in achieving precise stoichiometric addition, controlled disposal conditions are needed to minimize the potential mobility of mercury-bearing waste placed in the Subtitle C landfills. Available data indicates that pH 6.0 is the highest pH at which the immobility of the mercury in the subject has been demonstrated. Therefore, we believe that the pH 6.0 restriction on codisposal is appropriate and necessary to insure the immobility of the mercury contained within these wastes.

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 other 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.

2.30 ETC Comment

On June 3, 1993 the ETC (then known as the Hazardous Waste Treatment Council - HWTC) submitted a rulemaking petition to EPA to amend the BDAT treatment standard for High Mercury D009 wastes to allow stabilization. A copy of this rulemaking petition is included as Attachment 4. In this rulemaking petition, treatment data was provided that demonstrated that mercury waste batches containing in a range of 2.6% to 3.7% mercury were treatable using stabilization technology to TCLP leachate levels in the range of 0.02 to 0.07 ppm mercury. With minor modifications, the stabilization technology is capable of achieving 0.025 ppm TCLP leachate levels for mercury on K175 wastes that are in the range of 1% to 2% mercury. A copy of this rulemaking petition for alternate LDR treatment standards for mercury wastes is included to support the treatability of Kl75 wastes.

Agency Response:

The Agency has begun a comprehensive reevaluation of the technologies used to treat mercury-bearing wastes as detailed in the ANPRM of May 28, 1999 (64 FR

28949). The Agency will consider making uniform changes to the current treatment standards at a later date upon completion of the current effort. Additional data and testing of residues under expected disposal conditions would be required to further evaluate the effectiveness and durability of stabilization processes on these or similar mercury-bearing wastes.

Data presented in the petition do not demonstrate treatment of mercury wastes to less than 0.025 mg/L TCLP mercury. However with minor modifications, this stabilization technology is claimed to be able to achieve 0.025 mg/L TCLP mercury for wastes containing 1 to 2 percent mercury. Because we have set a numerical standard and not a technology standard of roasting and retorting, stabilization processes may be used in the treatment of K175 wastes, provided there is not impermissible dilution.

For the subject K175 waste, 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 another 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.

2.31 ETC Comment

The ETC is supportive of a pH restriction on treatment residues from K175 waste that undergo stabilization. However the pH limit of 6.0 may be overly restrictive given that EPA's leachate evaluations at this pH indicated levels of 0.0058 mg/liter. The pH restriction should be set relative to the level needed to demonstrate leachate concentrations under 0.025 mg/liter. It may be that leachate pH levels as high as 8.0 would be sufficient to control mercury from leaching above 0.025 mg/liter. The ETC urges EPA to allow this to be reviewed and set on a site-specific basis, as stabilization technologies vary in the specific chemistry applied. The standard should therefore require only that the pH of the residue be restricted to a level that is consistent with maintaining the mercury leachate level below 0.025 mg/liter. The ETC then would agree that the other waste residues disposed with this waste

should also be restricted to the same pH level. Each facility performing mercury treatment of Kl75 wastes would perform treatability studies to establish the upper pH level that maintains mercury leachate levels below 0.025 mg/liter.

Agency Response:

The subject waste leached between 0.116 and 0.406 mg/L at pH 8, but only 0.00582 at pH 6. Therefore, we selected pH 6.0 as the highest level tested that maintained immobility. The commenter requests that the standard should only require that the pH of the residue be restricted to a level that is consistent with maintaining the mercury leachate below 0.025 mg/L.

The mobility of mercury in the subject waste has been determined to be a function of pH and the presence of excess hydrogen sulfide (64 FR 46522). Absence an excess of sulfide in the waste, lower mercury solubility would be explained. In the process, under addition may leave soluble unreacted mercuric chloride, and over addition results in formation complexes soluble at higher pH. Due to the difficulty in achieving precise stoichiometric addition, mercury recovery is needed to minimize the ultimate amount of potentially mobile mercury-bearing waste placed in the Subtitle C landfills. Available data indicates that pH 6.0 is the highest pH at which the immobility of the mercury in the subject has been demonstrated. Therefore, we believe that the pH 6.0 restriction on treatment and codisposal is appropriate and necessary to insure the immobility of the mercury contained within these wastes.

The commenter seeks not to have a treatment technology that may achieve 0.025 mg/L at a pH greater than pH 6.0 precluded. However, no demonstration is made that such a technology exists for the subject waste. Should a demonstration be made the commenter may petition to have the standards amended in accordance with 40 CFR 260.20.

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 another 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.

2.32 ETC Comment

Addition of Five New Dioxin and Furan Congeners
to the List of UTS and F039 Standards

The ETC is opposed to the addition to the UTS and F039 list of the five new congeners of dioxin and furan described on page 46522 of the preamble. As stated above, the existing dioxin and furan UTS covering the more toxic tetra-, penta- and hexa- congeners, are sufficient to serve as surrogates for the far less toxic hepta- and octa- congeners.

The ETC is also opposed to requiring these additional congeners as UHCs for characteristic wastes. The extremely low levels for these five congeners are set at the quantitation limit of Method 8280A. This additional analytical burden will add substantial cost to the management of characteristic wastes. Considering the high volume of characteristic wastes, it will also raise problems with regard to laboratory capacity to analyze these new dioxin and furan congeners as UHCs. Many interferences and analytical matrix problems can be expected as the proposed standards are set at the quantitation limit of the method most commonly available. This could raise substantial disruption to the management of many characteristic wastes.

Agency Response:

The commenter correctly notes the substantial cost of dioxin and furan analysis. However, current regulations already require the analysis of tetra-, penta-, and hepta-dioxins and furans. Analysis of the remaining hepta- and octa- dioxin/furan congeners can be accomplished with the same labor and instrument analysis time. Standards with the additional congeners would have to be procured or prepared of the analysis. However, many laboratories purchase standards prepared by vendors for analysis via SW-846 Method 8280 which already contain the hepta- and octa- dioxin/furan congeners, because they are already part of the methods scope. Therefore, we project negligible financial costs for the analysis of the addition of the new dioxin and furan congeners to the Table of Universal Treatment Standards(UTS) at 268.48 and to the list of regulated constituents in hazardous waste leachate, F039, in 268.40.

We do not foresee significant costs to characteristic wastes as they must already be tested for the tetra, penta, and hexa congeners when reasonably expected to be present. The only increase in analysis will be what characteristic wastes are

expected to contain the new congeners and none of the already regulated congeners below UTS levels. Commenters identified no such wastes.

We also do not foresee significant analytical problems. Method 8280 is highly compound specific and therefore has few interference problems. Furthermore, likely treatment will be via combustion. The combustion residues are generally less problematic in analysis than untreated wastes as major constituents have generally been destroyed. Also since the original development of 8280 more sensitive instruments has been developed, such that determination of the regulated levels should readily be obtained.

Conclusion

The ETC continues to be troubled by the convoluted and complex manner in which EPA is going about evaluating new waste listings. Since the solvent rule in 1996, EPA has been using risk assessment, generator surveys, and concepts like contingent management in a manner that runs counter to RCRA, which was meant to be a protective statute to avoid exposure of human health and the environment to hazardous constituents in wastes. Many wastes that need to be regulated under RCRA currently are not managed in a protective fashion. If the listing program continues to go in this complex direction, virtually no progress will be made in the safe management of wastes that are truly hazardous. The listing program is tying up valuable Agency resources with little environmental return.

Instead, the ETC urges EPA to pursue aggressively regulations that will address the findings of the Hazardous Waste Scoping Study from November 1996. Strengthening of the characteristic waste program can be done in a more straight forward fashion, and would provide far more protection since it would address a larger universe of unregulated wastes. In addition, this would ultimately address the much smaller segments of waste listings remaining for EPA to evaluate.

Respectfully submitted,

David R. Case
Executive Director

SECTION 3
Dow Chemical Company
CALP-00012

Comment Summary/Introduction

The Dow Chemical Company (Dow) is pleased to have this opportunity to comment on this Proposed Rule on Chlorinated Aliphatic Hydrocarbon Wastes. These comments are submitted electronically, with three copies sent in regular mail as a backup. We are members of the Chemical Manufacturers Association (CMA), the Chlorine Chemical Council (CCC) and the Vinyl Institute (VI). Dow participated in the preparation of the separately submitted comments of each of these organizations. We fully support their comments, incorporate them by reference into these comments and comment separately to emphasize the following points:

1. The proposed K173 wastes should not be listed, as the emissions model does not adequately account for dioxin that partitions to the solids. EPA has over estimated the concentration of dioxins available for stripping by one, and possibly more, orders of magnitude.

2. The proposed K173 wastes should not be listed as the risk assessment utilized by EPA used overly conservative assumptions. The result is an estimation of calculated risk that is overly conservative by a factor of approximately 10.

3. The scope of the K173 listing should be revised to only include processes that produce chlorinated aliphatic hydrocarbons as their primary product.

4. EPA should utilize a site-specific regulatory determination for these wastes.

5. Full Subpart CC compliance should not be required wastewater tanks containing the proposed 173 waste with a dioxin concentration greater than 1 ppt TEQ, and any requirements for covers on wastewater tanks should only be applicable to aerated wastewater tanks.

6. For purposes of this rule, when analyzing for dioxin, the water phase should be analyzed.

7. The recordkeeping burden for exemption from the Subpart CC requirements should be reduced, and a longer time period for compliance with these requirements should be given.

8. The contingent management approach proposed for K174 wastes should be expanded to include incineration or other treatment of these sludges.

9. The five dioxin isomers should not be added to the Universal Treatment Standards or to the Land Disposal Restrictions for F039 wastes.

10. Dow supports EPA's shift from I-TEF to WHO-TEF.

Summary

Dow commends EPA for several good policy decisions in this proposal. Specifically Dow supports EPA's adoption of the WHO-TEF, the appropriate use of contingent management, and limiting the risk assessment to the compounds of real concern.

EPA should correct its emissions model and risk assessment to reflect what actually occurs and its own risk methodology. After making these corrections, EPA should re-evaluate its proposed listing decisions. EPA should also seize this opportunity to expand its use of site specific regulatory determination.

EPA should collect sufficient information to make an informed decision whether to add the five dioxins to the Universal Treatment Standards and the Land Disposal Restrictions for F039 wastes. There is no reason to make this decision now, with no information on this decision's impact.

Discussion

3.1 Dow Chemical Company Comment

Emissions Model and Risk Assessment Overestimate Risk

Dow believes that both the emissions model and risk assessment are over-conservative and contain incorrect assumptions that results in an overstated risk for the proposed K173 wastes. When these items are corrected, the model will predict an acceptable risk that will result in these wastes not being listed with the decision criteria used in the proposed rule.

Emissions Model Does Not Adequately Account for Dioxins that Partition to the Solids, Resulting in an Overestimation of Risk

The emissions model used by EPA takes into account adsorption onto biomass solids as well as particles produced in the course of biodegradation. However, this model for estimating air emissions does not adequately address the fact that the bulk of the dioxin is already attached to the solids when it enters the aerated tank. Dioxin attached to the solids would not be available to be emitted to the air. The note on Tables 3-1a and 3-1b in the Risk Assessment Technical Background Document summarizing dioxin air emissions from Wastewater Tanks contain the following note:

The TEQ emissions estimates presented in this table are based on the solubility limits for 1,2,3,4,6,7,8-HpCDF, OCDD, and OCDF (see Appendix C), and the sample concentrations in the PL-01 and GL-02 samples for the other congeners.

The solubility limit of 1,2,3,4,7,8,9-HpCDF should have been utilized in the modeling of the GL-01 sample, as the concentration of this isomer was above its solubility limit. EPA should re-evaluate the predicted emissions from this sample using the solubility limit for this isomer.

Tables 3-1a and 3-1b also show that the model used a TEF of 0.001 for OCDD and OCDF. To be consistent with the rest of the proposal and EPA's change to WHO-TEF, a factor of 0.0001 should be used. The emissions model should be revised to use the correct values.

Closer examination of Table 3-1b shows that the model predicts that 62% of 1,2,3,6,7,8-HxCDD that is present in the waste stream will volatilize (0.0018 g/yr versus 0.0029 g/yr). Intuitively this is extremely high, based simply on the very low vapor pressure of this compound. Additionally, the percentage volatilized for the other isomer listed in the table range from 0.0000035% to 2.2%. Based on the information presented in this table, 60% of the dioxin air emissions from the GL-02 sample were from this seemingly overstated emission of 1,2,3,6,7,8-HxCDD. EPA should re-evaluate the results of this model and determine the cause of this anomaly as it is probable that this could result in predicted emissions that are less than half of the amount presented in Table 3-1b.

The model used by EPA seems to incorrectly assume that all of the dioxin entering the aerated tank is in the water phase (unless above the solubility limit) and then attaches to the solids. Dioxins will be absorbed onto solids even when the measured concentration is less than the solubility limit, and as such it cannot be assumed that all measured dioxin is truly soluble and available for stripping just because that measured dioxin concentration is less than the solubility limit. A complete discussion of dioxin availability in this matrix is included in Attachment 2 of the Vinyl Institute's comments. EPA should account for this in the air emissions model. As noted by EPA in the proposal, when properly managed the solids do not pose a substantial hazard.

Dow conducted a laboratory study on this subject relative to wastewaters from our EDC plants. Several samples were filtered and the dioxin concentrations were measured separately for the liquid filtrate and the solids. For samples containing 3 to 25 ppt TEQ dioxin (similar to those evaluated by EPA), the results consistently showed that 97-98% of the dioxin was on the solids, on both a total and TEQ basis. On an individual congener group basis the results consistently showed that 83-98% of the dioxins remained with the solids. In actuality these partitioning coefficients are probably higher as some of the dioxins measured in the filtrate were actually on solids that passed through the filter. The dioxin on these small solids is not available for stripping. In many instances, even though the total analysis for congener groups were well below the solubility limits used by EPA, greater than 90% of the that congener group remained with the solids.

Below is a table utilizing data from Dow's study that estimates how much dioxin in the GL-02 sample would actually be available for stripping. The first four columns are the same as Table 3-1b in the Risk Assessment Technical Background Document. The fifth column contains the estimate (based on Dow's

study) how much of the individual isomers are in the solid phase, while the last two columns are the adjusted amounts of the isomers in the liquid phase that are available for stripping.

Isomer	TEF	Concentration (ng/L)	Annual Quantity (g/yr)	% left on solids	Annual Quantity in Water Phase (g/yr)	Annual TEQ Quantity in Water Phase (g/yr)
1,2,3,4,6,7,8-HpCDD	0.01	0.880	0.283	97.7	0.0065	0.000065
1,2,3,4,6,7,8-HpCDF	0.01	43.0	13.844	98.4	0.222	0.0022
1,2,3,4,7,8,9-HpCDF	0.01	12.0	3.863	98.4	0.0618	0.000618
1,2,3,4,7,8-HxCDD	0.1	0.052	0.017	83.3	0.0028	0.00028
1,2,3,6,7,8-HxCDD	0.1	0.091	0.029	83.3	0.0048	0.000048
1,2,3,7,8,9-HxCDD	0.1	0.110	0.035	83.3	0.0058	0.000058
1,2,3,4,7,8-HxCDF	0.1	5.30	1.706	96.4	0.0614	0.0061
1,2,3,6,7,8-HxCDF	0.1	1.20	0.386	96.4	0.0139	0.0014
1,2,3,7,8,9-HxCDF	0.1	0	0	96.4	0	0
2,3,4,6,7,8-HxCDF	0.1	0.430	0.138	96.4	0.0049	0.000049
2,3,4,7,8-PeCDF	0.5	0.210	0.068	93.0	0.0048	0.0024
2,3,7,8-TCDD	1	0.017	0.05	80.2*	0.0099	0.0099
2,3,7,8-TCDF	0.1	0.082	0.026	84.3	0.0041	0.000041
OCDD	0.001	6.90	2.221	98.4	0.0355	0.00000355
OCDF	0.001	6000	1931.676	98.7	25.111	0.0251
		Total	**1954.3**	**Avg = 92.3**	**25.548**	**0.0501**

* No TCDD was detected in any of the samples; estimate is based on the average less two standard deviations.

EPA needs to correct the erroneous assumptions used as input to its emissions model. Any modeling needs to reflect physical reality. This can be done by using the above factors or other suitable factors that do not base regulations on things that can not physically occur.

Agency Response:

The Agency's response to this comment is provided in Section 4.5 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.2 Dow Chemical Company Comment

Assumption used in Risk Assessment Overestimates Risk

The Chlorine Chemistry Council retained ChemRisk, a service of McLaren-Hart to evaluate the risk assessment used for the proposal. This review indicates that EPA's risk estimate is high by a factor of ten. Based on this evaluation alone EPA should determine to not list the proposed K173 wastes as hazardous. Below are details from this report supporting this conclusion. A compete version of this report is included as an appendix to CCC's comments.

Agency Response:

The Agency's responses to the McLaren Hart/Chemrisk comments are provided in Sections 4.29 through 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.2 Dow Chemical Company Comment

Exposure Assessment

There are a number of areas in which the exposure assessment relies on conservative assumptions, many of which result in the generation of unrealistic risk estimates. Some of the key areas are discussed below.

Contribution of Feed to Dairy and Beef Dioxin Levels

USEPA has suggested that a variety of consumption rates be used for different food sources for dairy and beef cattle, and further assumed that all feed is contaminated to the same degree with releases from the waste streams under review. Between 2% and 3% of the non-lactating and lactating cattle's body weight is consumed as dry feed each day (Fries and Paustenbach, 1989). Depending on the age of the animal and its intended use, the animals may be fed largely on forage (replacement dairy cows, young beef cattle, and breeding animals), about 50% forage (lactating dairy cattle) or no forage (fattening beef cattle). The potential exposure to airborne dioxin changes over time. 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). Animal husbandry practices differ both over time and location for cattle and the use of the cattle, such as dairy or beef. Fries and Paustenbach (1989) point out that time on pasture averages only 87 days/year nationwide, but varies from 12 days in the west to as much as 150 to 300 days in the Southeast. Similarly, beef cattle may be raised for part of their lives on pasture but are typically finish their lives on a grain only diet. They also are generally slaughtered within a year of birth whereas dairy cattle typically have a much longer life-span. These considerations influence both the exposure and potential translocation of dioxin to meat or milk. As such information needs to be considered in the exposure assessment and both deterministic and probabilistic risk characterization.

The studies of Stevens and Gerbec (1988), and Fries and Paustenbach (1989) present alternative information that can also be considered in this evaluation. USEPA suggested 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. Stevens and Gerbec (1988) reported 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. USEPA assumed 8.8 kg/day for forage, 2.5 kg/day of silage, 0.47 kg/day of grain, and 0.5 kg/day of soil throughout the life of a beef cow. During the nursing phase, the beef cow receives practically all its daily dose through the mother's milk and this dose has been (and could be) calculated for nursing cattle (Stevens and Gerbec, 1988). During the pasture phase of life, the growing animal is assumed to eat 13.6 kg/day of feed. This consists of 10.2 kg/day of forage, 3.4 kg of silage, and 0.05 kg/day of soil. During the fattening stage of growth prior to slaughter, virtually the entire diet consists of grain. While soil ingestion rates can vary, typical animal husbandry practices suggest that it would rarely exceed 1 to 2% of the dry matter intake for lactating dairy cattle. In beef cattle, it could be greater during the pasture phase, but during the grain-only period, little or no soil ingestion occurs. Additionally, the animal gains as much as 60 to 70% of its body weight during this period and the impact of this and half-life considerations on dioxin residuals in the meat need to be taken into account.

Finally, the assumption that all feed is contaminated appears to be unrealistic. This would imply that this farm not only has both a dairy and beef cattle operation, but raises sufficient grain (and silage) and stills maintains enough pasture to graze the animals as well (in addition to crops for human consumption). This same point 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 these assumptions accordingly. Since grain and silage are often purchased elsewhere, it would be more appropriate to select a value of less than 100% in assessing the contribution of contaminated feed to the body (and milk) burden of the cattle considered therein.

Agency Response:

The Agency's response to this comment is provided in Section 4.29 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.3 Dow Chemical Company Comment

Transfer of Dioxin to Milk and Meat and Dioxin Kinetics

An important consideration in completing the risk assessment for dioxin in food is the relationship between the food animal exposure to dioxins from the waster stream and the amount of dioxin that appears in the milk or meat. USEPA relies on a biotransfer factor for milk that varies from compound to compound and is modified by the ratio of beef fat to milk fat (5.4) to estimate the transfer of dioxin to the meat based on the work of Travis and Arms (1988). Fries (1987) reported that steady state was achieved in milk fat within 40 to 60 days. In short term feeding studies, various researchers have examined the ratio of dioxins in the diet to the residues found in body and milk fat (Firestone *et al.*, 1979; Parker *et al.*, 1980; Jensen *et al.*,1981; Jensen and Hummel, 1982). They reported ratios for

milk fat:diet in cows of 3.7 for 2,3,7,8 TCDD, 2.8 for HxCDD, 0.3 for HpCDD, and 0.05 for OCDD. Similarly, the ratios for beef fat: diet were reported as 3.5 for 2,3,7,8-TCDD, 2.1 for 0.2 for HxCDD, and 0.05 for OCDD. While these animals were probably not at steady state this suggests that multiplying a biotransfer factor for milk by 5.4 may overstate the dose and hence the risk for these compounds. Fries and Paustenbach (1989) suggested that a steady state bioconcentration factor (BCF) for dioxins of 5 was reasonable based on observations from dioxin and chlorinated compounds with similar properties, although it appears that the higher chlorinated compounds have lower BCFs and this needs to be taken into account in this risk assessment. Using the same data and assuming a half-life of 41 days for TCDD in dairy cattle (a value also supported by the work of Olling *et al.*, 1991), Stevens and Gerbec (1988) assumed that 12% of the daily dose appeared in milk after 21 days. At steady state, they believed this translated into 40% of the daily dose of dioxin expressed in the milk. McLachlan *et al.* (1990) reported a value of 20% based on an experiment in lactating cows. They were critical of the other approaches used including that of Travis and Arms (1988) which USEPA apparently relied on to derive their biotransfer factor. Their interpretation of the Firestone *et al.* (1979) also supports the notion that less of the higher chlorinated compounds are transferred to the milk and in fact they reported a decrease in PCDD/F transfer to milk with increasing Kow, a finding in conflict with Travis and Arms (1988). If the calculations in this risk assessment rely on the generalized assumption of a direct correlation between biotransfer and Kow, a re-evaluation may be in order based on these and other findings. A simple kinetic model for the contamination of milk and meat can be developed and used as input into this risk assessment.

Regardless of the BCF or biotransfer factor used, the final step in the assessment requires that the concentration of dioxin in the milk would be divided by the daily milk production (15.6 liters/day) and the dose to humans a function of the daily ingestion of milk (perhaps corrected for changes in milk fat content, if any) and the bioavailability of the compounds in the milk. Given the short half life of these compounds in the cow and the constant milking pressure, the temporal input of dioxin and related compounds is important. Since the source of feed may vary over the seasons, the relative contribution of contaminated to uncontaminated feed may be important. This is not a concern under the USEPA's risk assessment in which all feed was assumed to be contaminated. Since, however, this is unlikely for reasons outlined above, the relative dioxin concentration in milk seems likely to vary over time and ought to be addressed both deterministically (a time-weighted average) and probabilistically.

The issue is perhaps more profound for the beef cow which has a shorter life span and different husbandry practices. The dose to the beef cow originates first from the mother's milk and then from feeding on contaminated plant materials. In the normal scheme of things, the beef cow is fed on grain the last third of its life and if this grain is uncontaminated as is likely for reasons discussed above, the growth of the animal in conjunction with the kinetics of the various congeners becomes a critical issue. Stevens and Gerbec (1988) used this husbandry information and first order kinetics to determine a BCF of 18.8 for 2,3,7,8-TCDD for the period equivalent to two-thirds of the animal's life. This value was combined with the concentration of dioxin ingested daily to arrive at the relevant dioxin fat concentration prior to the grain-only feeding. It is unlikely that grain fed a beef cow would be

contaminated for reasons alluded and, therefore, a net loss of the relevant congeners would occur prior to slaughter. Stevens and Gerbec (1988) used an estimate of dioxin half-life in beef to determine the amount present at time of slaughter. This basically suggested a reduction of greater than 50% at the time the animal was sacrificed. This information is then combined with assumptions as to the amount of fat present in a cut of beef, the amount of beef consumed daily and the relative oral bioavailability of the congeners present in the diet to arrive at the daily dose. Including kinetics and husbandry information would influence and improve both deterministic and probabilistic evaluations of the exposure and the risk by further reducing uncertainty. On this basis, a reduction in the risk from beef ingestion of 50% is appropriate.

Agency Response:

The Agency's response to this comment is provided in Section 4.30 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.4 Dow Chemical Company Comment

Exposure Duration for Child of Farmer

The exposure duration range for the Child of Farmer in the Monte Carlo Assessment is inappropriately weighted and inadequately justified. Specifically, the exposure duration of a child is assumed to last up to 30 years, resulting in an unrealistic scenario (*i.e.,* a 30-year old child). If these are truly to be considered "child" scenarios, the probability distribution for exposure duration should be truncated by the duration of the time window of interest (1-5 years, 6-11 years, 12-18 years). Therefore cancer risk estimates for the 1-5 year old, 6-11 year old, and 12-18 year old child scenarios should be adjusted by a factor of 0.13 (4 years/30 years), 0.17 (5 years/30 years), and 0.20 (6 years/30 years), respectively. Alternatively, these scenarios should be labeled as child/adult to reflect the fact that the entire exposure duration is not spent as a child.

Agency Response:

The Agency's response to this comment is provided in Section 4.31 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.5 Dow Chemical Company Comment

Application of Monte Carlo Methods

The preamble states that exposure factors without 100th percentile values used an estimation method of multiplying the 95th or 99th percentile by 2. As indicated by some of the peer reviewers, this is an arbitrary application for estimating parameter ranges and may result in very unlikely, high-end parameter selection during the running of the Monte Carlo realizations.

Agency Response:

The Agency's response to this comment is provided in Section 4.32 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.6 Dow Chemical Company Comment

A hidden correlation lies in the manner in which the concentrations in the waste stream were sampled. Specifically, by randomly selecting one of the six samples for each iteration, the relationship between congener concentrations becomes fixed. For example, the highest (or near highest) concentrations for 2,3,4,5-PeCDF and 1,2,3,4,7,8-HxCDF were identified in sample GL-02. Therefore, the concentrations for these two congeners becomes perfectly correlated (i.e., the high concentration of one occurs only when the other is at its high concentration). This hidden correlation is contrary to USEPA's statements to the fact that there does not appear to be a consistent fingerprint for chemical congeners of a given waste stream.

Agency Response:

The Agency's response to this comment is provided in Section 4.33 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.7 Dow Chemical Company Comment

The correlation of body weight between child-age cohorts may not be a valid assumption. It is unlikely that body weight will remain within a specific percentile throughout for long exposure duration. While it is likely that a general correlation exists, a less stringent correlation should be applied (*i.e.* <1.0), accounting for the period of great variability in children's weight as they grow from infancy to adulthood.

Agency Response:

The Agency's response to this comment is provided in Section 4.34 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.8 Dow Chemical Company Comment

Adult Beef Ingestion

The adult farmer was assumed to ingest 0.3234 kg/day beef for the high end evaluations of the deterministic risk assessment. For the Monte Carlo analysis, beef intake was assumed to be lognormally distributed, with a mean of 2.5 g/kg-day (sd = 2.69). These values were obtained from the Exposure Factors Handbook (USEPA, 1997). These intake values correspond to a relatively small proportion of the surveyed population (<3%) who consume home produced beef (USEPA, 1997). The upper bound intake for the deterministic assessment corresponds roughly to the 90th percentile, and therefore appears reasonable. However, the mean intake for the Monte Carlo assessment appears to be elevated. Mean beef intakes for 20-69 year olds corresponds to a value of approximately 1.95 g/kg-day (USEPA, 1997). Therefore, we recommend that the Monte Carlo risk estimates for the adult farmer via beef ingestion be adjusted by a factor of 0.78 (1.95/2.5).

Agency Response:

The Agency's response to this comment is provided in Section 4.35 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.9 Dow Chemical Company Comment

Child Beef Ingestion

Time-weighted average beef ingestion factors for children between the ages of 1 and 19 were developed in the risk assessment. For the deterministic assessment, the child of a farmer was assumed to ingest up to 0.0059 kg/kg-day beef for the high end evaluation. For the Monte Carlo assessment, beef ingestion was assumed to be lognormally distributed, with a mean value of 3.88 g/kg-day (sd = 4.71). These values were obtained from the Exposure Factors Handbook (USEPA, 1997). Again, these intake values correspond to a relatively small proportion of the surveyed population (<5%) who consume home produced beef (USEPA, 1997). The upper bound intake for the deterministic assessment falls between the 75th and 90th percentile for 6-11 years olds, but exceeds the 100th percentile for 12-19 year olds. Therefore, this intake is likely to be appropriate for younger children, but overly conservative for teens. The mean intake for the Monte Carlo assessment appears to be elevated. Mean beef intakes for 6-19 year olds corresponds to a value of approximately 2.75 g/kg-day (USEPA, 1997). Therefore, we recommend that the Monte Carlo risk estimates for the adult farmer via beef ingestion be adjusted by a factor of 0.71 (2.75/3.88).

Agency Response:

The Agency's response to this comment is provided in Section 4.36 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.10 Dow Chemical Company Comment

Adult Dairy Consumption

The adult farmer was assumed to ingest up to 2.1 kg/day dairy products for the high end evaluations of the deterministic assessment. For the Monte Carlo assessment, dairy intake was represented by a Weibull distribution with a location equal to 0, a scale equal to 17.45, and a shape of 1.25 g/kg-day. These values were obtained from the Exposure Factors Handbook (USEPA, 1997). The deterministic intake also corresponds to a very small percentage (<1%) of the surveyed population. This value exceeds the 90th percentile of dairy intake for 20-39 year olds (15.4 g/kg-day or 1.08 kg/day assuming a 70 kg body weight) (USEPA, 1997). Similarly, a large fraction of the Weibull distribution exceeds this value. Intake of dairy products in older age groups, while not presented, is likely to be lower based on trends noted for dairy consumption in the general population (*i.e.*, not home produced). For this reason, we recommend that all cancer risk estimates calculated for the adult farmer via dairy ingestion be adjusted by at least a factor of 0.51 (1.08/2.1).

Agency Response:

The Agency's response to this comment is provided in Section 4.37 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.11 Dow Chemical Company Comment

Child Dairy Consumption

Time-weighted average dairy ingestion factors for children between the ages of 1 and 19 were developed in the risk assessment. The child of a farmer was assumed to ingest up to 0.024 kg/kg-d dairy products for the high end evaluation of the deterministic assessment. For the Monte Carlo assessment, intake was represented by three Weibull distributions (location, scale, shape) for ages 1-5 years (0, 26.47, 1.7), 6-11 years (0, 14.82, 1.56), and 12-18 years (0, 6.52, 1.14). This value was obtained from the Exposure Factors Handbook (USEPA, 1997), and falls between the 50th and 75th percentile for 1-5 years, the 75th and 90th for 6-11 years, and the 99th and 100th percentile for 12-19 years for the general population (i.e., not strictly home producers). As such, the deterministic intake value is appropriate for younger children (1-11 years of age), but is overly conservative for teens.

Agency Response:

The Agency's response to this comment is provided in Section 4.38 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.12 Dow Chemical Company Comment

Fraction Beef Ingested

The percentage of beef from a contaminated source was assumed to be 48.5% in the risk assessment. The value for this term applies only to a relatively small fraction of the surveyed population who farm, and as such is overly conservative by a factor of 12.7 (0.485/0.038) if applied to the general population (USEPA, 1997). It may well be that this percentage overstates the upper end homegrown beef consumption markedly.

Fraction Dairy Ingested

The percentage of dairy products from a contaminated source was assumed to be 25.4% in the risk assessment. It is important to note that the value for this term applies only to a relatively small fraction of the surveyed population who farm, and as such is overly conservative by a factor of 21.2 (0.254/0.012) if applied to the general population (USEPA, 1997). It may well be that this percentage overstates the upper end homegrown dairy consumption markedly.

Agency Response:

The Agency's response to this comment is provided in Section 4.39 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.13 Dow Chemical Company Comment

Loss from Cooking and Meat Preparation

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 chemical due to food preparation, cooking, and consumption practices. The Exposure Factors Handbook (USEPA, 1997) recommends that this important factor 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, because of the propensity that dioxin-like compounds have for fat, the cancer risk estimates associated with the beef ingestion pathway should be adjusted by a factor of 0.55 (0.73x0.76). Loss of residues from grilling or broiling of fish has been shown to reduce contaminant load by 50% or more and this "cooking reduction" value has been employed in deriving fish consumption advisories for PCBs.

Agency Response:

The Agency's response to this comment is provided in Section 4.40 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.14 Dow Chemical Company Comment

Toxicity Assessment

Chemicals that contribute significantly to the total cancer risk estimates include two dioxin-like chlorinated furans (2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF), and to a lesser extent chloroform. Only comments associated with the toxicity values for these chemicals are summarized below.

Toxicity Equivalency Factors (TEFs)

A hidden area of conservatism in USEPA's risk assessment lies 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, do not reflect central tendency values, but are instead upper bound values. Using the World Health Organization's database of Relative Potency (REP) estimates for these two congeners, it was 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. The geometric mean from these 59 studies corresponds to a value of 0.19. Similarly, 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. The geometric mean from these 10 studies corresponds to a value of 0.041. Therefore reliance on these upper-bound TEF values combined with an upper-bound cancer slope factor for TCDD results in cancer risk estimates that are overly conservative by a factor of approximately 2.5. Since Monte Carlo methods are used for other aspects of the risk assessment, a similar treatment of the TEF values would not be difficult to perform and would serve to eliminate this hidden conservatism. Alternatively, we recommend that the cancer risk estimates for these two congeners via all pathways be adjusted by a factor of 0.4 (0.19/0.5 or 0.041/0.1).

Agency Response:

The Agency's response to this comment is provided in Section 4.41 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.15 Dow Chemical Company Comment

Cancer Slope Factor for TCDD

The risk assessment relies heavily upon a cancer slope factor of 156,000 (mg/kg-day)-1, as reported by USEPA (HEAST, 1997).

The cancer slope factor for TCDD has not been verified by USEPA's IRIS workgroup. Because this value is currently under review, it is subject to change in the relatively near future. We therefore propose that USEPA delay finalizing this proposed rule until the revised cancer potency factor for TCDD is released.

The existing slope factor for TCDD does not take into account mechanistic information that would suggest there is a threshold for TCDD carcinogenesis. 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) 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.*" Based on this consideration, the cancer risk posed by all of the dioxin-like dioxin and furans, may well be zero for all pathways considered in the risk assessment.

The existing cancer slope factor for TCDD is based on human equivalent doses calculated by scaling doses to body weight raised to the 2/3 power. This practice is obsolete, and does not reflect changes in USEPA policy for scaling doses to body weight raised to the 3/4 power (USEPA, 1992). The existing slope factor can readily be converted to the correct body weight scaling practice using the formula below:

Adjusted Slope Factor = [Existing Slope Factor][Unscaling Factor]*[Rescaling Factor]*

Where,

Existing Slope Factor = $156{,}000\ (mg/kg\text{-}day)^{-1}$
Unscaling Factor = $(BW_{rat}/BW_{human})^{1/3} = (0.3\ kg/70\ kg)^{1/3} = 0.16$
Rescaling Factor = $(BW_{human}/BW_{rat})^{1/4} = (70\ kg/0.25\ kg)^{1/4} = 4.09$
Adjusted Slope Factor = $98{,}000\ (mg/kg\text{-}day)^{-1}$

Based on these calculations, the existing cancer slope factor serves to overestimate cancer risk from dioxin-like compounds by at least 35% even if a conservative, linear dose-response is assumed. As such, we recommend that all cancer risk estimates for dioxin-like compounds be adjusted by at least a factor of 0.65.

The USEPA has derived a cancer slope factor value of 6,200 $(mg/kg\text{-}day)^{-1}$ for hexachlorodibenzo-p-dioxin mixtures. Curiously, this value was not used in USEPA's risk assessment for any of the hexachlorinated dioxins/furans. Instead USEPA has opted to use the cancer slope factor of 156,000 $(mg/kg\text{-}day)^{-1}$ and a TEF value of 0.1 (used for all 2,3,7,8-hexachlorinated dioxins and furans), yielding an effective cancer slope factor of 15,600 $(mg/kg\text{-}day)^{-1}$. This practice serves to overestimates cancer by a factor of approximately 2.5. The risk assessment for hexachlorinated dioxins/furans would be greatly improved if they were based on the value of 6,200 $(mg/kg\text{-}day)^{-1}$ for the following reasons:

1. This cancer slope factor is verified on USEPA's IRIS database, whereas the value for TCDD is not.
2. This cancer slope factor is based on exposure to a mixture of congeners, whereas the value for TCDD is based on exposure to a single congener.

3. It 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. In so doing, the inherent uncertainties associated with the application of the TEF approach would be eliminated.

For these reasons, we recommend that all cancer risk estimates calculated for hexachlorinated dioxins/furans be adjusted by a factor of 0.40 (6,200/156,000). Additionally, since the slope factor of 6,200 $(mg/kg\text{-}day)^{-1}$is also based on scaling doses using body weight raised to the 2/3 power, the same adjustment factor of 0.65 (assuming a body weight of 0.3 kg for a rat, and 70 kg for a human) is applicable here. Therefore, the net adjustment factor for cancer risks attributed to exposure to hexachlorinated dioxins/furans is most appropriately 0.26 (0.40x0.65).

Agency Response:

The Agency's response to this comment is provided in Section 4.42 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.16 Dow Chemical Company Comment

Chloroform

USEPA's unit risk of 2.3E-05 $(ug/m^3)^{-1}$ for chloroform was also calculated using the outdated practice of scaling dose based on body weight raised to the 2/3 power. For this reason, we recommend that the cancer risks attributed to chloroform be adjusted by a factor of 0.52 (calculated in the same manner as above for TCDD, assuming a body weight of 0.03 kg for a mouse and a body weight of 70 kg for a human).

Agency Response:

Given recent information on chloroform carcinogenicity compiled by EPA's Office of Water (OW), we have reconsidered our conclusions regarding chloroform cancer risk. Based on mode of action considerations, EPA's Science Advisory Board (SAB), WHO, the Society of Toxicology, and EPA now all strongly endorse a 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's concern regarding 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 2/3 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 3/4 power (63 *FR* 15686), as recommended in EPA's 1996 Guidelines for Carcinogen Risk Assessment (USEPA, 1996).

References:

USEPA. 1996. Proposed Guidelines for Carcinogen Risk Assessment. 61 *FR* 17960.

3.17 Dow Chemical Company Comment

Risk Characterization

Background of Dioxins in Beef and Dairy

A number of studies have been conducted on the levels of dioxins found in foodstuffs available commercially to the general public that are instructive in considering the significance of the risk assessment being reviewed. While these studies are limited in terms of the number of data points, location and date, they are nonetheless useful for placing the draft report's findings in perspective.

The most recent of these (Schecter *et al.*, 1994) examined supermarket products (n = 18) from New York State and reported total dioxin concentrations in meat and dairy products ranging from 0.6 to 59.3 ppt and 0.6 to 14 ppt, respectively. The TEQ for these foods were 0.03 to 1.5 ppt for meat and 0.04 to 0.7 ppt for dairy. Specifically, ground beef, beef rib sirloin tip and beef rib steak were found to contain 4.1, 0.6, and 30.7 ppt of dioxins, respectively (The TEQs for combined dioxins and furans in these samples were 1.5, 0.04, and 0.3 ppt respectively). Cottage cheese, blue cheese, heavy cream, cream cheese and cheese slices were found to contain 0.6, 14.0, 5.0, 4.0, and 4.0 ppt of dioxins, respectively (The TEQs for combined dioxins and furans in these samples were 0.04, 0.7, 0.4, 0.3, and 0.3 ppt respectively). The risks associated with consumption of these foods are close to those that are identified as being of concern in this risk assessment.

A similar study in Germany in the late 1980s (Beck *et al.*, 1989) reported the combined TEQs for dioxins and furans as 0.86 (milk), 0.43 (butter), and 1.31 (beef) ppt. LeFleur *et al.* (1990) reported levels of 2,3,7,8-TCDD in various food products from Midwestern groceries and found 17 to 62 pg/kg in ground beef, 12 to 37 pg/kg in beef hot dogs, 7.2 to 9.4 pg/kg in canned corned beef hash, 24 to 25 pg/kg in whole milk, and 13 to 14 pg/kg for half-and-half. Milk obtained directly from dairies was found to contain 0.48 pg/g of 2,3,7,8-TCDD and levels increased as storage time in paperboard cartons increased (to a maximum of 2.7 pg/g after 288 hours). In contrast, a study by Schecter *et al.*, (1989) found no detectable amounts of 2,3,7,8-TCDD in milk samples collected, although the higher chlorinated congeners were present. Whole and lowfat (2%) cow's milk contained 3.6 and 3.3 ppt of HxCDD, respectively. HpCDD and OCDD were reported as 6.5 and 15 ppt in cow's milk and 8 and 21 ppt in lowfat (2%) milk, respectively. Given that these findings from what might be considered "pooled samples" from grocery stores have similar levels to that predicted to occur in the food stuffs of subsistence farmers from the impact of releases from the waste streams under review, it seems questionable that any significant risk is present. This is particularly true since the risk assessment relies on a variety of models and model inputs that are likely to over-predict the impact of releases from the waste stream to the environment as identified by both USEPA's peer reviewers and our review. In the same vein, a number of exposure assumptions appear that seem too high and are unjustified in the text. For instance, dairy farmers typically do not raise beef cattle and vice versa. To assume that the same farm furnishes subsistence levels of both food groups appears overly conservative and inappropriate. Similarly, the levels of consumption selected for various foods and percent contribution to the diet

appears too high and is often unsupported in the text. This issue was raised by the peer reviewers as well. This leads to suspicions that the risk may be significantly over-stated for some pathways.

Agency Response:

The Agency's response to this comment is provided in Section 4.43 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.18 Dow Chemical Company Comment

Calculations

Attempts to reproduce some of the cancer risk estimates for the deterministic assessment have been unsuccessful. Nearly 100% of the cancer risk associated with indirect exposure to wastestream K173 is attributable to two pathways (ingestion of beef and dairy), and two chemicals (2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF). The highest deterministic risk estimate calculated for the adult farmer corresponded to a value of 2E-05. According to the equation presented in Table E-5.8, cancer risk was calculated using the following equation,

$$Cancer\ Risk = \frac{I \times ED \times EF \times CSF}{BW \times AT \times CF}$$

Where,

I Intake (mg/day): corresponding to high end deterministic evaluation of the adult farmer from 2,3,4,7,8-PeCDF (6.1E-09 and 5.9E-09 mg/day) and 1,2,3,4,7,8-HxCDF (9.6E-09 and 8.53E-09 mg/day) for the beef and dairy ingestion pathways, respectively, assuming upper bound concentration estimates and intake assumptions (presented in Tables H.1-1a and K-1 of the risk assessment).

ED Exposure Duration (yrs): 48.3
EF Exposure Frequency (days/yr): 350
CSF Cancer Slope Factor (mg/kg-day)-1: 78,000 (156,000 x 0.5) for 2,3,4,7,8-PeCDF, and 15,600 (156,000 x 0.1) for 1,2,3,4,7,8-HxCDF.
BW Body weight (kg): 70
AT Averaging Time (yrs): 70
CF Conversion Factor (days/yr): 365

When the calculations are performed, the cancer risk estimate obtained when exposure concentration, beef and dairy intake, and exposure duration are held at their high end values is 1E-05, or approximately one half of the value of 2E-05 reported in the risk assessment for these congeners and pathways (Table H.1.3c). Adding to our concern is the fact that the exposure point concentrations for chemicals in beef and dairy do not agree for the Farmer and Child of Farmer scenarios. A reason for

the discrepancy is not obvious, but suggests that the risk estimates for both the deterministic and Monte Carlo assessments should be re-evaluated carefully.

Agency Response:

The Agency's response to this comment is provided in Section 4.44 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.19 Dow Chemical Company Comment

Role of the Deterministic and Monte Carlo Evaluations

Ideally, the deterministic and Monte Carlo risk assessments should be completed in a tiered approach, with the deterministic assessment conducted first, followed by the completion of the Monte Carlo assessment (if required). In this way, the deterministic assessment can be used to help guide the Monte Carlo assessment as to which pathways, chemicals, and assumptions require the most attention. Indeed, one of USEPA's guiding principles for Monte Carlo Analysis is to "*restrict the use of probabilistic assessment to significant pathways and parameters.*" Unfortunately, this does not appear to have been the case for this risk assessment. Rather, the deterministic and Monte Carlo evaluations appear to have been conducted at best in parallel, or at worst completely independent of one another. Evidence supporting this observation arises from the fact that the units for many of the intake assumptions are different for the two assessments (i.e., kg/day vs g/kg-day). Also, while the deterministic assessment clearly identifies the dairy and beef ingestion pathways as very important to risk, many of the parameters for this pathway do not appear to have been included in the Monte Carlo assessment (i.e., fraction of contaminated forage is fixed at 1.0, intake rates for beef and dairy cattle are fixed at constant values). On the other hand, non-driving pathways (ingestion of fruits and vegetables) are afforded full Monte Carlo treatment.

The independent nature of the deterministic and Monte Carlo assessments may be responsible for another troubling observation. It has been our experience that when Monte Carlo methods are applied to a deterministic risk assessment that has been based on several upper-bound assumptions (i.e., compounded conservatism), the deterministic risk estimate will fall well above the 90^{th} or 95^{th} percentile of the resulting risk distribution. However, in the case of the adult farmer scenario, the application of Monte Carlo methods has resulted in a large tail of risk estimates (90^{th} percentile = 5E-05) that were even higher than those obtained from high end deterministic evaluation (2E-05). There are three possible explanations for this observation: (1) upper bound estimates for parameters in the deterministic were inappropriately identified, resulting in an under estimate of risk; (2) the distributions identified for parameters in the Monte Carlo assessment were inappropriately identified, resulting in an overestimate of risk; and/or (3) a calculation error has occurred in one or both of the assessments. Unfortunately, time does not permit us to investigate an explanation further. However, we recommend that the calculations of the deterministic assessment be checked thoroughly.

Agency Response:

The Agency's response to this comment is provided in Section 4.45 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.20 Dow Chemical Company Comment

Selecting a High End Risk Descriptor

Reliance upon a 95th, 97.5th, or 100th percentile as an upper bound is problematic, particularly given the uncertainties associated with characterizing the tail end of the distributions for the underlying assumptions. In identifying a high-end descriptor for risk, USEPA's *Guidance for Risk Characterization* (USEPA, 1995) recommends that emphasis should be placed on using the 90th percentile of the risk distribution, except in instances when a large number of individuals may be included in the high end (in which case a 95th percentile could be used). Because USEPA has identified a relatively small population (farmers living within a few hundred meters of a holding tank, who consume beef and dairy from home grown sources), the 90th percentile should be adopted as the high end descriptor for this population (in essence they are assessing the high end of a high end consumer group). As such, we strongly recommend that reference to the 95th, 97.5th, or 100th percentiles be removed from the text and tables. As an alternative, we recommend that the resulting risk distributions be presented graphically (using either a frequency or cumulative probability plot) with the 50th and 90th percentiles and deterministic results being indicated by arrows.

Agency Response:

The Agency's response to this comment is provided in Section 4.46 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.21 Dow Chemical Company Comment

Impact of Adjustment Factor on Total Risk

To illustrate the conservative nature of USEPA's risk assessment based on only a few assumptions we were able to quantify, adjusted deterministic risk estimates for the adult farmer scenario are calculated below.

Chemical	Pathway	High End Deterministic Risk Estimate for Adult Farmer*	Adjustment Factors for Exposure Assessment	Adjustment Factors for Toxicity Assessment	Adjusted Deterministic Risk Estimate
2,3,4,7,8-PeCDF	Beef	2.6E-06	0.5 (loss of chemical before slaughter) 0.55 (loss from cooking)	0.4 (conservative TEF value) 0.65 (BW scaling to 3/4 power)	1.9E-07
	Dairy	3.0E-06	0.51 (overly conservative intake rate)	0.4 (conservative TEF value) 0.65 (BW scaling to 3/4 power)	4.0E-07
1,2,3,4,7,8-HxCDF	Beef	4.1E-06	0.5 (loss of chemical before slaughter) 0.55 (loss from cooking)	0.4 (conservative TEF value) 0.65 (BW scaling to 3/4 power) 0.4 (use of HxCDD CSF)	1.2E-07
	Dairy	4.6E-06	0.51 (overly conservative intake rate)	0.4 (conservative TEF value) 0.65 (BW scaling to 3/4 power) 0.4 (use of HxCDD CSF)	2.4E-07
Other Dioxin-Like Congeners	Beef	1.2E-06	0.55 (loss from cooking)	0.65 (BW scaling to 3/4 power)	4.3E-07
	Dairy	1.4E-06	0.51 (overly conservative intake rate)	0.65 (BW scaling to 3/4 power)	4.6E-07
Total		**2E-05**			**2E-06**

*Although the contribution of each congener/pathway was not provided in the risk assessment, it can be estimated from the total risk estimates for each pathway and the relative contribution of each congener to the TEQ in each exposure media

Therefore, the conservative practices used in USEPA's deterministic assessment for the adult farmer scenario have produced risk estimates that are overly conservative by a factor of approximately 10. We anticipate that similar results would be obtained for other exposure scenarios (child of farmer), as well as for the Monte Carlo evaluations.

This analysis clearly shows that EPA has overstated the risk for the proposed K173 wastes. EPA should withdraw the proposal for this listing**.**

Agency Response:

The Agency's response to this comment is provided in Section 4.47 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

3.22 Dow Chemical Company Comment

Scope of the K173 Listing should be Further Defined

The scope of the K173 listing needs to be clarified. The rule preamble says that the listing covers wastewaters from the production of chlorinated aliphatic hydrocarbons. The preamble explicitly is not limited to processes using free radical catalyzed reactions. This is a departure from the scope of the F024 listing. This is clear, however, it is contradicted by the scope of several background documents, upon which the rule relies. These background documents indicate either that agency personnel themselves are unclear of the exact scope, or that the background documents are incomplete, as they do not adequately address the scope of the proposed rule. Either way, EPA could not have adequately considered the scope of the K173 proposed listing as presented in the rule's preamble.

Section 3.1 of the Listing Background Document details the types of chlorinated aliphatics manufacturing processes. These are sorted by the product produced. This section indicates that these are the only processes covered by the K173 listing, or any of the proposed listings.

The Economics Background Document says, "the current listing proposal only addresses the non-listed waste streams in the F024 listing," page 2. Additionally, Section V. D. (page 51) of the Economics Background Document evaluates the potential costs imposed by this proposal, saying:

These costs are incremental in the sense that all 23 CAHC manufacturing facilities are currently regulated under RCRA (i.e. as chlorinated aliphatic manufacturers via the existing RCRA F025 & F026 wastecodes)

Note: It is assumed that EPA intended this note to state "F024 & F025 wastecodes," as F026 does not pertain to chlorinated aliphatic wastes.

Thus, EPA has neither evaluation nor consideration of any imposed costs for any scope increase beyond those of F024 and F025 processes. To avoid promulgating a rule with unconsidered costs, EPA needs to limit the scope of this rule to that of processes already regulated by F024 and F025.

Agency Response:

The scope of the proposed listing determination for chlorinated aliphatic wastewaters was identified in Section 3.1 of the Listing Background Document, where EPA identified the various waste groups that were the subject of the listing determination. As stated at proposal, the Agency did not restrict its investigation or the scope of the listing determination to only those wastewaters generated from free-radical catalyzed processes, because our investigations showed that the constituents of potential concern were different than the constituents on which the F024 listing is based. 64 *FR* at 46480. In addition, the constituents of potential concern (i.e., dioxins, chloroform, arsenic) were found in all wastewater samples, regardless of the type of manufacturing process used. See EPA's response to comment in Section 13.17 (Shell comments) of this Response to Comment Document for additional clarification of the scope of the proposed chlorinated aliphatic wastewater listing.

The commenter is correct in pointing out that the 1999 Economics Background Document reference to "F025 & F026" is a typographical error; it should read "F024 & F025."

The statement in the 1999 Economics Background Document pertained to the waste types rather than the industrial manufacturing processes. The deviation from the F024 listing scope is stated in the 1999 Economic Background Document, directly after the sentence referenced in the comment above. Consequently, the scope of costs included in economic analysis for both the 1999 proposed listing and for the final listing rule, are not restricted to the F024 process wastes.

3.23 Dow Chemical Company Comment

There are manufacturing processes that generate chlorinated aliphatics as either waste streams, by-products or co-products that do not generate chlorinated aliphatics as their primary product. Most of these processes are significantly and fundamentally different than the types of processes evaluated in this proposal. They do not generate wastewaters similar in composition to those evaluated. For instance, the raw materials may not be typical aliphatic hydrocarbons as are the raw materials for the processes studied. Since these processes clearly were not part of EPA's evaluation, it is inappropriate to include these wastewaters in the K173 listing. Often these chlorinated aliphatic by-products and co-products are recovered from what were previously waste streams as a part of a facility's pollution prevention program. Including these processes in the scope of the listing is a serious specific disincentive for these pollution prevention efforts and a general disincentive for future similar pollution reduction efforts.

Nearly all chemical manufacturing plants generate wastewater as a part of their maintenance activities, due to equipment cleanings in preparation for maintenance. Often, this wastewater, even if included in this rule's listings, is from equipment that does not contain any of the chemicals of concern associated with this rule. Consequently, EPA should exclude wastewater from equipment clean outs from the proposed K173 listing.

If the ultimate conclusion is that some chlorinated aliphatic wastewaters are listed, EPA should clarify that the scope of K173 only includes process wastewaters from processes that produce chlorinated aliphatic hydrocarbons as one of their primary products. EPA needs to have background documents that adequately cover the scope of any listing.

Agency Response:

The comment above states that "If the ultimate conclusion is that some chlorinated aliphatic wastewaters are listed, EPA should clarify that the scope of K173 only includes process wastewaters from processes that produce chlorinated aliphatic hydrocarbons as one of their primary products." As discussed above, EPA is issuing a final decision not to list wastewaters from chlorinated aliphatic production processes.

Please see EPA's response to comment in Section 13.15 of this Response to Comment Document (Shell comment) regarding the issue of chlorinated aliphatic chemicals that are generated as by-products from producing non-chlorinated aliphatic chemicals.

3.24 Dow Chemical Company Comment

Dow Supports a Concentration Based Listing Approach

Dow is very pleased that EPA is incorporating the concept of contingent management in its RCRA regulations. Locating contingent management in the listing itself is both logically correct and increases the behavior inducing part of contingent management. Eliminating the RCRA regulation of a material has significant real and perceived benefits in the regulated community. This part of this regulation is well done.

The scope of this listing is narrower than many, with just three compounds (or classes of compounds) of national regulatory concern: dioxins, arsenic and chloroform. There are also a small number of facilities anticipated to be directly affected by this additional listing (approximately 23). Thus, this listing presents an appropriate opportunity to experiment and try what may result in improved approaches in regulation.

Agency Response:

The Agency appreciates that commenter's support for the proposed alternative (concentration-based) listing approach. However, as discussed above, EPA is issuing a final decision not to list wastewaters from chlorinated aliphatic production processes.

3.25 Dow Chemical Company Comment

In this preamble EPA notes that there are concerns with using nationalized reasonable worst case risk factors and not using site specific factors in estimating the risk. EPA noted a concern with using best estimates in lieu of site-specific data, for example on 64 *FR* 46,498.

Site specific risk factors are being used in the proposed rule. For example, not applying the listing to ash that is placed in a solid waste or hazardous waste landfill because such placement is inconsistent with the highest risk mismanagement scenarios. EPA has a long and successful history of using such site specific, risk based regulation.

One of EPA's first uses of this site specific, risk based regulation was in the fugitive portion of the vinyl chloride NESHAP. EPA had a regulatory program designed to reduce the occurrence of vinyl chloride fugitive emissions from valves and flanges as measured in a specified manner from a rate which represented the industry average to a lower level. A laudable goal; however, after the rule was proposed, some of the potentially regulated facilities were determined to already have a lower leaking frequency than EPA's regulatory fugitive emission program's goal. The final rule begins with a measurement of the facility's fugitive emission rate. If a facility has a demonstrable fugitive emission rate below the target, then the detailed fugitive emission program does not apply. The regulatory target was set slightly below the goal of the fugitive emission program.

EPA should adopt a regulatory alternative allowing generators to determine the site specific risk and regulatory classification of generated streams, potentially regulated under this rule. This would be similar to the generator determining the status of wastes under the spend solvents, co-product/by-product classification system. The state of the art risk based systems, such as the CHEMDAT8 are much clearer and better defined than these other generator determinations.

One of the advantages of this type of site specific regulatory determination is that it focuses the regulatory attention on high risk waste handling behavior. Another is that it provides an incentive for the regulated community to make changes to reduce risk. This type of site specific risk determination would avoid the perverse effect of most hazardous waste listings of making changes to the system, such as to reduce risk, much harder to make.

This type of site specific risk determination also has the effect of reducing the higher specific cost risk reduction aspects of the listing. Rather than have a very high cost risk reduction at the borders of the regulation, the regulation would allow anyone with such a meritorious complaint simply to spend part of

the high cost about which they were complaining to reduce the risk and remove the stream from the scope of the regulation. If no such a solution were cost effective, then the complaint about the inappropriate costs of regulation might lack substantial merit.

Any such site specific regulatory determination needs to be easy to enforce. The risk evaluation used for the background of this regulation can be adopted. The generator should be able to replace national reasonable worst case factors with those for the site in question. All of the variables should not need to be replaced, but some might be grouped together, such as distance to receptor and angle to receptor. One should be able to use distance to actual people and update the determination if the site specific characteristic changed.

To ensure that this aspect of the regulation actually reduces risk, EPA could lower the acceptable risk *slightly*, perhaps using 5×10^{-6}. In this aspect, this rule would reflect the approached used in the vinyl chloride fugitive emission rule.

One way to include this site specific regulatory determination in the current regulation would be to exclude from the listing any stream which the generator can demonstrate through a risk analysis that has a risk, using site specific factors, that is less than 5×10^{-6}. Such risk analysis needs to use CHEMDAT8 or its equivalent. The generator needs to have the burden of proof in a similar manner to that if a restricted waste is stored more than one year for appropriate purposes. EPA could issue guidance if needed to allow future risk analysis methods, or a generator could assume the burden of showing that the risk analysis used was equivalent to CHEMDAT8.

Agency Response:

EPA acknowledges the commenter's suggested alternative approach to the hazardous waste listing program based upon what appears to be described as a self-implementing, facility-specific risk assessment. As the commenter seems to point out, the Agency's proposal to regulate certain wastewaters based upon risks posed by air emissions suggests comparisons with existing implementation approaches used to address risk in the EPA's air program. However, an approach where generators of solid waste would perform facility-specific risk assessments to determine whether wastes should be regulated as hazardous waste, while offering the possibility of allowing for more site-specific factors to inform the resultant decision, would have significant issues associated with it. Adoption of the commenter's suggested approach within the Subtitle C program would require a considerable amount of effort, and would have a significant amount of issues requiring input from the public, all of which are beyond the scope of the chlorinated aliphatics rule.

3.26 Dow Chemical Company Comment

Requirements of Subpart CC for Wastewater tanks containing K173 Wastes should be Revised

The proposed rule uses Subpart CC to control dioxin emissions from wastewater tanks containing K173 wastes with dioxin above the specified threshold. Full Subpart CC is inappropriate and overburdensome for large wastewater treatment tanks. The Subpart CC rules were written to control VOC emissions from typical storage tanks (when the rules written wastewater treatment tanks were exempt from the RCRA tank standards). Dioxin is not a VOC and the tanks covered by the proposal can be much larger than a typical storage tank. EPA should return to one of the alternatives it initially considered -- simply require tank covers. Further definition could be given that would adequately address the issues raised by the risk assessment without placing undue burden on the facility. The rules should allow for other types of covers such as floating roofs, or a fixed roof with an open vent to the atmosphere, this would still reduce emissions to a level deemed protective by EPA's modeling without unduly burdening industry with complete Subpart CC controls.

EPA's risk assessment only modeled aerated wastewater tanks and the calculated risk was very near the "no list" limit. Consequently, EPA should only regulate aerated tanks. If the Subpart CC requirements are the regulatory alternative selected, then they should only apply to aerated tanks. Emissions from non-aerated tanks are significantly lower than aerated tanks and do not pose a substantial risk based on EPA's model. As previously mentioned, the dioxin applicability limit should be based on dioxin in the water phase only. This would eliminate any uncertainty of how much of the dioxin in the waste stream is available for emitted. Additionally, the concentration limit should be based on the outlet concentration of the tank, rather than the inlet. An aerated wastewater tank can be modeled as a Continuously Stirred Tank Reactor (CSTR). Any textbook on reaction kinetics shows that the concentration of the constituents in the tank are best estimated by their concentration in the outlet. Any air emissions are a function of the composition of the actual contents. In lieu of measuring the dioxin in the waste stream itself, any facility be should allowed to measure the actual amount of dioxin being emitted from a tank to determine the applicability of the Subpart CC requirements. Although it may difficult to measure emissions from large open top vessels, it will be occasionally possible Some tanks may be covered, but not vented to a control device as would be required by Subpart CC. Measuring actual emissions from these vent stacks would be a straightforward procedure. This would eliminate some of the uncertainty associated with the emissions model used by EPA. The regulatory limit should be the concentration used in the model as the limit for requiring regulation.

The way that the proposed rule links the proposed listing for K173 wastes into Subpart CC does allow implementation time. A provision similar to 40 CFR §265.1083(b) should be added allowing 30 month to implement the Subpart CC requirements.

Agency Response:

EPA appreciates the commenter's input and concerns regarding the potential differences in air emissions between aerated and non-aerated wastewater treatment tanks. If other adjustments and modifications to the Agency's risk assessment had not lowered EPA's original risk estimate to a level which resulted in the Agency reversing its proposed decision to list the wastewaters as hazardous, the Agency most likely would have pursued a further investigation of the commenter's concerns regarding potential emissions from non-aerated tanks. However, because the Agency is 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

3.27 Dow Chemical Company Comment

Analytical and record keeping requirements to be Exempt from Subpart CC should be revised

The proposal requires facilities to demonstrate that tanks containing K173 wastewaters contain less than 1ppt TEQ dioxin, to be excluding from Subpart CC requirements. Dow recognizes that there needs to be some mechanism to ensure that the wastewaters are below this level. In the spirit of EPA's burden reduction efforts, Dow offers the following suggestions:

1. Simply require that the facility have the documentation available for inspection rather than require that it be submitted.

2. Require re-testing only if changes are made at the facility would be expected to increase dioxin concentrations in the wastewater. As written, re-testing would be required if a change were made to decrease dioxins in the wastewater.

3. Allow for less frequent re-testing based on previous analytical results. As an example, EPA could allow the frequency to be reduced by a factor of two if the analysis is less than 0.5 ppt (or half of any limit), with a minimum frequency of once every ten years.

4. 40 CFR §265.1080(h)(1)(ii)(c) seems to require that grab samples be used in the analysis. EPA should also allow the option of composite sampling. This could reduce some analytical burden, as well as provide more assurance that on average the material is below the limit, fitting the measurement with the concern giving rise to the requirement.

5. Specify what to do if re-testing shows that a stream that was previously below the limit is now above the limit. There needs to be the ability to re-test within a certain time frame, as well as the ability to statistically analyze any data to determine if there are any outliers. The "Q-test" described in Appendix IX of Part 266 should be used to evaluate such data. If the final result is that the wastewater does now exceed the applicable standard, the facility should be given a reasonable time to comply with Subpart CC, or modify their process so as to re-establish the regulatory status of not needing to meet Subpart CC.

Agency Response:

EPA appreciates the commenter's input with regard to the implementation of the proposed air emissions requirements for wastewater treatment tanks. However, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

3.28 Dow Chemical Company Comment

The proposed rule allows 60 days to develop the documentation required to show that the wastewater streams are below the limit requiring Subpart CC compliance. Based on the documentation requirements, complexity of the testing, and the required accuracy, it may not be possible to develop this documentation within 60 days. To determine that a wastewater stream is below 1ppt TEQ dioxin at a 95% confidence level around the mean may require a significant number of samples over a period of time. Below is an example of how long this process would take:

- Develop a detailed sampling and analysis plan – 4 weeks
- Conduct sampling ensuring that the timeframe is long enough to account for variability in the waste stream – 4 weeks
- Analyze the samples – while most labs quote a turnaround time of 3 weeks, it is anticipated that this proposal would stress the limited number of labs able to perform the analysis – 4 weeks
- Analyze the data from the labs – 1 week
- Complete the certification and notification – 2 weeks

The above estimate does not include any additional time that may be required for any additional testing, that could result from problems that may arise in the lab with this difficult analysis. EPA should change 40 CFR §265.1080(h)(5) to allow a facility 6 months to submit the notification and certification.

Agency Response:

Please see response to comment in Section 3.27 above.

3.29 Dow Chemical Company Comment

The perceived risk for these wastes is for air emissions from aerated wastewater treatment tanks. It is known that much of the dioxin in wastewater streams tends to bind to solids in the stream. Based on this, testing done to determine applicability of Subpart CC should allow for the solids to be filtered out of the stream and only analyze the water phase for dioxin. As previously mentioned this analysis should be conducted at the outlet of the tank.

Agency Response:

Please see response to comment in Section 3.27 above.

3.30 Dow Chemical Company Comment

Dow support the decision to specifically exclude treatment sludges from treating K173 wastes from the definition of hazardous waste

Dow agrees with EPA that sludges from the treatment of K173 wastewaters should be excluded from the definition of hazardous waste. EPA used a risk based analysis of these wastes and their management, and allowed the management of this evaluated risk to override the precautionary principles upon which the derived from rule was based. This proposed exclusion supports the following concepts related to listing of wastes:

- Risk based listings
- Contingent management based listings
- New point of generation for treatment residuals such as wastewater treatment solids and incinerator ash

Dow supports these concepts and encourages EPA to continue to use them in future rulemakings.

Agency Response:

The Agency acknowledges the commenter's support of the exclusion to the derived-from rule. However, EPA is issuing a final decision not to list chlorinated aliphatic wastewaters as hazardous, for reasons described in the preamble to the final rule and relevant background documents. Therefore, because wastewater treatment sludges derived from such wastewaters will not become hazardous (as a result from being derived-from K173) we are not finalizing the proposed exemption at 40 CFR 261.3(c)(2)(ii)(F).

3.31 Dow Chemical Company Comment

Dow Supports the Contingent Management Approach is used for the K174 Listing

Dow agrees with the contingent management approach used by EPA for the K174 listing. Management of these wastes in landfills does not pose significant risk and should not be regulated under RCRA. This approach also supports the concepts discussed in our comments on the exclusion of K173 sludges from the definition of hazardous waste.

The contingent management approach proposed by EPA for K174 wastes should be expanded to include sludges that are incinerated, as well as any other treatment prior to placement in a landfill that would reduce the volume, toxicity, or mobility of the constituents. This was not included in the proposal, as EPA's survey did not indicate that any of these wastes were incinerated. Since that time, Dow has installed some pretreatment equipment at some of its facilities covered by the proposal, up stream of the main wastewater treatment plant. Additionally, it may be necessary on a periodic basis to clean tanks or sumps handling wastewaters associated with this proposed listing. Large quantities of sludge are not generated by these operations. The incineration of these wastes is effective and acceptable treatment. EPA confirms this on page 64 *FR* 46,521 of the preamble with, "incineration has been fully demonstrated for treating dioxin-containing wastes."

EPA should revise the proposed K174 listing to that EDC/VCM sludges that are incinerated are not included in the listing.

Agency Response:

The Agency acknowledges Dow's support of the contingent management approach for EDC/VCM sludge.

The Agency disagrees with the commenter's assertion that EPA should allow for EDC/VCM wastewater treatment sludges that are incinerated in non-hazardous waste incinerators to be excluded from the hazardous waste listing. 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.

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 did not identify non-hazardous waste incineration as plausible management and did not conduct an analysis of potential risks associated with this 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 indeed a plausible management alternative for EDC/VCM wastewater treatment sludges, 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 will want to carefully consider the potential risks of managing these wastes in non-hazardous waste incinerators, should such management be identified as plausible. 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 state-licensed landfill and are not placed on the land prior to final disposal in a landfill.

The commenter's reference to EPA's statement that "incineration has been fully demonstrated for treating dioxin-containing wastes" pertains to the preamble discussion for the proposed land disposal restrictions treatment standards for K174. The Agency's discussion referred to hazardous waste incineration. EPA points out that generators of K174 may elect to manage these sludges in hazardous waste incinerators and in compliance with all applicable RCRA hazardous waste management standards, in lieu of managing the sludges directly in a landfill in under the conditions of the conditional listing.

3.32 Dow Chemical Company Comment

Dow Supports the decision not to list wastewater sludges for the production of methyl chloride and allyl chloride

Dow agrees with EPA's proposal not to list the wastewater sludges from methyl chloride and allyl chloride processes. EPA's evaluation of these wastes and their management did "not pose a substantial present or potential hazard to human health or the environment."

Agency Response:

The Agency acknowledges the commenters support of the no list determination for the wastewater sludges from methyl chloride and allyl chloride processes.

3.33 Dow Chemical Company Comment

Dow Supports Excluding from the Listing Leachate from Landfills Containing Previously Disposed Wastes

Dow agrees with the proposed revisions to 40 CFR §261.4(b)(15) that would exclude from the definition of hazardous waste leachate from landfills containing previously disposed of wastes that would meet the proposed listings for K174 or K175. This is consistent with previous EPA rulemaking (64 *FR* 6,806, February 11, 1999) and also supports the concept of new point of generation for treatment residuals.

Agency Response:

EPA proposed amending the existing exemption from the definition of hazardous waste (40 CFR 261.4(b)(15)) to also exempt leachate from non-hazardous waste landfills that have historically managed VCM-A wastewater treatment sludges (newly-listed as K175 in the final chlorinated aliphatics rule). The reasoning for the proposed exemption was that the Agency would temporarily defer 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. Also, EPA received no comments from landfill owner/operators indicating they had disposed of this waste and were concerned about disruption of their leachate management activities as a result of the new listing. 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.

EPA notes that the proposed regulatory language for 261.4(b)(15) inadvertently included the K174 waste code, which was not intended. Under the conditional listing approach for K174 wastes, the listing would not attach to these wastes when managed in a landfill, therefore the K174 waste code would not attach to leachate from previously disposed EDC/VCM sludges. The leachate deferral was only discussed in the preamble to the proposed rule as it applied to the K175 waste code, and EPA only intended to include the K175 waste code in the proposed regulatory exemption.

3.34 Dow Chemical Company Comment

Dow does not Support the Addition of 5 Dioxin Isomers to the Universal Treatment Standards and the Treatment Standards for F039 Wastes

EPA incorporated the five dioxins and furans into the existing requirements for UTS and LDR (F039) to fulfil a policy concern. This policy concern was articulated when the initial F039 was listed. While one can understand EPA's proper concern the F039 not be used to evade the LDR requirements, one is frustrated by the use of F039 and UTS to broaden the LDR requirements to increase environmental regulation of commingled wastes. Waste handlers can not easily separate wastes from their integrated waste management systems. No environmental protection results from regulating those using integrated waste management systems to a lower level than those who's economics dictate the use of non-integrated waste management systems. In addition to not serving any environmental goal, EPA has violated its constitutional and APA requirements.

As part of its due process obligations under the Constitution and APA, EPA has a duty to consider the legal environment inside which it may regulate. EPA failed to meet this constitutional due process requirement in evaluating whether or not to grant a national capacity variance of up to two years under 42 USC §6924(h)(2), RCRA §3004 (h)(2). The press of meeting court and statutory deadlines might excuse rushing in some instances. This argument is meaningless in justifying the discretionary addition of these five dioxins and furans to the existing UTS and LDR (F039) as EPA's proper choice is to delay considering the addition of these five new dioxins and furans until it knows the impact of this regulatory change, or if national capacity exists to treat these wastes previously subject to both UTS and LDR (F039). Regulating in the total absence of data is the epitome of abuse of discretion.

Agency Response:

EPA has complied with the Administrative Procedures Act by first proposing to amend the list of constituents for F039 and UTS. As we noted in the proposal, in general, EPA requested data on the annual generation volumes and characteristics of

wastes affected by this proposed rule and the current treatment or recovery capacity capable of treating the wastes (64 *FR* at 46523).

EPA has the authority to postpone prohibitions on the land disposal of a "newly identified" hazardous waste for two years on a national basis and (potentially) two more years on a case-by-case basis from "the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available" (RCRA § 3004(h)(2)). Here, when changing the treatment requirements for wastes already subject to LDR (including F039 and characteristic wastes), EPA no longer has authority to use RCRA § 3004(h)(2) to grant a capacity variance to these wastes. However, EPA is guided by the overall objective of Section 3004(h), that treatment standards best accomplishing the objective of Section 3004(m) to minimize threats posed by land disposal should take effect as soon as possible, consistent with the availability of treatment capacity. Therefore, we evaluated whether sufficient treatment capacity is available for these wastes and based the effective date on this estimate.

In this case, EPA does not believe that such a delay in the effective date is necessary because, according to our analysis, we do not expect a treatment capacity shortfall for these wastes as a result of the addition of the new dioxin and furan congeners to the table of UTS at 268.48 and to the list of regulated constituents in hazardous leachate, F039, in 268.40. The results of this analysis are summarized below and presented in "Background Document for Capacity Analysis for Land Disposal Restrictions: Newly Identified Chlorinated Aliphatics Production Wastes (Final Rule)," September 2000.

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.

3.35 Dow Chemical Company Comment

The cost estimate is similarly flawed. One can not estimate costs for matters which one did not even consider. There is no evidence in the economic analysis that any such consideration was made. There is no evidence of the fraction of these wastes which will have new obligations to meet. There is no evidence of what additional treatment will be needed. There is no evidence that the cost of this additional treatment produces any, let alone sufficient benefits to justify the imposition of these legal requirements.

Obviously, EPA will have to gather information to be able to make a proper decision whether or not to add the five dioxins and furans to the UTS and LDR (F039). This can be done in many manners, such as a survey of those wastes already subject to UTS and LDR (F039) under 40 USC §6927(a), RCRA §3007(a).

Agency Response:

The 1999 economic analysis did not estimate any additional costs for adding the five dioxin/furan congeners to the RCRA Universal Treatment Standards for land disposal restrictions (40 CFR 268.40), and to the list of regulated constituents for the multisource leachate RCRA wastecode (F039), because the treatment standards for the existing dioxin/furan congeners were assumed in the economic analysis – because of chemical "congener" similarity and co-presence – as sufficient for simultaneously achieving the new UTS for the five congeners, with no additional cost (e.g. no-migration permit for underground injection of K173 wastewaters, incineration of K174 sludges, and RMERC roasting/retorting of K175 sludges). The 1999 Economics Background Document (Section V.D., page 49) stated that "[t]he proposed alternative treatment requirements for wastecodes K173, K174, and K175 are not costed in this document, because no waste quantities are anticipated to require such treatment (which is consistent with the assumptoions defined in the Federal Register preamble and the Capacity Analysis Background Document for this listing proposal)". This assumption is consistent with the findings of the national capacity variance analysis, as summarized in the 1999 proposed listing Federal Register preamble: "Available information shows that these wastes [i.e. K173, K174, K175] and the treatment residuals can be managed in existing treatment and reclamation units that routinely manage similar or as-difficult-to-treat hazardous wastes that currently are prohibited from land disposal" (64 FR 46519). The economic analysis for the final listing rule explicitly addresses this issue in greater detail.

3.36 Dow Chemical Company Comment

There is an Apparent Error in the Treatment Standard for OCDD for Non-wastewater F039 Wastes

The proposal lists the treatment standard for OCDD in non-wastewater F039 wastes as 0.0025 mg/kg. This assumed to be a typographical error, as it is inconsistent with the value of 0.005 mg/kg proposed for K173 wastes, K174 wastes and the Universal Treatment Standards.

Agency Response:

The commenter is correct. The intended value was 0.005 mg/kg.

3.37 Dow Chemical Company Comment

Dow Supports the Reportable Quantities for Spills of Proposed Wastes

The proposal appropriately lists a one pound CERCLA Reportable Quantity for the proposed waste. The proposal alternately allows facilities to use the maximum concentration for hazardous constituents as found in EPA's listing study in order to apply the mixture rule when evaluating whether or not to report a spill. Dow supports this concept as it can eliminate unnecessary reporting, as well as simplify a facility's process for assessing reportable spills.

Agency Response:

EPA acknowledges the commenter's support for the proposed approach for implementing CERCLA RQs for the chlorinated aliphatic wastes. The Agency is finalizing the provisions in 40 CFR 302.6(b)(1)(iii) as proposed.

3.38 Dow Chemical Company Comment

Dow supports the change to WHO-TEF from I-TEF

Dow has long recommended to EPA that there should be no toxicity factor for the OCDD's and OCDF's, as they do not have the TCDD like toxicity. For example see the September 5, 1997 comments of the Pentachlorophenol Task Force on the 62 FR 24,887 May 7, 1997 proposal. A copy can be provided if requested. Reducing the toxicity factor for the OCDD's and OCDF's by an order of magnitude is a step in the right direction. As EPA stated in this proposal, there is not a great deal of difference between the calculated values from WHO-TEF and I-TEF. The examples we examined almost universally showed a slightly larger calculated WHO-TEQ concentration than the corresponding calculated I-TEQ concentration. Thus, Dow fully supports EPA's shift from I-TEF to WHO-TEF.

This replacement by WHO-TEF needs to promptly adopted by all EPA programs to avoid unnecessary confusion among the general public. It would indeed be unfortunate if the Dioxin Reassessment and the PBT Policy failed to reflect this shift in EPA dioxin policy.

Agency Response:

As noted in the proposed rule, EPA used the TEFs identified as the I-TEFs (International-TEFs) to conduct the chlorinated aliphatics risk assessment because, until very recently, this is the TEF scheme EPA scientists have recommended and used for the last 10 years (EPA 1989). The World Health Organization (WHO) recently reviewed the I-TEFs (Van den Berg et al. 1998), and determined that three of the I-TEFs, those for 1,2,3,7,8-PeCDD (pentachlorodibenzo-p-dioxin), OCDD (octachlorodibenzo-p-dioxin), and OCDF (octachlorodibenzofuran), required modification. EPA is in the process of adopting these modifications, and consequently reviewed the impact that the revised (WHO-) TEFs would have on the results of the chlorinated aliphatics risk assessment. 1,2,3,7,8-PeCDD was not detected in dedicated chlorinated aliphatic wastewaters, dedicated EDC/VCM sludges, or methyl chloride sludges. Consequently, the difference in the I-TEF and the WHO-TEF for 1,2,3,7,8-PeCDD has no impact on the results of EPA's risk analyses. Because OCDD and OCDF contribute proportionally very little to the actual risk attributable to dioxin compounds, the decision to use either the I-TEFs or the WHO-TEFs has negligible impact on the overall risk results.

References:

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

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

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

3.39 Dow Chemical Company Comment

EPA's use of the Peer Review of Risk Assessment

The proposed rule was developed and published prior to EPA evaluating any feedback from the peer review. The purpose of a peer review should be obtain other opinions as to whether the document is technically correct and utilizes the best available information to obtain the most accurate result. Proposing a rule based on a document that has not gone through a peer review is inappropriate, as it could result in wasted effort by the agency as well as those affected by the proposal. EPA is also encouraged to modify the charge they give to peer reviewer to ensure they receive adequate feed back. The charges given to the peer reviewers for the risk assessment generally asked if the reviewer thought

what EPA did was valid and reasonable, rather than if they thought it was correct or the best way to assess the risk.

Agency Response:

The Agency believes that peer review is important process and, therefore, submitted the Risk Assessment Technical Background Document for peer review with the with the understanding that those comments would be addressed before the rule was finalized. These comments were included in the docket for the proposed rule for review by the public and other interested parties to facilitate a full and open review of the risk assessment approach and results. The Agency does not see this as wasteful; indeed, we believe that providing access to peer review comments provides great benefits to other reviewers. The peer review comments can be used to identify concerns or areas for improvement.

With respect to the commenter's suggestion that the peer review charges were inappropriate, the Agency disagrees with the commenter's assertion that there is a single, correct way to perform a risk assessment. The peer review simply provides the opinions of a single reviewer; it does not constitute an absolute scale with which to measure the adequacy of the assessment. Even a cursory review of the peer review comments demonstrates that risk assessment experts may reasonably disagree with respect to what constitutes the "correct" method or the "best" data. We believe we constructed our risk assessments based on defensible data, assumptions, and methodologies, as well as relevant Agency guidance. Consequently, we charged the peer reviewers to provide their insight into the technical merit of the methods and data chosen to achieve the goals of the risk assessment.

SECTION 4
Vinyl Institute
CALP-00004

INTRODUCTION

The Vinyl Institute, Inc. (VI) is pleased to submit these comments on the U.S. Environmental Protection Agency's (EPA) proposal to list three wastes from the chlorinated aliphatics industry as hazardous wastes under the Resource Conservation and Recovery Act (RCRA). The VI is a trade association whose members are responsible for the majority of the U.S. production volume of ethylene dichloride (EDC), vinyl chloride monomer (VCM), and polyvinyl chloride (PVC)[1]. The VI and its members have a direct and substantial interest in this rulemaking.

The VI appreciates the considerable effort expended by EPA in evaluating the health risk that exposure to chlorinated aliphatics waste streams may have on humans and the environment. However, for a number of reasons, the VI is not satisfied that the risks associated with these waste steams have been accurately characterized with regard to their risk to human health and the environment.

These comments focus primarily on EPA's proposed listing of the K173 stream, but also address the K174 and K175 streams. On these and other issues, the VI fully supports comments filed separately by the Chemical Manufacturers Association (CMA), the Chlorine Chemistry Council (CCC), and by VI member companies.

[1]The VI is a member of the American Plastics Council (APC). VI's members include Borden Chemicals and Plastics Limited Partnership, CertainTeed Corporation, The Dow Chemical Company, Formosa Plastics Corporation U.S.A., The Geon Company, Kaneka Delaware Corporation, Occidental Chemical Corporation, Oxyvinyls LP, Shintech, Inc. and Westlake PVC Corporation

4.1 Vinyl Institute Comment

I. K173 Wastewaters Do Not Pose a Substantial Hazard to Human Health or the Environment

Under RCRA, a waste may be listed as a hazardous only if the waste poses a "substantial present or potential hazard to human health or the environment." EPA has committed significant scientific resources to determining whether the proposed K173 waste stream meets this standard. However, EPA's exposure assessment relies on unrealistic assumptions that over-estimate risks. EPA's toxicity assessment adds additional conservatism to these risk estimates.

In response to the proposal, CCC retained the services of ChemRisk, a service of McLaren-Hart Inc., to perform a critical review of EPA's risk assessment in support the listing of K173 waste. This Report (Attachment 1) concludes that EPA has overestimated dioxin risks for the farmer beyond what can be considered an appropriate high-end estimate.

Specifically, the Report concludes that the "conservative practices used in USEPA's deterministic assessment for the adult farmer scenario have produced risk estimates that are overly conservative by a factor of approximately 10." (page 13). The Report concludes that similar results would be obtained for other exposure scenarios *(e.g.,* child of farmer).

Agency Response:

Because of 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. 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 our exposure assessment should have accounted for cooking and post-cooking losses of beef. 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 determined that available information provides sufficient basis to determine that chlorinated aliphatic wastewaters should not be listed as hazardous waste.

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.

The Agency's response to specific issues raised by the commenter are addressed in the responses that follow. The Agency's responses to the McLaren-Hart Inc./Chemrisk comments are provided in Sections 4.29 through 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

4.2 Vinyl Institute Comment

To illustrate the conservative nature of EPA's risk assessment, McLaren-Hart quantified and adjusted risk estimates for the adult farmer scenario. Based on its adjustment, detailed on page 12 of the Report, McLaren-Hart determined that the Adjusted Deterministic Risk Estimate is 2E-06. EPA's High End Deterministic Risk Estimate for the Adult Farmer was determined to be 2E-05. According to the Report, some of the overly conservative assumptions include:

All feed is contaminated, the farmer raises all his/her own grain, maintains pasture land, and that a farm has both dairy and beef cattle;

The exposure duration of a child of a framer is assumed to last up to 30 years, resulting in an unrealistic scenario of a 30-year old child; and,

An adult farmer ingests 0.3 224 kg/day (0.72 lbs/day) of home grown beef and ingests 2.1 kg/day (4.6 lbs/day)of home grown milk.

Because EPA typically considers its decision to list a waste when carcinogenic risks are 1E-05 or greater, based on the McLaren-Hart Report this waste would not meet RCRA's listing criteria because the "substantial present or potential hazard to human health or the environment" standard is not met. Hence, the VI believes that the listing description should be dropped.

Agency Response:

EPA's responses to the comments provided in the McLaren-Hart report are provided below in Sections 4.29 through 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004). The Agency's response to the following three specific issues raised by the commenter are provided in the sections noted below:

"All feed is contaminated, the farmer raises all his/her own grain, maintains pasture land, and that a farm has both dairy and beef cattle"

-The Agency's response to this comment is provided below in Sections 4.6 and 4.29 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

"The exposure duration of a child of a framer is assumed to last up to 30 years, resulting in an unrealistic scenario of a 30-year old child"

-The Agency's response to this comment is provided below in Section 4.31 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

An adult farmer ingests 0.3 224 kg/day (0.72 lbs/day) of home grown beef and ingests 2.1 kg/day (4.6 lbs/day)of home grown milk.

-The Agency's response to this comment is provided below in Sections 4.35 and 4.37 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

The Agency has concluded that available information provides sufficient basis to determine that chlorinated aliphatic wastewaters should not be listed as hazardous waste. A summary of the basis for our decision is provided in Section 4.1, above.

4.3 Vinyl Institute Comment

Above and beyond the conclusions of the McLaren-Hart report, with regard to EPA's risk assessment, as discussed in section II.B., below, EPA also has failed to consider that **the vast majority of dioxins in chlorinated aliphatics wastewaters never reach the aeration tanks that EPA has so thoroughly modeled.**

Agency Response:

The Agency's response to this comment is provided below in Section 4.5 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

4.4 Vinyl Institute Comment

II. Other Comments on K173

A. The Scope of the Proposed K173 Listing Must Be Clarified

Based on a review of the proposal and associated background documents, the scope of processes covered by the proposed K173 listing is unclear. The preamble to the proposal indicates that the listing covers waste waters from the production of chlorinated aliphatic hydrocarbons, and is not limited to free radical catalyzed processes, as is the case for the F024 listing. While this seems clear, it is contradicted in several background documents, indicating either that Agency personnel themselves are unclear of the exact scope, or that the background documents are incomplete as they do not adequately address the scope as presented in the preamble to the proposal.

Section 3.1 of the Listing Background Document details the various types of chlorinated aliphatics manufacturing processes by product produced. It appears that these are the only processes covered by the K173 listing or any of the listings in the proposal.

Page 2 of the Economics Background Document clearly states that "the current listing proposal only addresses the non-listed waste streams in the F024 listing." Additionally, section V.D. (page 51) of this document addresses potential costs of this proposal and states:

These costs are incremental in the sense that all 23 CAHC manufacturing facilities are currently regulated under RCRA (i.e. as chlorinated aliphatic manufacturers via the existing RCRA F025 & F026 wastecodes).

It is assumed that EPA intended this to be the F024 and F025 wastecodes. Regardless, this indicates a narrower scope than described in the preamble.

Some manufacturing processes whose primary product or products are not chlorinated aliphatics may still generate chlorinated aliphatics either as waste streams or by-products. Often these processes are significantly different than the types of processes evaluated as a part of this study and do not generate wastewaters similar in composition to those evaluated by EPA. For instance, the raw materials may not be typical aliphatic hydrocarbons as was the case for the processes studied. Because these processes clearly were not part of the evaluation conducted by EPA, it would be inappropriate to include any wastewaters generated from these plants in the K173 listing. Frequently, by-products and co-products are recovered from what were previously waste streams as a part of a facility's pollution prevention program. Including these processes in the scope of the listing would serve as a disincentive for these pollution prevention efforts.

Nearly all chemical manufacturing plants generate wastewater as a part of their maintenance activities due to equipment cleanings in preparation for maintenance. Often this water is derived from equipment that does not contain the chemicals of concern associated with the listing.

If the ultimate conclusion of EPA's review is that chlorinated aliphatic wastewaters should be listed as hazardous under RCRA, EPA should clarify the scope so that it only includes process wastewaters from processes that produce chlorinated aliphatic hydrocarbons (as defined by EPA) as one of their primary products. EPA should also ensure that the background documents adequately cover the scope of the listing.

Agency Response:

See EPA's response to comment in Section 3.22 and 3.23 of this Response to Comment Document (comments from Dow Chemical).

4.5 Vinyl Institute Comment

B. EPA's Risk Assessment Contains a Significant Error In That Data Demonstrate That Most Dioxins in Wastewater Never Reach Aeration Tanks And/or Are Unavailable for Volatilization

EPA has underestimated the degree to which dioxins partition to solids in aqueous matrices and has erroneously assumed that the CHEMDAT8 program correctly accounts for sorption. Dioxins will be absorbed onto solids in the proposed K173 stream even when the measured concentration is less than the solubility limit; it cannot properly be assumed that all measured dioxin is truly soluble and available for volatilization simply because the measured dioxin concentration is less than the solubility limit. Accordingly, **EPA has overestimated the concentration of dioxins available for volatilization in biological treatment units by one or more orders of magnitude.**

In performing its risk assessment, EPA used the CHEMDAT8 model to estimate the emissions of dioxins from aerated tanks. This model is based on several assumptions, including Henry's Law, for the partitioning of volatiles organics from an aqueous media. EPA indicates the model predicts the mass

fraction of the influent constituent that is emitted, adsorbed, biodegraded, or hydrolyzed. EPA's sensitivity study (Table D, 3-3) indicates that Total Organic Carbon (TOC) and Total Suspended Solids (TSS) had little effect on the calculated tank emission - less than 13 percent change with a two-fold change in solids parameter. Under EPA's model, influent constituent concentration and flow rate had the greatest effect on dioxin emissions.

Under its Dioxin Characterization Program, the VI has investigated releases of dioxins from U.S. EDC/VCM manufacturing plants. A report summarizing results of the program through 1998 was prepared and has been submitted to EPA.[2] In the report, the VI concludes that dioxin concentrations in treated EDC/VCM wastewaters (effluent) varied by up to a factor of 10 between facilities of comparable production capacity. The VI also tested Waste Water Treatment Plant Solids (WWTPS) and found significant variability in dioxin levels. VI offered a possibility of carryover of contaminated catalyst from oxychlorination as a reason. This could be observed in the copper and TSS levels in the wastewater stream.

For purposes of this proposal, EPA's model used the **influent** to EDC/VCM water treatment plants to estimate dioxins volatilized in the treatment tanks. EPA estimates emissions from biological treatment units based on the assumption that the dioxin concentration in the aqueous phase is equal to the solubility limit when the measured dioxin concentration is greater than the solubility. If the measured concentration did not exceed the solubility limit, the concentration observed in the high end sample, GL-02, was used.

EPA has overlooked the degree to which dioxins partition to solids in the aqueous environment and has erroneously assumed CHEMDAT8 correctly accounts for sorption.
Dioxins will be absorbed onto solids even when the measured concentration is less than the solubility limit. It cannot be assumed that all measured dioxin is truly soluble and available for volatilization simply because the measured dioxin concentration is less than the solubility limit. Accordingly, EPA's assessment of dioxin volatilization from aeration units fails to account for the fact that almost all of the dioxins are adsorbed to solids in this process stream and are removed in primary clarifiers prior to aeration. As a result, EPA has overestimated the concentration of dioxins available for volatilization in the biological treatment unit by one, and possibly more, orders of magnitude. This analysis is further developed in Attachment 2, which was performed by Shell Chemical.

The VI believes that the concentration of dioxins in the aqueous phase of the influent to the wastewater treatment process from EDC/VCM plants is based on the amount of dioxin extracted from a solids matrix *(viz.,* copper catalyst or combustion solids) and is in equilibrium with the dioxin in the solids phase at levels significantly below solubility limits. This is confirmed by results from the VI dioxin characterization program. These results show 3 to 7 parts per quadrillion (ppq) I-TEQ dioxin levels in

[2] "The Vinyl Institute Dioxin Characterization Program; Phase I Report," Vinyl Institute (August 10, 1998).

EDC/VCM plant wastewater effluent, as compared to 40 to 7,400 ppq observed by EPA in wastewater influent. Thus, the highest dioxin concentration observed in wastewater effluent is three orders of magnitude lower than the "high-end" concentration predicted by EPA in the influent.

Two of the four effluent samples analyzed under the VI program were derived from stand-alone EDC/VCM wastewaters. If these samples are representative, and volatilization and solids removal are the only difference between the influent and effluent streams, this suggests that the majority of the dioxins in the influent water samples are actually in the solids phase, and further, that these solids are captured in the wastewater treatment solids and are not available for volatilization.

A VI member company, Dow Chemical, has conducted a laboratory study on this subject relative to wastewaters from its EDC plants. Under this study, several wastewater samples were filtered and dioxin concentrations measured separately for the liquid filtrate and the solids. For samples containing 3 to 25 ppt TEQ dioxin (similar to those evaluated by EPA), the results consistently showed that **97 to 98 percent of the dioxin was on the solids, on both a total and TEQ** basis. On an individual congener group basis, the results consistently showed that 83 to 98 percent of the dioxins remained with the solids. The actual partitioning is likely higher because no filter is 100 percent efficient and some of the dioxins in the filtrate likely were due to solids that passed through the filter. In many instances, even though the total analysis for congener groups were well below the solubility limits used by EPA, greater than 90 percent of the congener group remained with the solids.

Below is a table utilizing data from this study that estimates how much dioxin in the GL-01 sample would actually be available in the water phase. The first four columns are the same as Table 3-1b in the Risk Assessment Technical Background Document

Congener	TEF	Concentration (ng/L)	Annual Quantity (g/yr)	% left on solids	Annual Quantity in Water Phase (g/yr)	Annual TEQ Quantity in Water Phase (g/yr)
1,2,3,4,6,7,8-HpCDD	0.01	0.880	0.283	97.7	0.0065	6.5 E-5
1,2,3,4,6,7,8-HpCDF	0.01	43.0	13.844	98.4	0.222	0.0022
1,2,3,4,7,8,9-HpCDF	0.01	12.0	3.863	98.4	0.0618	6.18 E-4
1,2,3,4,7,8-HxCDD	0.1	0.052	0.017	83.3	0.0028	2.8 E-4
1,2,3,6,7,8-HxCDD	0.1	0.091	0.029	83.3	0.0048	4.8 E-4
1,2,3,7,8,9-HxCDD	0.1	0.110	0.035	83.3	0.0058	5.8 E-4
1,2,3,4,7,8-HxCDF	0.1	5.30	1.706	96.4	0.0614	0.0061
1,2,3,6,7,8-HxCDF	0.1	1.20	0.386	96.4	0.0139	0.0014
1,2,3,7,8,9-HxCDF	0.1	0	0	96.4	0	0
2,3,4,6,7,8-HxCDF	0.1	0.430	0.138	96.4	0.0049	4.9E-4
2,3,4,7,8-PeCDF	0.5	0.210	0.068	93.0	0.0048	0.0024
2,3,7,8-TCDD	1	0.017	0.05	80.2*	0.0099	0.0099
2,3,7,8-TCDF	0.1	0.082	0.026	84.3	0.0041	4.1E-4
OCDD	0.001	6.90	2.221	98.4	0.0355	3.55E-5
OCDF	0.001	6000	1931.676	98.7	25.111	0.0251
		Total	**1954.3**		**25.548**	**0.0501**

* No TCDD was detected many of the samples; estimate is based on the average less two standard deviations.

Oxyvinyls LP has generated similar data, which is attached to these comments as Attachment 3.

Tables 3-1 a,b in the Risk Assessment Technical Background Document provide calculated emissions from the central and high end dioxins stream water tank. The congener 1,2,3,6,7,8HxCDD in the "high dioxin" sample had a mass fraction of 60 percent emitted, representing 66 percent of the calculated TEQ emitted. This calculated result appears clearly erroneous and raises significant issues regarding the model. Information on the 0.66 TEQ stream is not in the report for review.

It is also important to note that although the 1 ng/L TEQ level in the influent provides guidance as to the toxicity of airborne dioxin emissions from wastewater treatment systems, consistent with a

concentration-based listing approach, discussed immediately below, it is really the released constituents that should be used to determine the need for listing. For example, OCDF in the "high dioxin" influent stream contributed 6 out of the 7.4 ng/L TEQ for the influent stream, but based on Table 3-lb has no significance in the calculated emitted TEQ grams/yr.

In light of the preceding, **EPA must re-evaluate the emissions model, using the above factors or other suitable factors, that allow for the fact that dioxins remain on the solids and are not available to be emitted to air.** EPA should consider obtaining samples and analytical results from wastewater streams that exclude dioxins present on solids, and which reflect the limited amount of dioxins present in the aqueous phase and that are available for volatilization.

Agency Response:

The Vinyl Institute, as well as other commenters on the proposed rule (see Shell, CALP- 00011, Section 13.11 below; Dow, CALP-00012, Section 3.1 above; Occidental/Oxy Vinyls LP, CALP-00013, Section 14.3 below; Chlorine Chemistry Council, CALP-00007, Section 10.3 below; Formosa, CALP-00009, Section 11.10 below; and Louisiana Chemical Association, CALP-00010, Section 12.23 below) believe EPA has underestimated the degree to which dioxins partition to solids in aqueous matrices, thus has overestimated emissions from aerated biological wastewater treatment tanks. The Vinyl Institute, as well as the other commenters noted above, raise a number of concerns related to EPA's estimation of emissions from aerated biological wastewater treatment tanks.

Before we address the commenter's main issues, we would like to point out that the commenter noted some discrepancies and apparent errors in the 1999 Risk Assessment Technical Background Document. These errors are related to our presentation of emissions modeling results for the wastewater treatment tank. For example, they noted that in Table 3-1b in the 1999 Risk Assessment Technical Background Document, the congener 1,2,3,6,7,8-HxCDD in the high end sample had a mass fraction of 60 percent emitted, representing 66 percent of the calculated TEQ emitted. This result appeared clearly erroneous to the commenters and raised significant issues regarding the CHEMDAT8 model.

EPA agrees that data were incorrectly entered in some of the cells of Table 3-1b as it was presented in the 1999 Risk Assessment TBD (USEPA, 1999). In addition, the footnote to Table 3-1b should have included 1,2,3,4,6,7,8-HpCDF in the list of the congeners that were capped at their solubility limits. These errors have been corrected and the revised table is presented in the 2000 Addendum to the Risk Assessment TBD (USEPA, 2000). The errors are merely word processing errors, the total emissions estimate is presented correctly and the emissions estimate for 1,2,3,6,7,8-HxCDD was used in the analysis correctly (in terms of how the emissions

analysis was performed for the 1999 proposal). The actual mass of 1,2,3,6,7,8-HxCDD emitted is only 0.9 percent (not 66 percent) of the total 1,2,3,6,7,8-HxCDD mass in the wastewater influent (on a TEQ basis). In addition, the reader can confirm that there was not an overestimate in the 1,2,3,6,7,8-HxCDD risk results by referring to Table H.1.3c. in Appendix H of the 1999 Risk Assessment Technical Background Document (USEPA, 1999) where the risk results show that 1,2,3,6,7,8-HxCDD is only 2 percent of the total high end farmer risk estimate for wastewater tanks. One commenter (Dow, CALP-00012) pointed out that Tables 3-1a and 3-1b do not use the WHO-TEFs for OCDD and OCDF. As explained in the preamble to the proposed rule (64 FR 46497), the 1999 chlorinated aliphatics analyses were performed during a period of time when EPA was transitioning between the use of the I-TEFs and the WHO-TEFs. The I-TEFs were used in the chlorinated analyses. However, as EPA explained in the preamble to the proposed rule, the contribution of OCDD and OCDF to the overall risk estimate is negligible, thus choosing to use either the I-TEFs or the WHO-TEFs makes no real difference in the outcome of the analysis.

One of the primary issues raised by the commenter is that CHEMDAT8 does not correctly account for adsorption. One of the reasons for this conclusion is the erroneous result presented in the Table 3.1b, discussed above. Dow (CALP-00012) also stated that although CHEMDAT8 takes into account adsorption onto biomass solids, 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. Dow states that CHEMDAT8 "seems to incorrectly assume that all of the dioxin entering the aerated tank is in the water phase (unless above the solubility limit) and then attaches to solids." Although the commenters appear to believe that CHEMDAT8 accounts for sorption onto solids in some manner, the commenters did not provide information about what specific equations or algorithms in CHEMDAT8 (a spreadsheet model) they felt resulted incorrect or inadequate consideration of sorption. EPA believes that the commenters' concerns may have originated from a misunderstanding of how EPA applied a solubility constraint on influent dioxin concentrations (this was an EPA-imposed constraint, not a model-imposed constraint). Below we address the commenter's concerns regarding CHEMDAT8's adequacy for modeling sorption of dioxins. Following that, we address the solubility issue.

EPA contends that CHEMDAT8 appropriately models sorption of dioxins onto solids. Specifically, CHEMDAT8 models sorption as reversible, linear, equilibrium partitioning. 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. CHEMDAT8 assumes that 100 percent of the influent TSS is

removed by the system. The biomass growth rate is based on the consumption rate of total organic carbon (TOC).

CHEMDAT8 uses two estimation methods to establish the TOC consumption rate. One method employs the maximum biorate input parameter and the biomass concentration within the tank. These parameters are used to estimate the maximum consumption rate of TOC under substrate-saturated conditions (more TOC present than the microorganisms can metabolize). The second method simply assumes that all of the influent TOC is degraded, such that the TOC consumption rate is equal to the rate at which TOC is fed into the system. The smaller of these two rates is used to set the TOC consumption rate (that is, the microorganisms will metabolize organic matter at their maximum rate unless the TOC is completely depleted).

CHEMDAT8 calculates the biomass growth rate using a biomass yield coefficient of 0.5 g-new biomass/g TOC consumed. As new biomass grows, a portion of the return solids stream is "wasted" to maintain a relatively constant, active, biomass culture in the system. The amount of solids "wasted" from the system is equal to the rate at which TSS enters the tank via the influent plus the rate of biomass growth. This wasted sludge is a virtual sink of contaminants from the wastewater treatment system and, in the case of dioxins, it represents the primary removal mechanism.

Regarding the commenter's discussion on the CHEMDAT8 sensitivity study (Table D.3-3 in the 1999 Risk Assessment Technical Background Document), it is important to point out that the analysis considered other constituents in addition to dioxins. By including compounds that tend not to sorb, adjusting the TOC and TSS had little effect on the overall calculated tank emissions (as the commenter pointed out "less than 13 percent change resulted with a two-fold change in solids parameter"). However, if only dioxins are considered, varying TSS and TOC one parameter at a time had a more significant impact on dioxin emissions (a two-fold change in TSS and TOC, respectively, resulted in approximately a 35 to 41 percent and 23 to 29 percent change in emission estimates). Without understanding that CHEMDAT8 considers both TSS in the influent and new biomass growth, one might expect that a two-fold change in TSS or TOC would result in a 50 percent change in emissions rather than the 35 to 41 percent and the 23 to 29 percent change observed. However, as discussed above, sorption is impacted by both TSS and TOC. An increase in either of these parameters will reduce emissions by increasing the amount of solids available for sorption and reduce the amount of dioxin available for volatilization. Therefore, one would need to vary both TSS and TOC by a factor of two to achieve a 50 percent change in emissions.

The commenter suggests that EPA should use analytical data for samples in which solids have been removed (either physically or analytically) as input to CHEMDAT8, since such data would reflect the limited amount of dioxins present in the aqueous phase that are available for volatilization. In addition, the commenter expresses a great deal of concern regarding EPA's assumption that dioxin congener concentrations in the aqueous phase are equal to the solubility limit when the measured congener concentrations are greater than their aqueous solubility limits. The commenter believes dioxins will be absorbed onto solids even when the measured concentrations are less than their solubility limits, and that EPA cannot properly assume that all measured dioxin is truly soluble and available for volatilization simply because the measured dioxin concentrations are less than their solubility limits.

EPA agrees with the commenter that the primary removal mechanism of dioxins in wastewater treatment tanks will be through the sorption of dioxins onto solids. This is clearly described in Section 3.2 of the 1999 Risk Assessment Technical Background Document (USEPA, 1999; p. 3-2) and the model selected for this analysis, CHEMDAT8, does model this removal mechanism. For the chlorinated aliphatics wastewater analysis, CHEMDAT8 predicts that, depending on the congener, 90 to 99 percent of the influent dioxins are removed by sorption onto solids in the wastewater tank. It is possible that the Vinyl Institute, as well as other commenters, interpreted the following statement in the 1999 Risk Assessment Technical Background Document: "... we modeled wastewater emissions at the solubility limit for three [this should have read 'four'] congeners with sample concentrations that exceed their respective solubility limits" to mean that the model assumes that the aqueous phase concentration within the wastewater treatment tank remains at the limit of solubility. The Addendum to the Risk Assessment Technical Background Document (USEPA 2000) suggests that this statement could be modified to read: "...we constrained the overall influent contaminant load to the wastewater treatment system based on the aqueous solubility of the four congeners with sample concentrations that exceeded their respective solubility limits." In the analysis, the aqueous phase concentration inside the tank was not fixed at the solubility limit, and was generally 0.5 to 2.5 percent of the influent concentration. The relative impact of the actual constraint imposed on the influent contaminant load was to *reduce* the estimated TEQ emissions, as is explained in the subsequent sentences in Section 3.2 of the Background Document (USEPA, 1999).

In the analysis we presented in the 1999 Risk Assessment Technical Background Document (USEPA, 1999), we attempted to cap the dissolved phase dioxin congener concentrations at their solubility limits by constraining the total (dissolved plus solid phase) concentrations of the congeners reported in our samples to their solubility limits. This resulted in our capping the concentrations of four congeners at their solubility limits. Under the assumptions of the 1999 analysis (that is, 100

percent of the solids in the wastewater treatment system influent enter the aerated biological treatment tank) this actually resulted in our underestimating the dioxin concentrations entering the tank. This is because it is reasonable to expect that the concentration of a congener in a sample might exceed its solubility limit when there are solids present in the sample (even though it is reasonable to assume that the congener concentration in the dissolved phase would not exceed the solubility limit). A more technically rigorous alternative to using the solubility limit as a constraint on the tank influent concentration is to use the saturation limit as a constraint on the influent concentration. The saturation limit is calculated based on the solubility limit for the dissolved phase, the TSS influent concentration, and the concentration of sorbed contaminant in equilibrium with the aqueous phase at the solubility limit (see the Addendum to the Risk Assessment Technical Background Document [USEPA, 2000]). Applying a "saturation limit constraint", as we did in a revised analysis described in more detail below, results in less reduction in emissions than the reduction we calculated using the solubility limit approach (that is, employing the more accurate "saturation limit constraint" to the total plus dissolved phase concentration increases emissions as compared to applying a solubility constraint).

We strongly agree with commenters that dioxins will be sorbed onto solids present in the wastewater even when the total congener concentrations in the sample are less than their solubility limit, and our modeling results showed that this was the case (90 to 99 percent of the influent dioxins were removed by sorption even when total congener concentrations were less than their solubility limits). However, we disagree with commenter's suggestions that we should have limited the influent to the wastewater treatment tank to the dioxin concentration in the dissolved phase. This is because CHEMDAT8 considers the total contaminant load to the system. Specifically, CHEMDAT8 takes the total contaminant load to the system (both dissolved and solid phase) and partitions it between the solid and dissolved phase in the tank according to an equilibrium partitioning relationship (a relationship that is very similar to used in Shell's analysis). In fact, the dioxin in the tank influent is not only partitioned onto the TSS in the tank influent, but also onto the additional solids represented by the biomass in the tank. Consequently, it does not matter how dioxin is partitioned onto solids when the wastewater enters the tank, because the model repartitions the solids inside the tank according to the model's equilibrium partitioning relationship. In the case of chlorinated aliphatics wastewaters, limiting the analysis to an evaluation of the dissolved phase would have seriously under-represented the total contaminant load to the system and greatly underestimated emissions (that is, only the dioxin mass in the dissolved phase would be partitioned in the tank, rather than the total dioxin mass associated with the dissolved plus solid wastewater phases).

In support of their comments, the Vinyl Institute presents data from a study/analysis of their own, as well as data from the studies/analyses of three other commenters: Shell Chemical, Oxyvinyls, and Dow. Our evaluation of these studies is discussed in detail below.

The Vinyl Institute cited data from study they performed to investigate releases of dioxins from U.S. EDC/VCM manufacturing plants. A report that summarized the results of this study was submitted to EPA. The Vinyl Institute claims that the results of their study confirm their conclusions in that 3 to 7 parts per quadrillion (ppq) I-TEQ dioxin were reported in EDC/VCM plant wastewater effluent, as compared to 40 to 7,400 ppq observed by EPA in wastewater influent. Thus, they explain, the highest dioxin concentration observed in their wastewater effluent samples is three orders of magnitude lower than the "high-end" concentration predicted by EPA in the influent.

EPA sees no particular disparity between the results of our analyses and the effluent data provided by the Vinyl Institute. Specifically, we predicted that dioxin congener concentrations in the wastewater inside the tank (equal to the effluent concentration in a completely mixed stirred tank reactor), would be 0.5 to 2.5 percent of the influent concentrations. Although the Vinyl Institute did not provide any influent data to which we can compare their effluent data, the Vinyl Institute's effluent concentrations, 3 to 7 ppq, are 0.04 to 18 percent of EPA's influent concentrations. The removal efficiencies predicted by CHEMDAT8 fall neatly in the center of this range of apparent removal efficiencies calculated using EPA's measured influent concentration and Vinyl Institute's effluent concentrations.

The Vinyl Institute refers to comments and analyses from Shell Chemical (CALP-00011) to support their comments. Shell's comment is essentially the same as the Vinyl Institute's, that is "...the dioxin emissions are overestimated...because the inlet concentration of dioxins available for stripping from an aggressive biological treatment unit is overestimated." Shell provides an analysis which they say "explains and supports our assertion about the overestimate in dioxin emissions." Shell calculates the equilibrium dissolved-phase dioxin congener concentrations in EPA's chlorinated aliphatics wastewater samples, then recalculates EPA's emissions estimates assuming that their dissolved phase concentrations are influent to EPA's modeled wastewater treatment tank. Shell then compares their recalculated influent data to effluent data from EDC/VCM treatment units presented in a study by Carroll et al. (1998). Shell states "in a complete mix biological reactor, such as the one modeled by CHEMDAT8, the effluent concentration equals the reactor concentration. These effluent concentration values are thus more representative of the driving force for air emissions from the biological treatment unit than are the measured concentrations of in incoming stream that is only part of the feed to the reactor." Shell concludes by stating that

"Dioxins adsorbed onto suspended solids are unavailable for air stripping, and should not be included in the CHEMDAT8 calculations. An approach such as that above to determine the true aqueous, available for stripping, concentration should be used by EPA to adjust the calculated emissions..."

EPA strongly disagrees with the commenter's suggestion that emissions from the wastewater treatment tank should somehow be calculated from the reported emissions by applying a ratio of the effluent or dissolved phase concentrations by the influent concentrations. As modeled by CHEMDAT8, the mechanisms that result in reduction of contaminant mass in the effluent are: biological degradation, hydrolysis (not important for dioxins), sorption onto solids, and emissions to the air. Based on the sum of these loss mechanisms, CHEMDAT8 calculates a steady state concentration within the tank, which is, as noted by Shell, the effluent or dissolved phase concentration (CHEMDAT8 assumes 100 percent solids removal efficiency within the tank). CHEMDAT8 then applies the calculated volatilization mass transfer rate coefficient to the calculated dissolved phase concentration within the tank to calculate the emission rate from the aerated tank. Therefore, the CHEMDAT8 model emission estimates are already based on the predicted dissolved phase (effluent) concentrations and Shell's adjustments to the reported emissions essentially "double counts" the tank removal efficiency before estimating the emissions. If one wishes to estimate the emissions from the aerated tank based on effluent congener concentrations, then one needs to directly apply the volatilization mass transfer rate coefficient for that congener to that concentration. Shell's use of the soluble phase adjustment factor to the emissions calculated by CHEMDAT8 is inappropriate.

Shell noted in their analysis that, even after accounting for sorption, the concentration of OCDF was above the solubility limit. Shell suggests that the OCDF concentration is either a reporting or analytical error. EPA notes that in our reevaluation of the tank emissions analysis, we observed that at equilibrium, the dissolved phase OCDF concentration in the high end sample exceeded the OCDF solubility limit, therefore we constrained the OCDF concentration in the dissolved phase at the solubility limit. We point out that, even after having included this constraint in our analysis, the OCDF concentration at its saturation limit (the concentration we used in our revised analysis [USEPA, 2000]), is greater than the OCDF concentration constrained to its solubility limit (the concentration we used in the analysis presented in the 1999 Risk Assessment Technical Background Document [USEPA, 1999]).

The Vinyl Institute presented results of a laboratory study that Dow Chemical conducted on wastewaters from its EDC plants. In this study, several wastewater samples were filtered and dioxin concentrations measured separately for the liquid filtrate and the solids. For samples containing 3 to 25 ppt TEQ dioxin (similar to those

evaluated by EPA), Dow's results consistently showed that 97 to 98 percent of the dioxin was on the solids, on both a total and TEQ basis. On an individual congener group basis, the results consistently showed that 83 to 98 percent of the dioxins remained with the solids. Dow believes the actual partitioning is likely higher because no filter is 100 percent efficient and some of the dioxins in the filtrate likely were due to solids that passed through the filter. They note that in many instances, even though the total analysis for congener groups were well below the solubility limits used by EPA, greater than 90 percent of the congener group remained with the solids.

The Dow analysis described by the commenter is consistent with EPA's analysis. As discussed previously, EPA predicted using CHEMDAT8 that, depending on the congener, 90 to 99 percent of the influent dioxins are removed by sorption onto solids in the wastewater tank.

Lastly, the Vinyl Institute presented results of an analysis by Oxyvinyls in support of their comments. In summary, the logic of the Oxyvinyls analysis is:
1) In EDC/VCM wastewaters and sludges, the ratio of the concentration of total dioxin and furan congeners (PCDD/Fs on a WHO-TEQ basis) to the concentration of OCDF (on a WHO-TEQ basis) is 11.275. Therefore, based on a measurement of OCDF in EDC/VCM wastewater samples, one can always determine the total concentration of dioxins and furans (on a TEQ basis).
2) Oxyvinyls has collected and analyzed 10 samples of filtered process wastewater for OCDF in the last 2 years using a analytical screening procedure developed by Oxyvinyls and Geon. Using the screening procedure, no OCDF was detected in the filtrate (the concentrations are below detection limits), although OCDF was detected in the solids. Oxyvinyls concludes that the data clearly indicate that dioxins and furans are strongly associated with solids. Oxyvinyls then estimated the concentration of dioxins and furans in the filtrate to be equal to one half the detection limit times 11.275. Oxyvinyls concludes that this concentration is well below the 1 ng/L TCDD TEQ action level proposed by EPA.
3) Lastly, Oxyvinyls concludes that the solid particles are denser than the aqueous phase and settle out in clarification units where they are insulated from the atmosphere by the aqueous layer. Because the aqueous layer is free of dioxins, there is no contact between dioxins and the environment.

The primary flaw with Oxyvinyls' analysis is that because ODCF has the largest log K_{ow} value (8.8), it will have the highest affinity for the solids. The PeCDF and TCDD/F congeners, for example, have the lowest log K_{ow} values (6.5 to 6.9) and also have the highest toxicity. Based strictly on a comparison of the log K_{ow} values, we would expect that OCDF would be roughly 100 times more concentrated on the solid samples than PeCDF or TCDD/F. Because the TEQ of OCDF is 100 to 1,000 times

less than PeCDF and TCDD/F TEQs, the difference in the TEQ partitioning between the solid and aqueous phases for OCDF and PeCDF is likely to be greater than a factor of 10,000. As such, it is critical that any factor developed to convert the OCDF TEQ to total dioxin/furan TEQ be developed for samples that have nearly identical TSS concentrations to the samples to which that conversion factor is to be applied. This critical criterion is not met when applying the 11.275 conversion factor to filtrate samples. The table does footnote that the estimated total dioxin/furan TEQ values are predicated on the assumption that "PCDD/F's have similar affinities (as OCDF) for the solids." This assumption is not correct, and the importance of the differences in the affinities for solids on the TEQ partitioning should not be ignored.

Further, one of the assertions made in the last item of Oxyvinyls comments is not well-founded. The water is never totally "free" of dioxins and furans, and although dioxins and furans will concentrate predominately on the solids, dioxins and furans also will exist in the dissolved phase, and will be available for release to the atmosphere, especially under turbulent conditions. This fact is demonstrated by the analysis EPA presents in the 2000 Addendum (USEPA, 2000).

The Vinyl Institute makes one point that has considerable merit. This point is that EPA's assessment of dioxin volatilization from aeration units fails to account for the fact that almost all of the dioxins are adsorbed to solids in this process stream and are removed in primary clarifiers prior to aeration. As discussed in our response above, we agree that dioxins in the chlorinated aliphatics wastestream will primarily exist as a sorbed phase (sorbed to solids in the wastestream), although we disagree that CHEMDAT8 fails to adequately account for this fact. However, the commenter raised a very relevant concern regarding how we designed our evaluation of emissions from aerated, biological treatment tanks. EPA agrees with the commenter's concern 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.

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[3], p. 472), and we have no information that leads us to believe that the equalization tanks in use by the facilities are agitated. One of the commenters points out that "EPA did not model emissions from a non-aerated tank and emissions from such tanks would be significantly less than aerated condition [sic]. Even non-aerated tanks would have some solids, so the same sorption impact on emissions (reduced) would be in effect." (See Section 13.19, response to Shell Chemical, CALP 00011).

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. Based on our calculations, this level of solids removal from chlorinated aliphatics wastewaters prior to biological treatment would reduce the high end deterministic risk estimate by a factor ranging from approximately 0.67 (70 percent removal of solids) to 0.94 (50 percent removal of solids) (USEPA, 2000).

The final point raised by the commenter is that although the 1 ng/L TEQ level in the influent provides guidance as to the toxicity of airborne dioxin emissions from wastewater treatment systems, consistent with a concentration-based listing approach, it is really the released constituents that should be used to determine the need for listing.

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

For example, OCDF in the "high dioxin" influent stream contributed 6 out of the 7.4 ng/L TEQ for the influent stream, but based on Table 3-lb has no significance in the calculated emitted TEQ grams/yr.

The Agency notes the commenter's point regarding the relationship between the 1 ng/L TEQ wastewater concentration that was proposed as a trigger level for implementing tank cover requirements for tanks managing listed wastewater, and the concentration of 'released constituents.' However, because the EPA is not finalizing the chlorinated aliphatics wastewater listing, for reasons not related to this proposed trigger level, this comment is moot.

References:

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

USEPA. 1999. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Office of Solid Waste. July.

USEPA. 2000. *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, Addendum*. Office of Solid Waste. September 30.

4.6 Vinyl Institute Comment

C. EPA Should Use a Site-Specific Risk Approach As it Has in Other Recent Rulemakings

In a recent final National Emission Standard for Hazardous Air Pollutants (NESHAP) rulemaking under the Clean Air Act, EPA used facility-specific data in determining actual risks.[4] This NESHAP regulates, among other things, emissions of dioxins and furans from hazardous waste incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. As a result of the public and peer review comments received on the risk assessment in the proposed NESHAP, 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.

The VI recommends that EPA use a similar approach for chlorinated aliphatic production wastes. For example, it is the VI's understanding that EPA's human risk analyses are based on dioxin

[4]64 Fed. Reg. 52,828 (September 30, 1999) ("NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors").

emissions from K173 wastewater treatment systems affecting farmers and farmers' children living within 300 meters (0.18 miles) of a EDC/VCM plant that live in the same location for 48.3 years or more. EPA assumed that the farmer raises fruits, exposed vegetables, root vegetables, beef cattle, and daily cattle within this 0.18 mile range and that the farmer consumes approximately 42 percent of the exposed vegetables, 17 percent of the root vegetables, 33 percent of the fruits, 49 percent of the beef, and 25 percent of the dairy products.[5] EPA explains that the farmer meeting this criteria is a human at a health risk for an excess lifetime cancer risk due to exposure to a cancer causing contaminant, namely dioxin *(i.e.,* "affected receptor").

Because the VI is not aware of any farmers living within 0.18 miles of a member company facility that meet all the criteria detailed above, the VI is unclear as to why its operations would be regulated under this proposal. It makes no sense to regulate a waste stream or to require controls and expenditures to protect a type of individual that will not be present in the area.

Additionally, EPA's estimates of consumption patterns by various receptors seems unreasonable in general and extremely unlikely for our facilities in particular. It is difficult to believe that a farmer living 0.18 miles from a chlorinated aliphatic production facility would grow fruit trees and vegetables, along with raising beef and dairy cattle all on the same plot of land. In fact, in the South Texas area where several EDC/VCM manufacturing facilities are located, dairy cattle production is non-existent due to the climate. More problematic perhaps is EPA's proposed connection between milk consumption and exposure to dioxin for children of farmers given their relatively high consumption of milk and the tendency of chlorinated dioxins and furans to bioaccumulate in milk fat.[6] Given its disproportionate significance in the exposure calculation, site-specific data on dairy/milk production should be used to improve the accuracy of the risk assessment for this particular exposure route.

A Peer Reviewer also raises these types of issues. 'While generally stating that EPA's overall risk assessment methodology was reasonable and technically defensible, the Peer Review stated the following with regard to the Risk Assessment Document and receptors:

Page 2-31, paragraph 4. Where do the percentages of food eaten by the home gardener that are home grown come from? It is hard to believe that a home gardener gets 11.6% of his exposed fruit (apples, peaches, pears, and berries) from a home garden. That would mean that 11.6% of home gardeners are growing apple, peach or pear trees in their home garden; a figure that is hard to believe given that most home gardens are small and mainly used to grow vegetables.

Page 2-34, Paragraph 1. It is hard to believe that a recreational angler obtained 32 percent of the fish in his/her diet from a stream located near a waste management unit or near his home. This figure

[5]64 Fed. Reg. at 46,485.

[6]64 Fed. Reg. at 53,004.

represents that fraction of the total fish is his diet that is caught. However, of the total fish that an angler catches, what fraction is caught within one mile of his residence? I would expect this fraction to be small. But even if assumed to be 58%, it would reduce the total intake from the fish pathway by 50%.

Page 2-34, Paragraph 2 Where do the percentages of food eaten by the farmer that are home grown come from?"

Review of Risk Assessment Technical Background Document; Chlorinated Aliphatics Listing Determination, by Curtis Travis, at 10.

In the proposal, EPA itself expresses concern with regard to its lack of site-specific information. EPA states:

The risk analyses were based on a limited set of waste sample data. It is possible that these data do not represent the true distribution of contaminant concentrations in the waste categories evaluated, resulting in either an overestimation or underestimation of the actual risk to receptors. EPA obtained little site-specific information regarding waste management units for the chlorinated aliphatics industry, necessitating that we make a number of assumptions regarding waste management in off-site landfills, the land treatment unit, and wastewater tanks. We typically used regional databases to obtain the parameter values necessary to model contaminant fate and transport. Because the data that we used are not specific to the facilities at which the actual wastes are managed, the data represent our best estimates of actual site conditions. Use of these databases in lieu of site-specific data may result in either overestimates or underestimates of risk. 64 Fed Reg. at 46,498.

One of the Peer Reviewers also agrees with the observation that more site-specific data should be used. In particular, while acknowledging that the CHEMDAT8 model used by EPA in developing the proposal has undergone extensive review by both EPA and industry and is considered to provide reasonable accurate emission estimates, the Peer Reviewer noted that

The annual waste quantity (flow rate) and dimensions of the tank **are sensitive input** parameters. **Specific data on these parameters were not available for the aerated tanks; therefore, the flow rate and dimensions of the tanks were estimates based on reported annual waste quantities.** It is not clear why such fundamental data were not available, but give that they were not, the assumptions make [sic] seem reasonable.

Review of Risk Assessment Technical Background Document; Chlorinated Aliphatics Listing Determination, by Curtis Travis, at 10 (emphasis added).

Agency Response:

The Vinyl Institute, as well as other commenters on the proposed rule (see for example Occidental/Oxy Vinyls LP, CALP-00013, Section 14 below; Equiva, CALP-00016, Section 15 below; Formosa, CALP-00009, Section 11 below; and Louisiana Chemical Association, CALP-00010, Section 12 below) believe EPA should use a site-specific risk approach in evaluating chlorinated aliphatics wastes.

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). 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, we avoid evaluating exposure scenarios that are 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. The commenter contends that one peer reviewer questioned why fundamental data such as annual waste quantity (flow rate) and dimensions of the tank were not available to EPA. However, EPA notes that the reviewer concluded that the data used by EPA seemed reasonable, as did another peer reviewer who said that the tank operational characteristics and parameters used in EPA's analysis are reasonable and defensible. 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)).

In response to the commenter's specific concerns about the parameters used to conduct the risk assessment, 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). Moreover, the information provided in the public comments (see Section 12.16, Louisiana Chemical Association, CALP-00010) confirms that an exposure scenario in which a farmer (the receptor for which we calculated the highest risk estimates) 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) 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[7], and a factor of 12.7 for beef[8], 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

[7] 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).

[8] 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).

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, Table 13-71 of the Exposure Factors Handbook [USEPA, 1997], 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). (The 1987-1988 NFCS data on intake of home-produced foods are included for use in the recent (1997) Exposure Factors Handbook (USEPA, 1997), which has been reviewed by EPA's Science Advisory Board (SAB) as well as numerous other external reviewers. 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 (see responses to the Louisiana Chemical Association, CALP-00010, Section 12.16) 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) (see Section 12.16, Louisiana Chemical Association, CALP-00010). 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 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.

As noted by the commenter, one peer reviewer also challenged the basis for EPA's estimates of the amount of homegrown food consumed by the fisher (the percentage of fish assumed to be self-caught) and the gardener (the percentage of fruits and vegetables that the gardener eats that are assumed to be home grown). As was the case for the percentages of home grown foods consumed by the farmer, these values are from Table 13-71 of the Exposure Factors Handbook (USEPA, 1997). We note that the highest risk estimates supporting both the proposed and final listing determinations were those attributable to the farmer receptor, not the fisher or gardener receptor.

Lastly, the commenter quoted EPA's discussion of uncertainty in the risk analysis as a basis for why the risk assessments conducted by EPA should have been more site-specific. Specifically, the commenter cited EPA's uncertainty associated with limited data on waste concentrations, site-specific characteristics of waste management

units for the chlorinated aliphatics industry, and site-specific parameters associated with estimating contaminant fate and transport. Although this commenter (and others) stated that EPA's risk assessment should have used more site-specific data, the commenters did not provide much additional site-specific information that EPA assumes the commenters would like the Agency to use more of (e.g., facility-specific waste concentrations, site-specific characteristics of waste management units, site-specific parameters associated with estimating contaminant fate and transport). Some of the comments could be viewed as providing EPA with more "site-specific" information (*e.g.*, dairy cattle do not exist in certain geographic areas, facilities operate clarifiers prior to biotreatment tanks, etc.) EPA points out that the Agency evaluated and considered all of these comments, along with all other information received, before reaching a final decision on the listing determinations presented in the final rule.

References:

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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.

4.7 Vinyl Institute Comment

If scientific information demonstrates that dioxin is present in wastewater in concentrations that warrant air emissions controls, it would make sense to regulate only those situations where the risks are justified *(i.e.,* when the risk threshold is exceeded and when an affected receptor is present). Given that the proposal is addressing such a limited number of facilities (23 sites), why not allow each facility to run the same modeling program EPA used with site-specific data, distance to nearest receptor, wastewater concentrations, *etc.* Facilities that remain below the critical dioxin emission level would be allowed to "opt-out" of the requirements and their wastewaters and wastewater sludges would not be considered hazardous waste.

This is the same rational allowed under this proposal for the management of K174 hazardous waste under the "contingent management" option. Under this approach, EPA is proposing to list particular wastes as hazardous only if the wastes are managed in a way other than the manner in which EPA has

determined is protective of human health and the environment.[9] If a facility's current operations can be reasonably estimated to be protective of human health and the environment, why impose costly emission control requirements?

In light of the preceding, the VI believes that a risk based, site-specific risk assessment procedure should be used by EPA so that only actual risks are regulated.

Agency Response:

The Agency's response to this comment is provided in Section **3.25** of this Response to Comment document (responses to Dow Chemical Company, CALP-00012).

4.8 Vinyl Institute Comment

D. If the PCDD/F Concentration in Wastewaters is Less than the Trigger Concentration, Wastewater Should Be Considered Non-Hazardous

EPA has proposed three Options for addressing K173 Waste determination, as summarized below:

Option	Dioxin Concentration	Status of Wastewaters, RCRA Requirements
Option 1	≥1 ppt TCDD TEQ	Hazardous Waste & RCRA Subpart CC
	< ppt TCDD TEQ	Hazardous Waste
Option 2	≥1 ppt TCDD TEQ	Hazardous Waste & RCRA Subpart CC
	< ppt TCDD TEQ	Non- Hazardous Waste
Option 3	≥1 ppt TCDD TEQ	Hazardous Waste & RCRA Subpart CC
	< 1 ppt TCDD TEQ	Non- Hazardous Waste if determination requirements are followed and the determination is certified to EPA. Method used in the Dyes & Pigments RCRA Listing (64 Fed. Reg. 40,210, 40,227 (July 23, 1999).

64 Fed. Reg. at 46,504.

The VI supports the use of a concentration-based listing approach, similar to the approach used in Option 2. As noted above, however, the VI believes the proposed 1 ng/L trigger level was calculated incorrectly and is over conservative.

[9] 64 Fed. Reg. at 46,480.

As EPA explains in the preamble, the trigger level is based on a risk level that is considered protective by EPA. Substances and streams that present no risks should not be classified as hazardous. Recently, EPA proposed to allow properly managed cement kiln dust (CKD) to remain non-hazardous providing the management standards are met. EPA stated:

> Today's proposed rule would regulate CKD under RCRA to address the concerns identified in the [Report to Congress on Cement Kiln Dust] while avoiding unnecessary requirements. The approach taken is to establish management standards for CKD and make it clear that all CKD managed in accordance with those standards is not classified as a hazardous waste.. . [t]he concept of regulating a waste if it fails to meet certain standards forms the basis of many RCRA regulations. 64 Fed. Reg. 45,633, 45,641 (August 20, 1999).

EPA should take a similar approach here.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. The Agency appreciates the commenter's input with regard to the concentration-based listing approach.

4.9 Vinyl Institute Comment

Second, as noted in the preamble, EPA's basis for determining "risk" was the single highest dioxin concentration in wastewater found during its testing, while the majority of companies had wastewater concentrations of dioxins that were well below that measured value (and below the 1 ng/L trigger as well). Thus, EPA is basing the entire rule making process and the threshold of concern on only one test result of six samples tested over the 1 ng/L threshold. Does the Agency truly believe that this small sample size is representative of the industry and justifies the proposed rulemaking?

In order to properly address temporal and spatial factors, in evaluating the wastewater streams of concern and the potential applicability of the rule the VI estimates that between 25 to 30 wastewater samples may need to be tested to defensibly evaluate the impact of the proposal at one facility. In contrast, EPA appears to be willing to accept scant evidence for the rulemaking that it would not typically accept as adequate evidence to support a facility's determination for non-applicability. Making a "blanket" listing determination would make "generators" of facilities whose wastewaters essentially don't meet the criteria for listing and in some cases may be more than an order of magnitude below the trigger level.

Agency Response:

First, EPA notes that it is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

The Agency believes, as described more below, that use of the highest wastewater dioxin concentration (on a TEQ basis) was consistent with the Agency's high end deterministic approach to risk assessment, and that representative wastewater sampling and analysis was used in support of the risk evaluation.

The reason that EPA used the highest concentration of dioxin in wastewater (on a TEQ basis) in the high end deterministic risk analysis for the adult farmer is that this parameter (the concentration of dioxin in wastewater) was determined to be one of the two most sensitive parameters in the analysis. EPA used one other high end value (exposure duration) in the high end deterministic analysis, however all other values in the analysis were set at their central tendency values. For example, waste volume was set at a value (the central tendency value) that results in less risk than would have been predicted if we had set waste volume at some of the values reported by chlorinated aliphatics facilities. This procedure is consistent with Agency practice for conducting high end deterministic risk assessments. 64 *FR* at 46482-46483, August 25, 1999 *Federal Register*.

The proposed trigger level for wastewaters actually was based on the second highest dioxin concentration reported in dedicated chlorinated aliphatic wastewaters (0.6 ng/L TCDD WHO-TEQ). EPA set the trigger level at 1 ng/L to account for the fact that we believed that facilities complying with the requirement that the TCDD TEQ concentrations of their wastewaters not exceed 1 ng/L would on average maintain wastewater TCDD TEQ concentrations of approximately 0.6 ng/L or below. (A complete description of how the trigger level was set is provided in the preamble to the proposed rule, 64 FR 46476 at 46503).

EPA believes that the wastewater sampling and analysis for this listing determination was reasonable and representative of the industry, as discussed in EPA's response to comment in Section 2.1 of this Response to Comment Document. EPA also believes that the subsequent selection of sample data to be used in the risk analysis, as described in the preamble to the proposed rule (64 *FR* at 46483) was reasonable for the following reasons.

EPA's decision to select only wastewater sample data from samples that represent "dedicated" wastewater (*i.e.*, wastewater from chlorinated aliphatic processes, and not commingled with process wastewaters from other processes) was appropriate because EPA sought to limit the evaluation to only wastes and constituents attributable to chlorinated aliphatic manufacturing processes, which was the scope of this listing determination. Given the scope of EPA's mandate under RCRA for making hazardous waste listing determinations, many wastes from the non-chlorinated aliphatic production processes (that are commingled with chlorinated aliphatic wastes) have

been evaluated under other listing determinations (*e.g.,* petroleum refining, solvents, organic chemicals). In fact, in several cases, the Agency found that facilities currently manage commingled wastewaters as hazardous waste due to the contributions of non-chlorinated aliphatic wastes subject to previous listing determinations.

In addition to using only "dedicated" wastewater sample data, EPA also only used wastewater sample data representing wastewaters at the "headworks" of a facility's wastewater treatment system. This was because EPA believed this wastewater was most representative of what is actually treated in the facility's wastewater treatment tanks, in terms of constituent concentrations. EPA also did not use data that represented wastewaters that are already regulated as hazardous waste, in order to minimize expending resources to evaluate wastes that have previously been designated as hazardous, which also avoids potentially duplicative or redundant regulation.

By limiting the samples by all of these criteria, EPA sought to model only chlorinated aliphatic wastewaters, not already managed as hazardous waste, that represent actual wastewater influent to aerated biotreatment tanks. Although EPA recognizes the commenter's point that the number of samples used was smaller than the original number of samples collected, EPA believes that there would have been potentially greater concerns with sample "representativeness" had EPA simply used *all* of the samples it had collected (*e.g*., samples not representative of what actually enters wastewater treatment, samples not representative of chlorinated aliphatics process wastewaters, samples representative of regulated hazardous waste) rather than the approach ultimately used.

Reference:
EPA. 1995. Guidance for Risk Characterization. U.S. Environmental Protection Agency Science Policy Council. February.

4.10 Vinyl Institute Comment

Moreover, the risk assessment used only the sampling results from the dedicated *(i.e.,* wastewater from EDC/VCM production facilities only) chlorinated aliphatics wastewater samples and the dedicated EDC/VCM sludge samples (6 of 4l wastewater samples and 4 of 7 sludge samples). Although EPA acknowledged that most facilities commingle their EDC/VCM wastewater, it chose to exclude the samples from the commingled wastewaters from its analysis. As a result, the conclusion based on the dedicated samples may exaggerate the risks associated with chlorinated aliphatics wastewater and EDC/VCM wastewater sludge from commingled facilities. Accordingly, EPA should use sample results from the commingled wastewaters and sludges in its risk assessment.

Agency Response:

See EPA's response to comment in Section 4.9 of this Response to Comment Document above.

4.11 Vinyl Institute Comment

Finally, particularly because the K173 listing as proposed would be a more "traditional" listing option *(i.e.,* listed no matter what the concentration), the VI is concerned about reporting and recordkeeping implications not addressed in the proposal. For example, what implications would the newly regulated "generation" of this material have with respect to biennial reporting and for the purpose of hazardous waste taxation? This issue could have a tremendous economic impact because all wastewaters would have the listing once this stream enters biological treatment. The VI believes that should EPA decide to list the K173 stream, a concentration-based approach is the only way to address EPA's protectiveness concerns and to ensure that regulation is fair and equitable.

Based on EPA's recent rulemaking activity and for the reasons discussed above, the VI strongly supports use a concentration-based listing approach.

Agency Response:

EPA appreciates the additional information provided by the commenter regarding aspects of implementing the tank cover requirement in the proposed rule. However, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents, therefore the Agency is not finalizing the tank covers and emissions control requirements (i.e., the amendments to 40 CFR 264/265/subpart CC), which also includes waste sampling and analysis requirements.

4.12 Vinyl Institute Comment

E. EPA Must Clarify Issues Regarding Sample Location and Frequency

1. Sample Location

The VI believes that any sampling location for determining compliance with a trigger level should be specified as a "location prior to co-mingling of waste streams" and should **not** be related to a specific piece of equipment *(i.e.,* after steam strippers). Defining the sampling location as proposed ignores the fact that facilities may further treat wastewaters prior to comingling, which could result in a lower dioxin concentrations at the point where the stream is comingled with other wastewaters. If the "risk driver" for this particular stream were related to air emissions from biological treatment tanks, it would seem

that consideration should be given to any process that would further lower or eliminate air emissions from these units prior to commingling of these waste streams.

Here, EPA's proposed sample location is arbitrary and appears to have been chosen as a way of obtaining the highest concentrations possible for use in risk assessment. One might argue that not all facilities have additional treatment in place; however, designating a sampling location relative to a particular piece of equipment is not an appropriate way to ensure that the sample is representative of the stream in question. Furthermore, the sample location as currently proposed essentially penalizes companies for providing additional treatment. The VI believes that it would be more appropriate to allow a facility to sample at the true "headworks" of the biological treatment plant, subject to a demonstration that the location selected is prior to co-mingling with other wastewater streams and prior to introduction into the plant biological treatment system.

Agency Response:

See EPA's response to Section 4.11 above in this Response to Comment Document.

4.13 Vinyl Institute Comment

2. Sample Frequency

Because EPA is requiring a high level of confidence *(i.e.,* 95 percent upper confidence), the VI foresees a sampling plan **that requires at least five samples with the potential for many more to certify compliance.** It is the VI's understanding that EPA expects the following:[10]

1. Each wastewater treatment tank managing K173 that is not compliant with 40 C.F.R§ § 264.1084/265.1085 of Subpart CC must be assessed to determine whether dioxin levels in the influent to the tank exceed the trigger level.

2. The headworks of the wastewater treatment system is assumed to be at a location directly after steam stripping. If a facility does not utilize steam stripping, the wastewater treatment system headworks is assumed to be the first tank in which wastewaters are combined, accumulated or treated after leaving the chlorinated aliphatics production process.

3. Tanks that are fully compliant with Subpart CC would not be subject to waste analysis, recordkeeping, and notification requirements.

[10]See 64 Fed Reg. at 46,504

4. Once the facility has established that TCDD TEQ levels do not exceed the trigger level for a specific tank, the facility can assume that the TCDD TEQ levels for all downstream tanks also are below the trigger level.

If this understanding is correct, if a site has wastewater stripping units prior to the wastewater treatment system, it would be required to sample each EDC/VCM wastewater stream directly after steam stripping. Because at many plants this involves multiple streams; **this would require multiple tests.**

Moreover, many sites have numerous (*e.g.*, > 50) open-topped tanks between where a wastewater stream exits the steam stripper and enters the discharge outfall. Because EPA proposes to exempt tanks that are less than <1 ng/L from control requirements and those that are downstream from an exempt tank, companies would be required to attempt to determine which of these many tanks was below the 1 ng/L threshold. Hence, companies would have to conduct **another test** at a tank were it would be assumed that the trigger was not exceeded. If these test results indicate that the wastewater dioxin concentration was at, well above, or well below the trigger concentration, the company would have to perform another test either upstream or downstream of the selected tank chosen.

This process would have to be repeated until the company determined at which point in the waste treatment system the 1 ng/L concentration limitation was not exceeded. The VI requests clarifications on these issues.

In addition, in the spirit of EPA's burden reduction efforts, the VI recommends that EPA simply require that the facility have the documentation as to compliance with the 1 ng/L limit available for inspection rather than require that it be submitted to the agency. EPA should also require re-testing only if changes are made at the facility that would be expected to **increase** dioxin concentrations in the wastewater. As written, re-testing would be required if a change were made to **decrease** dioxins in the wastewater. Specifically, EPA proposes that in designing the sampling program, the facility must consider "any expected fluctuations" in the concentration over time.

EPA should also include provisions on what is to be done in the event re-testing shows that a stream that was previously below the limit is now above the limit. The provision should contain the ability to re-test within a certain time frame, as well as the ability to statistically analyze any data to determine if there are any outliers. The "Q-test" described in Appendix IX of Part 266 could be used to evaluate this data. If the final result is that the wastewater does now contain greater than 1 ppt dioxin, the facility should be given an appropriate amount of time to comply with Subpart CC, or somehow modify their process.

Finally, proposed section 265.1080(h)(1)(ii)(c) seems to require that grab samples be used in the analysis. EPA should also allow a facility to use composite sampling if desired. This could reduce some of the analytical burden, as well as provide more assurance that on average the material is below the applicable trigger limit.

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.14 Vinyl Institute Comment

F. EPA Has Failed To Consider Significant Non-Economic Ramifications of The Proposal

The proposal reflects an overly simplistic view of what the rule would mean in terms of retrofitting tanks, while adding layers of complication and thus compounding what would already be a significant engineering task. Many companies have performed assessments of the cost associated with covering and controlling tanks in their biological treatment plant, even though it is likely that newly constructed, dedicated systems would be installed in lieu of retrofit at a significantly greater initial capital expense.

Biological treatment systems at EDC/VCM manufacturing sites rely on aeration and mixing of wastewater to obtain proper treatment of the constituents of concern. Unlike tanks used for storage of materials, tanks used for biological treatment are often equipped with various pieces of equipment that facilitate the desired treatment *(e.g.,* clarifiers). If it were simply a matter of covering/controlling storage tanks *(i.e.,* without any equipment concerns) the required action would amount to tank retrofit and the addition of piping, albeit at significant cost due to the size of the tanks involved. However, with biological treatment tanks there are many considerations over and above tank retrofit, which render re-design efforts considerably more difficult. There is the question of how equipment repairs will be effected. The re-design must allow for safe access, as personnel would now be required to enter a confined space for routine maintenance of treatment plant equipment. This would present new hazards and would require additional monitoring to ensure against an unsafe work environment during maintenance and repair activities. Personnel would no longer be able to perform even the simplest of maintenance or repair tasks without significant effort.

Facilities would also be forced to address the issue of water management when considering repairs. Production processes are such that large quantities of water must be managed on a daily basis. Presently, operation personnel have discretion over which situations require draining of tanks for equipment maintenance/repair and which situations do not. If the rule is finalized as proposed, this discretion would be eliminated, since the tanks would have to be drained every time maintenance/repair is performed regardless of how minor the activity. Such a scenario would require either frequent plant shut down or the addition of substantial tank storage capacity. One must also consider the issue of equipment removal. There are certain instances when the removal of equipment is required. Many times, this removal cannot be accomplished through some relatively small access port. Rather, larger/heavier pieces of equipment would have to be removed by way of the top of the tank using heavy

machinery. This presents the necessity of installing and using a removable top, a prospect that is impractical at best.

One key aspect of biological treatment plant operation that the proposal fails to take into account is the importance of inspection to ensuring proper operation. For certain pieces of equipment there is a visual aspect to monitoring proper operation that is as important, if not more important, than electronic monitoring of operations. Creating an enclosed space would not only hamper efforts at visual inspection of the process, it would transform a normally routine operation into a complicated procedure for vessel entry. In turn, the decreased effectiveness of visual inspection may result in an increase in wastewater NPDES difficulties and/or excursions. As mentioned, issues related to risk and the economic impact of these proposed regulations have been addressed below and by other companies/organizations. However, it appears that EPA has failed to adequately consider practical implications related to this proposal and whether the added risk of personnel exposure and possible NPDES non-compliance were outweighed by the estimated risks to the general population.

The VI also did not find within EPA's economic cost analysis any indication of the time and effort necessary to obtain and operate under an air permit for these newly regulated emission sources being considered. This effort can be substantial under the Clean Air Act's Federal Title V Air Permit Program. It has been the experience of VI member companies that receiving a State Air Operating Permit can take between 8 and 18 months. **Amending a Title V Air Operating Permit may take even longer.**

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.15 Vinyl Institute Comment

Finally, it was not apparent whether EPA considered the cost to conduct performance testing on the control devices. This effort can cost between $150,000 to more than $300,000 per control device. These costs are simply the costs associated with having a third party conduct the test and develop results- they do not account for the cost of:

1. operating the process at the required operating rate to indicate performance at a maximum production rate;

2. environmental personnel to coordinate testing, escort third party testing personnel, review testing protocols, *etc.,* and results; and

3. purchasing and contracting personnel efforts.

Taking these additional efforts into account adds to the cost to demonstrate that the control device is operating as required by the RCRA Subpart CC standard.

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.16 Vinyl Institute Comment

G. Provisions to Apply RCRA Subpart CC are Inconsistent and Unachievable

1. Compliance Time

If a facility is required to comply with RCRA Subpart CC due to the 1 ng/L trigger, section 265.1080(h) directs the owner/operator (0/0) to comply with 40 C.F.R. § 265.0185 (RCRA Subpart CC). However, as currently written, these sections contain many inconsistencies, particularly since Subpart CC was directed at controlling Volatile Organic Compounds (VOC), not dioxins.

RCRA Subpart CC requires **immediate** compliance for 0/Os that become newly subject to the requirements.[11] With regard to the time frame for compliance with this proposal, in the preamble EPA states:

The initial assessment must be conducted by the effective date of the rule. If the trigger level is exceeded, compliance with the applicable sections of 40 CFR 264/265 subpart CC must be accomplished **within one year** of the effective date. Alternatively, the facility may implement process changes to reduce the TCDD TEQ level below the trigger level, and repeat the initial assessment to demonstrate that levels are now below the trigger level, within the same **one year time frame.** 64 Fed Reg. at 46,503 (emphasis added).

Considering the type of construction that may be required, a one year time frame is too restrictive. For example, if a company were required to cover an existing wastewater tank, as previously discussed, the tank walls and bottom would have to be strengthened prior to installing a fixed roof. EPA's Clean Air Act Maximum Achievable Control Technology (MACT) Standards provide affected facilities that may be required to, for example, enclose existing open topped tanks and install control devices, three years to complete the activity).[12] Facilities that may be required to comply with RCRA Subpart CC should also be allowed **three years for** compliance. Also, as it is currently written section 265. 1082(c),

[11] 40 C.F.R. § 265.1083(c).

[12] *See* 40 C.F.R. § 63.6(c); 40 C.F.R. § 63.100(k)(2)(I).

which details when a new source must be in compliance, would have to be revised to provide for a three-year compliance period.

2. Sixty-Day Notification and Certification Requirement

This requirement, which appears at proposed section 265.1080(h)(5), is overly restrictive. At least 180 days, rather than 60, should be allowed. This would be more consistent with the approach used in the Hazardous Organic NESHAP ("HON") rule.[13]

It would take considerable time for facilities to sample and analyze process wastewaters to the extent that would be required under the rule as proposed. In addition, there is concern as to whether analytical laboratories are available to provide reliable test results in the proposed time frame. For example, if within 60 days a company has 40 samples for analysis and other EDC/VCM manufacturers also have 40 samples, more that 2,000 tests would have to be conducted, and only a handful of qualified analytical laboratories exist to perform these types of analyses.

Below is an example of how long this process would take:

- Develop a detailed sampling and analysis plan - 4 weeks
- Conduct sampling ensuring that the timeframe is long enough to account for variability in the wastestream - 4 weeks
- Analyze the samples - while most labs quote a turnaround time of 3 weeks, it is anticipated that this proposal could overload the limited number of labs able to perform the analysis - 4 weeks
- Analyze the data - 1 week
- Complete the certification and notification - 2 weeks

The above estimate does not include any additional time that may be required for any additional testing that could result from problems that may arise with this difficult analysis. Accordingly, EPA should modify proposed section 265.1080(h)(5) to allow a facility six months to submit the notification and certification.

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.17 Vinyl Institute Comment

[13] 40 C.F.R. § 63.151(b)(2)(i).

3. Process Knowledge

There appears to be a contradiction between the preamble language and the proposed requirements of section 265.1082(h)(2) as to whether process knowledge can be use to exempt a tank from control downstream of a tank that does not exceed the 1 ng/L trigger. Specifically, the preamble states:

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

64 Fed. Reg. at 46,505.

Section 265.1080(h)(2)(i)(B) provides the language to exempt a tank using process knowledge:

(2) Sampling and analysis. (i) General. For each wastewater
treatment tank for which an exemption is claimed, the generator of K173 must:
(A) Test for all 2,3,7,8-substituted CDDs/CDFs; or
(B) Use process knowledge for tanks downstream of a tank that is exempt as a result of testing specified in paragraph (h)(2)(i)(A) of this section.

However, further along in this specific section, the proposed regulation contradicts itself and requires a sample be taken in order to claim exemption (section 265.1080(h)(2)(iv)):

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

(A) the maximum TCDD TEQ in the influent to the tank does not exceed I ng/L at the 95% upper confidence limit around the mean;
(B) The TCDD TEQ **for each sample** shall be determined by multiplying the concentration of any 2,3,7,8-substituted CDD or CDF detected and the appropriate toxicity equivalency factor (TEF), as described below, and summing these products **for each sample**.

EPA must clarify this issue.

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.18 Vinyl Institute Comment

4. Certification Language

The proposed K173 certification language is flawed in that it has no associated time period. Under the language as proposed, a wastewater that is certified to be less than the trigger limit cannot spike over the limit **EVER!** The K173 certification language should be revised, at a minimum, so that the limitation is an annual average concentration, not an instantaneous limitation.

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.19 Vinyl Institute Comment

5. Control Technology

The language to determine the level of control at 40 C.F.R. § 265.1085(b) is based on vapor pressure, which does not seem to be an appropriate method to determine the level of control for dioxin emissions. Because dioxins, not VOCs, are the chemicals of concern, the method for selecting the level of control is completely inappropriate for dioxin. This same issue can also be found at proposed sections 265.1085(c) and 265.1084. The language would have to be reconfigured to account for dioxin emissions.

The existing language at 40 C.F.R. § 265.1085(c)(2)(iii) and (g)(2)(ii) is also problematic. If the regulation is reconfigured and it is determined that an affected tank must vent through a closed vent system to a control device, the standard allows no control exemption for when the tank is empty. The regulation only allows bypassing the control device, specifically:

(2) During periods of routine inspection, maintenance, or other activities needed for **normal** operations and for the removal of accumulated sludge or other residues from the bottom of the tank.

The VI suggests that if the regulation is reconfigured and an affected tank must vent through a closed vent system to a control device, than EPA develop language similar to that used in the HON rule. For example to allow for compliance during non-operational periods *(i.e.,* the tank is empty), the following language could be used:

The provisions set forth in this subpart of the part shall apply at all times except during periods of start-up or shutdown, malfunction, or **non-operation** of the chemical manufacturing process unit (or specific portion thereof) resulting in cessation of the emissions.

Agency Response:

See EPA response to comment above in Section 4.11 of this Response to Comment Document.

4.20 Vinyl Institute Comment

H. The VI Supports the Proposed Exemption From the Derived From Rule for K173

The VI supports EPA's proposal to exempt sludges generated from the treatment of K173 from being classified as hazardous waste as a result of the "derived-from" rule as long as the wastes would not otherwise be defined as hazardous waste.[14] The VI agrees that EPA's specific evaluations of the potential risks associated with sludges derived from K 173 should supercede any presumed risk imparted by application of the derived-from rule, which presumes risk absent any information on toxicity.

Agency Response:

See EPA's response to comment in Section 3.30 of this Response to Comment Document (comment from Dow Chemical, CALP-00012).

4.21 Vinyl Institute Comment

III. K174 Issues

A. Sludges Managed in Incineration Units Should Also Be Considered Non-Hazardous

EPA proposes to list EDC/VCM wastewater sludges as hazardous under K174 unless the sludges are managed in a Subtitle C or D landfill. EPA proposes this "contingent management" approach because it has determined that "no significant risks are posed from managing EDC/VCM wastewater treatment sludges in a landfill."[15] According to EPA, the management scenarios selected for its risk assessment for K174 were chosen based upon the waste management practices known to be practiced by the chlorinated aliphatic industry for non-hazardous sludges. According to EPA, based on survey results, these practices are: (1) on-site land treatment (one facility), (2) on-site disposal in a non-hazardous landfill (two facilities), (3) on-site co-disposal in a hazardous waste landfill (one facility), and (4) off-site disposal in a subtitle D landfill (7 facilities).

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[14] 40 C.F.R. § 26i.3(c)(2)(i).

[15] 64 Fed. Reg. at 46,508.

Accordingly, EPA modeled risks from two management scenarios of most concern - an off-site non-hazardous municipal landfill, and a land treatment unit. EPA concluded that "other non-hazardous waste management practices currently are not used by industry and would not serve as an appropriate basis for listing the waste as hazardous."[16] Given EPA's survey results and the Agency's view that land disposal and landfilling are "established management practices," EPA also states that it "believes it is unlikely that these sludges will be sent to any type of facility other than a landfill, particularly if the approach proposed in today's rule is promulgated."[17]

The VI agrees with EPA's contingent management approach for this waste stream but believes that it should be expanded to include as non-hazardous wastes EDC/VCM wastewater sludges that are disposed in incineration units. As EPA states, "incineration has been fully demonstrated for treating dioxin-containing wastes."[18] The VI is not aware of any EDC/VCM manufacturing sites that incinerate wastewater treatment sludges, but given EPA's conclusion that incineration is an acceptable means of managing dioxin-containing wastes, in the event incineration is used to manage these wastes the contingent management option for K174 should be expanded to include incineration as a disposal method.

Agency Response:

The Agency disagrees with the commenter. First, the Agency notes that commenter provided no information indicating that incineration of presently non-hazardous EDC/VCM sludges is occurring and indicated only that they were considering the practice. 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. 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.

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[16]64 Fed. Reg. at 46,507.

[17]64 Fed. Reg. at 46,521

[18]64 Fed. Reg. at 46,508.

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 incinerations, we have not identified non-hazardous waste incineration as plausible management and have not conducted an analysis of potential risks associated with this 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 indeed a plausible management alternative for EDC/VCM wastewater treatment sludges, 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 will want to carefully consider the potential risks of managing these wastes in non-hazardous waste incinerators, should such management be identified as plausible. 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 state-licensed landfill and are not placed on the land prior to final disposal in a landfill.

4.22 Vinyl Institute Comment

B. The Proposed Recordkeeping Requirements Are Overly Burdensome

Wastewater treatment sludges generated at EDC/VCM manufacturing site biological treatment plants are typically stored in roll-off boxes and shipped to Subtitle D landfills. All shipments are accompanied by a non-hazardous waste manifest that clearly identifies the waste, the quantity shipped, the destination landfill, and the transporter. Records of these shipments are maintained. The VI believes that documentation as described above, which is analogous to documentation for existing hazardous waste activities, should be sufficient proof of disposal in accordance with the conditions for exclusion from this hazardous waste listing. As for documentation of intent, such a concept would be difficult to prove by means of paperwork. It would seem that sufficient tracking based on a history of proper disposal would be sufficient proof of intent to landfill. Additionally, agency inspection should be more than adequate to ensure that land treatment or storage on land is not taking place. Inspectors merely have to verify that sludge is stored in containers and that there is no visual evidence of placement on land. Given that inspections are random and unannounced, the VI believes that current practices should more than adequately satisfy concerns regarding intent.

As proposed, recordkeeping requirements for non-hazardous wastes are as restrictive as if the waste were regulated. Existing RCRA regulations provide guidance for documentation of claims that materials

are not solid wastes or are conditionally exempt from regulation.[19] There is no need to establish a new or more specific set of rules or guidelines to demonstrate compliance with the contingent management option. Facilities are familiar with the current requirement to provide "appropriate documentation" (such as legally binding contracts) to demonstrate that a material is not a waste or is exempt from regulation. Any new set of standards or rules would only create additional unnecessary burden and confusion.

Agency Response:

The Agency is finalizing, as part of the listing description, a flexible performance standard similar to the requirements in 40 CFR 261.2(f) for documenting claims that materials are not solid wastes, when they are managed (or will be managed) in certain ways.

The Agency agrees that the type of paperwork described by the commenter would be sufficient to show that previous shipments of EDC/VCM sludge had been disposed in accordance with the conditions of the K174 listing. EPA also agrees that an Agency inspection is sufficient to verify no land placement of EDC/VCM at the generator's facility. Regarding a demonstration that EDC/VCM sludge (that is located at the generator's facility at any particular moment) *will be* sent to a landfill in conformance with the K174 conditional listing, the Agency acknowledges the commenter's point that it may be difficult to demonstrate where a waste *will be* sent based on paperwork. EPA agrees that prior waste disposal activity, as successfully demonstrated by the generator, certainly can provide useful (and in many cases, sufficient) information concerning the likely disposition of EDC/VCM currently stored on site.

However, there may be specific situations where demonstrations of prior shipments may not be fully adequate to indicate where waste will be sent (*e.g.*, demonstrated prior waste shipments are infrequent and/or not very recent). This is likely going to be a situation-specific type of assessment. However, because EPA does not believe that landfills would typically accept industrial waste shipments on short notice, without having some type of agreement, contract, or other arrangement already in place that require some lead time (*e.g.*, where confirmatory chemical analysis is required on a waste sample by the landfill owner/operator, or where certain purchasing arrangements must be made first, etc.) EPA believes that there will likely be other types of information, other than demonstrations of prior shipments, that would serve to demonstrate where EDC/VCM sludge *will be* sent.

[19] 40 C.F.R. § 261.2(f).

4.23 Vinyl Institute Comment

IV. K175 Issues

VI is concerned that any decision regarding the regulation and management of this material be based on a good understanding of the waste and a realistic assessment of the hazards it may present. While EPA provides a detailed description of the approach used to determine risks associated with the K173 and K174 proposed listings, similar information for the K175 stream listing is conspicuously absent.

Although EPA makes reference to previous analyses for the proposed Hazardous Waste Identification Rule[20], groundwater modeling and exposure assessment are only briefly mentioned in the preamble and in the background document for the risk assessment. EPA's assessment of risk is even more odd given the extremely small volume of VCM-A filter cake when compared to the overall quantity of wastes placed in the landfill. Moreover, VI does not believe that the EPA mismanagement scenario *(i.e.,* disposal in an unlined landfill) represents a plausible situation. Compounding the error associated with this improbable management scenario, EPA seeks to bolster its position by what essentially amounts to a repudiation of two regulatory standards that are fundamental to EPA's hazardous waste management program. According to EPA, procedures for determination of toxicity characteristic and disposal of hazardous waste in landfills meeting Minimum Technology Requirements (MTR), although accepted and approved for the universe of solid wastes (including hazardous wastes) managed by industry, do not apply and cannot be relied upon for this specific waste stream.

Agency Response:

EPA responds to these comments in Section VI. C. 1. of the preamble to the final rule, and in the response to comment in Section 5 of this Response to Comment Document.

4.24 Vinyl Institute Comment

Under the 1984 Hazardous and Solid Waste Amendments (HSWA), new standards for land disposal were developed. Those standards (modified by later amendments), set forth requirements for a double liner and leachate collection system and for facilities to install a system for leak detection. There were also standards from later amendments that required a facility to establish an action leakage rate, develop a response action plan, and to implement a quality assurance program to ensure that any construction activity would conform with the established system integrity standards. Landfills meeting MTR as defined by regulation must comply with rigid specifications on liner durability, resistance to chemical attack, and physical properties such as permeability. In addition, the facility must provide for monitoring and collection of leachate and for monitoring of groundwater at a pre-determined point of

[20] 60 Fed.Reg.at 66,344.

compliance. Also, the landfill operator must propose an "action leakage rate" subject to Agency approval to ensure that the unit leak detection system is capable of removing enough fluid to ensure that the head on the bottom layer does not exceed one foot within an adequate margin of safety. Prior to accepting waste for disposal, the operator must have an approved response action plan that outlines the steps to be implemented in the event that the action leakage rate is ever exceeded. Such standards are applicable to any Subtitle C landfill. In addition, the landfill presently receiving the VCM-A filter cake is equipped with a groundwater pumping system that is designed to reduce external hydraulic forces on the liner system due to static head. The cells are also surrounded by a slurry wall system that is anchored into the upper-most clay layer underlying the landfill. Clearly, a landfill meeting these standards cannot be equated with an unlined landfill for the sake of risk determination. EPA frequently states that there is "inherent uncertainty" associated with liner integrity in a Subtitle C landfill.

While one may argue that long term integrity is a factor with any liner system, it would seem that this uncertainty is not any greater with respect to the VCM - A filter cake than it is for any other waste that is currently placed in these landfills in accordance with EPA standards.

In accordance with EPA directives, the "life" of a facility includes not only the period of time when the unit is actively receiving waste. This period also applies to any post-closure period to which the unit is subject. Among other things, post closure care must include maintenance and monitoring of the final cover, the leak detection system, and the groundwater monitoring system. The post closure care period must continue for at least 30 years after final closure of the unit/site in question; however, this period may be extended as appropriate to "protect human health and the environment." Specific examples provided in the regulation include situations when "leachate or ground-water monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful. . . ." Liners are designed to withstand degrading forces even absent any mitigating action by the operator. Long term system integrity is further ensured by the requirements in place for continued maintenance and monitoring after closure. Clearly, with these regulations in place, operators will not be allowed to simply walk away from a site once active disposal operations have ceased. While VI can appreciate EPA's unwillingness to base any sort of hazard determination solely upon the performance of a liner, the EPA analysis should take into account the many other circumstances and characteristics that determine whether long term risks are expected or are even plausible.

Agency Response:

EPA responds to these comments in Section VI. C. 1. of the preamble to the final rule, and in the response to comment in Section 5 of this Response to Comment Document.

4.25 Vinyl Institute Comment

The Toxicity Characteristic (TC) Rule, promulgated in 1990, was the result of EPA's efforts to revise existing methods for determining the toxicity characteristic. The TC rule refined and broadened the

scope of existing regulations by adding 25 organic chemicals of concern. The analytical method used for complying with the rule was also revised, with the existing Extraction Procedure Toxicity Characteristic (EPTC) being replaced with the Toxicity Characteristic Leaching Procedure (TCLP). In developing the TC rule and the TCLP upon which it was based, the EPA had to consider several "mismanagement" scenarios and the relative effect each would have on leaching. Ultimately, the EPA retained the management scenario involving co-disposal of these wastes with municipal solid waste as most representing the reasonable worst-case scenario. According to the discussion in the preamble for the TC rule, EPA believed that the acidic leaching media from decomposition of putrescible wastes in a Subtitle D landfill was typically more aggressive than leaching media that would be expected from typical industrial landfills. The TCLP extraction procedure was therefore designed to simulate this condition. Within the preamble to the chlorinated aliphatics proposed rule, EPA explains that "preliminary" studies show that the mercury in the VCM-A filter cake may be more likely to leach at a higher pH. Consequently, EPA argues that the TCLP is not a sufficient indicator of the risks posed by this particular waste. In fact, EPA's argument raises the question as to whether the TCLP is an accurate indicator of toxicity characteristic **for any** of the constituents listed under 40 C.F.R. § 261.24, since for any of the constituents listed under that section the leach potential may be linked to the various species and complexes formed by the chemical in a specific waste stream. One may assume that it is possible, perhaps even likely, that under certain circumstances increased leaching may be demonstrated for the majority of the listed chemicals. Short of testing each species or complex of a particular chemical under each anticipated disposal scenario, there is no sure way to determine whether a chemical would exceed its respective TC level. Clearly, EPA realized that such an approach to determining the toxicity characteristic would be difficult, if not impossible, to implement and that very little benefit would be realized. Rather than single out particular waste streams and exponentially expanding the list of hazardous wastes, EPA sought to apply a reasonable worst case management scenario. At the time, EPA's own discussion of the TC rule identified the assumptions upon which the rule was based as being protective. With this proposed rule, EPA has chosen to identify what may or may not be a single exception to those original assumptions (of which there may be many more) and has effectively invalidated its own regulatory procedures for this particular stream.

Agency Response:

EPA responds to these comments in Section VI. C. 1. of the preamble to the final rule, and in the response to comment in Section 5 of this Response to Comment Document.

4.26 Vinyl Institute Comment

As has been demonstrated throughout these comments, VI does not believe that the information related to the VCM-A filter cake is sufficient to support a decision to list this material as a hazardous waste. However, should there be a final decision to list this waste, it would seem most appropriate to tie any specific listing to the mercuric sulfide cake as opposed to the proposed broad category quoted above. All of the discussion of risk in the preamble to the proposed rule centers on mercuric sulfide. This

includes EPA's discussion of the perceived unique leach potential of the filter cake at higher pH. As the listing description is currently phrased, any innovative alternative treatment process that results in some form of solid waste would still be subject to the hazardous waste listing regardless of the mobility of the mercury in the resulting material. Thus any incentive for transition to an alternative wastewater treatment process based on elimination of a hazardous waste stream would be minimal. Also, EPA's own discussion of this issue mentions the possible generation of a "larger volume" of waste to be handled. The principle behind any "Waste Minimization" program is the actual **reduction** of hazardous waste. An increased volume would have ramifications not only for the cost of treatment and disposal. The facility would also be required to modify its hazardous waste report and possibly Toxic Release Inventory (TRI) report to reflect a larger volume of waste generated. This would expose the facility to increased criticism from area stakeholders and an increase in hazardous waste taxes.

As it has been explained in the preamble to the proposed rule, EPA's listing decision is based upon the properties of the material that is currently generated. While VI does not agree with the position taken by EPA for the VCM-A filter cake, it most definitely does not believe that the listing should apply to an alternate treatment process (hence alternate form) if it can be shown that the resulting cake is stable under varying pH conditions and does not fail the TCLP.

Agency Response:

EPA responds to these comments in Section VI. C. 1. of the preamble to the final rule, and in the response to comment in Section 5 of this Response to Comment Document.

4.27 Vinyl Institute Comment

Under EPA's proposed alternative listing for VCM-A wastewater treatment sludge, the conditional listing option is immaterial since the facility currently manages its filter cake in a subtitle C landfill even in the absence of regulation. However, VI is supportive of this option for several reasons. The material, as generated and managed does not pose a significant risk to human health and the environment, as has been addressed previously in comments regarding risk assessment. Finally, disposal of this material in a subtitle C landfill is the most logical approach if one were to factor in the increased handling requirements and treatment difficulties that are encountered via retorting the material. Specific information regarding these general observations has been provided in comments appearing elsewhere in this document.

Agency Response:

EPA responds to these comments in Section VI. C. 1. of the preamble to the final rule, and in the response to comment in Section 5 of this Response to Comment Document.

4.28 Vinyl Institute Comment

V. EPA's Economic Analysis Significantly Underestimates Implementation Costs

The VI believes that EPA's Table IV - 1 - Summary of Estimated Industry Compliance Costs underestimates the cost to comply with the rule as proposed).[21] Specific details are provided below.

The VI believes that EPA did not use the true range of tanks that may be affected by the control requirements of RCRA Subpart CC. Page 40 and Exhibit D-1 of the *Economics Background Document* explain EPA's approach to characterizing tank systems and consequently developing implementation and compliance costs. In summary, EPA based its scope on information provided by 15 of the 23 surveyed facilities and then proportionally expanded the "universe" to estimate a total number of potentially affected tanks for all 23 facilities.

By summarizing the total capacity of the 58 wastewater tanks reported in the survey by the 15 facilities, EPA came up with an average tank size of 380,000 gallons. The total capacity of the 58 wastewater tanks was estimated at 22.045 million gallons, with each facility averaging six tanks per facility. EPA then developed "proxy" tank sizes ranging from 45,000 to 775,000 gallons to create a tank size distribution across a facility.

In order to estimate how many of the 58 wastewater tanks would require air emission controls under RCRA Subpart CC, EPA relied on the test results of six wastewater samples applied to the Risk Analysis.[22] As discussed above, of the six samples wastewater treatment system influent samples tested for dioxin, all taken from a "dedicated" wastewater management systems, one exceeded the 1 ng/L dioxin concentration threshold. Hence, EPA applied the assumption that one in six wastewater streams (17%) would require air emission controls. Because survey results indicated that several facilities already operate with emission controls, EPA multiplied the affected streams by a percentage ranging from 0 to 100% to account for the likelihood that some tanks were already covered.

By leaving eight sites out of its evaluation, EPA made assumptions with regard to the unsurveyed sites that may be inaccurate. EPA does not explain why eight sites were not included in the cost analysis. For example, EPA assumes that the largest tank potentially affected by air emission controls would be 775,000 gallons.

In addition, the RCRA section 3007 Survey used to support the proposal did not request exact design capacity, but used the following codes:

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[21] 64 Fed. Reg. at 46,518.

[22] 64 Fed. Reg. at 46,483; 64 Fed. Reg. at 46,503.

A = < 10,000 gallons
B= 10,000 gallons to 100,000 gallons
C= 100,000 to 1,000,000 gallons
D= > 1,000,000 gallons

By using these broad ranges, EPA has neither an accurate estimate of the amount of wastewater handled by the industry nor a true idea of the tank sizes involved.

As per note (d) of Exhibit D-4 in the *Economic Background Document,* EPA estimated that the roof area of a 20,000 gallon tank is 293 square feet and the cost to enclose it is $11,400 (1986 dollars). Proportionally, therefore, according to EPA the cost to cover a 775,000 gallon tank with a roof area of 3,728 square feet would be $145,048 (not including sales tax and field installation). The VI believes that the cost to cover large existing tanks *(i.e.,* greater than 1,000,000 gallons), is significantly more than a simple proportion evaluation using a the cost to cover a 20,000 gallon tank, and, thus, **EPA has significantly underestimated the costs associated with covering tanks as required under the proposal.**

The VI believes that EPA's continual use of one sample in six will exceed the air emission control trigger is inaccurate and underestimates the number of facilities that may exceed the trigger. Using this assumption yields only nine tanks of a potential 58 requiring control. The VI believes that this number may increase as facilities begin to test wastewater streams for dioxin. Many facilities may choose to cover tanks if test results prove that EDC/VCM wastewater streams are close to the trigger level.

Agency Response:

EPA notes the specific issues described by the commenter regarding cost estimates for air emission controls on tanks. However, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. EPA is therefore not finalizing the proposed amendments to the wastewater treatment unit exemption in 40 CFR sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers.

Attachment 1
McLaren-Hart Report on EPA Risk Assessment for K173

Critical Review of USEPA's Risk Assessment to Supporting the Proposed Rule for Listing Chlorinated Aliphatic Waste K173

Executive Summary

This document contains a critical review of the risk assessment used by USEPA to support their listing decision for chlorinate aliphatic waste K173. Our review has uncovered both qualitative and quantitative issues that significantly impact the confidence in the risk estimates and their interpretation. Qualitatively, we found three areas of concern: 1) the presentation of the risk assessment is poor and clarity suffers; 2) the risk assessment is more complicated than it needs to be in some places, while too simple in others; and 3) there appears to be a disconnect between the deterministic and probabilistic assessments. Quantitatively, we found four areas of concern: 1) the deterministic risk estimates for the adult farmer scenario could not be reproduced based on the information presented; 2) overly conservative assumptions have been adopted for several of the key intake parameters; 3) the cancer slope factors are based on an outdated methodology for scaling human equivalent doses, and a hidden conservatism lies in the fact that the TEF values for the driving congeners are upper bound estimates rather than central tendency ones; and 4) using the adjustment factors derived within the report, we obtained an overall adjustment of a factor of approximately 10 for the adult farmer scenario. Similar results for the other scenarios are expected.

1.0 Introduction

ChemRisk, a service of McLaren-Hart Inc., was retained by the Chlorine Chemistry Council to provide a critical review of USEPA's risk assessment used to support the proposed rule for listing chlorinated aliphatic waste K173. A total of four documents were reviewed:

> Federal Register Notice - Part II. Environmental Protection Agency. 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; Proposed Rule. Dated August 25, 1999
>
> Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Dated July 30, 1999
>
> Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination: Appendices A-K. Dated July 30, 1999
>
> USEPA's charge to the peer reviewers, and the peer reviewers' comments

The majority of the cancer risk associated with indirect exposure to wastestream K173 is attributable to reliance upon a single elevated sample (GL-02), two pathways (ingestion of beef and dairy from foraging cattle), and two chemicals (2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF). For this reason, our review focussed primarily on technical issues associated with these driving pathways and contributors. The remaining sections of this review are dedicated to comments on the exposure assessment (Section 2.0), toxicity assessment (Section 3.0), and risk characterization (Section 4.0) components of the risk assessment. In these sections, adjustment factors have been derived where feasible when the degree of overconservatism in the risk assessment could be quantified. In Sections 5.0 and 6.0, the reader will find a brief discussion of the peer reviewer comments and a list of cited references, respectively.

2.0 Exposure Assessment

There are a number of areas in which the exposure assessment relies on conservative assumptions, many of which result in the generation of unrealistic risk estimates. Some of the key areas are discussed below.

4.29 Vinyl Institute Comment

Contribution of Feed to Dairy and Beef Dioxin Levels

USEPA has suggested that a variety of consumption rates be used for different food sources for dairy and beef cattle, and further assumed that all feed is contaminated to the same degree with releases from the waste streams under review. Lactating and non-lactating cattle typically consume between 2% and 3% of the body weight as dry feed each day (Fries and Paustenbach, 1989). Depending on the age of the animal and its intended use, the animals may be fed largely on forage (replacement dairy cows, young beef cattle, and breeding animals), about 50% forage (lactating dairy cattle) or no forage (fattening beef cattle). This exposure changes over time. 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). Animal husbandry practices differ both over time and location for cattle and according to whether they are dairy or beef cattle. Fries and Paustenbach (1989) point out that time on pasture averages only 87 days/year nationwide, but varies from 12 days in the west to as much as 150 to 300 days in the Southeast. Similarly, beef cattle may be raised for part of their lives on pasture but are typically raised on grain prior to slaughter. They also are generally slaughtered within a year of birth whereas dairy cattle typically have a much longer life-span. These considerations influence both the exposure and potential translocation of dioxin to meat or milk. As such, information on the time between consumption of contaminated feed and slaughter, as well as loss of chemical from tissue during this time period needs to be considered in the risk assessment.

The studies of Stevens and Gerbec (1988), and Fries and Paustenbach (1989) present alternative information that can also be considered in this evaluation. For dairy cattle, USEPA suggested that they 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. Stevens and Gerbec (1988) reported 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 for the dairy cow. USEPA assumed 8.8 kg/day for forage, 2.5 kg/day of silage, 0.47 kg/day of grain, and 0.5 kg/day of soil throughout the life of a beef cow. During the nursing phase, the

beef cow receives practically all of its daily dose through the mother's milk and this dose has been (and could be) calculated for nursing cattle (Stevens and Gerbec, 1988). During the pasture phase of life, the growing animal is assumed to eat 13.6 kg/day of feed. This consists of 10.2 kg/day of forage, 3.4 kg of silage, and 0.05 kg/day of soil. During the fattening stage of growth prior to slaughter, virtually the entire diet consists of grain. While soil ingestion rates can vary, typical animal husbandry practices suggest that it would rarely exceed 1 to 2% of dry matter intake in lactating dairy cattle. In beef cattle, it could be greater during the pasture phase, but during the grain-only period, little or no soil ingestion is likely to occur. Additionally, the animal gains as much as 60 to 70% of its body weight during this period and the impact of this and half-life considerations on dioxin residuals in the meat need to be taken into account.

Finally, the assumption that all feed is contaminated appears to be unrealistic. This would imply that this farm not only has both a dairy and beef cattle operation, but raises sufficient grain (and silage) and still maintains enough pasture to graze the animals as well (in addition to crops for human consumption). This same point 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 these assumptions accordingly. Since grain and silage are often purchased elsewhere, it would be more appropriate to select a value of less than 100% in assessing the contribution of contaminated feed to the body (and milk) burden of the cattle considered therein. A fixed value of 1.0 for fraction of contaminated feed is not a central tendency estimate and fails to reflect the lack of certainty for this parameter. Therefore, we recommend that a value of 0.5 be adopted for the fraction contaminated under the deterministic assessment, and that a uniform distribution be adopted for the Monte Carlo assessment, with values ranging from zero to one.

Agency Response:

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, 1999). 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, 1999). 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 (pasture grass and hay) 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 commenter's 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 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 a number of other rulemakings, such as the combustion MACT rulemaking (64 *FR* 52828), and have recommended that these assumptions be used in estimating risks under other Agency programs (USEPA, 1998a). Furthermore, the feed ingestion rates for dairy cows presented by Stevens and Gerbec (1988) are average ingestion rates for dairy cows in Minnesota. In contrast, EPA's data for the intake rates of forage, grain, and silage for dairy cows are based on either on data from the South Carolina/Georgia region (see Boone et al., 1981) or more general data (see Shor and Fields, 1980 and NAS, 1987). 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. The soil intake data for dairy cows presented by the commenter are based on Fries, et al. (1982) who state that "Ingestion of soil by cattle in previous studies [citation] ranged from 0.25 to 2.41% of dry matter when cattle were on lots with bare soil and from 1.38 to 2.43% when cattle were on pasture and received supplemental feed." The soil intake assumed for dairy cows in Stevens and Gerbec's study was 0.5% of dry matter intake, whereas we assumed a soil intake for dairy cows equivalent to 2% of dry matter intake. Whereas the percentage of soil intake that Stevens and Gerbec cite is on the low end of Fries, et al.'s (1982) range for cows that are raised on lots with bare soil, the value we used falls in the middle of Fries, et al.'s range for cows on pasture. Because, as explained above, we evaluate cows that consume pasture as an important portion of their diet, Fries, et al.'s data actually serve to confirm the value for soil intake that we used in our analyses.

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 (for example, USEPA 1998a, USEPA 1998b, 64 FR 63382, 63 FR 42210).

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, 1999) 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, 2000). 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, 2000).

References:

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

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

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4.30 Vinyl Institute Comment

Transfer of Dioxin to Milk and Meat and Dioxin Kinetics

An important consideration in completing the risk assessment for dioxin in food is the relationship between the food animal exposure to dioxins from the waste stream and the amount of dioxin that appears in the milk or meat. USEPA relies on a biotransfer factor for milk that varies from compound to compound and is modified by the ratio of beef fat to milk fat (5.4) to estimate the transfer of dioxin to the meat based on the work of Travis and Arms (1988). Fries (1987) reported that steady state was achieved in milk fat within 40 to 60 days. In short term feeding studies, various researchers have examined the ratio of dioxins in the diet to the residues found in body and milk fat (Firestone *et al.*, 1979; Parker *et al.*, 1980; Jensen *et al.*,1981; Jensen and Hummel, 1982). They reported ratios for milk fat:diet in cows of 3.7 for 2,3,7,8 TCDD, 2.8 for HxCDD, 0.3 for HpCDD, and 0.05 for OCDD. Similarly, the ratios for beef fat: diet were reported as 3.5 for 2,3,7,8-TCDD, 2.1 for 0.2 for HxCDD, and 0.05 for OCDD. While these animals were probably not at steady state this suggests that multiplying a biotransfer factor for milk by 5.4 may overstate the dose and hence the risk for these compounds. Fries and Paustenbach (1989) suggested that a steady state bioconcentration factor (BCF) for dioxins of 5 was reasonable based on observations from dioxin and chlorinated compounds with similar properties, although it appears that the higher chlorinated compounds have lower BCFs and this needs to be taken into account in this risk assessment. Using the same data and assuming a half-life

of 41 days for TCDD in dairy cattle (a value also supported by the work of Olling *et al.*, 1991), Stevens and Gerbec (1988) assumed that 12% of the daily dose appeared in milk after 21 days. At steady state, they believed this translated into 40% of the daily dose of dioxin expressed in the milk. McLachlan *et al.* (1990) reported a value of 20% based on an experiment in lactating cows. They were critical of the other approaches used including that of Travis and Arms (1988) which USEPA apparently relied on to derive their biotransfer factor. Their interpretation of Firestone *et al.* (1979) also supports the notion that less of the higher chlorinated compounds are transferred to the milk and in fact they reported a decrease in PCDD/F transfer to milk with increasing Kow, a finding in conflict with Travis and Arms (1988). If the calculations in this risk assessment rely on the generalized assumption of a direct correlation between biotransfer and Kow, a re-evaluation may be in order based on these and other findings. A simple kinetic model for the contamination of milk and meat can be developed and used as input into this risk assessment.

Regardless of the BCF or biotransfer factor used, the final step in the assessment requires that the concentration of dioxin in the milk would be divided by the daily milk production (15.6 liters/day) and the dose to humans a function of the daily ingestion of milk (perhaps corrected for changes in milk fat content, if any) and the bioavailability of the compounds in the milk. Given the short half life of these compounds in the cow and the constant milking pressure, the temporal input of dioxin and related compounds is important. Since the source of feed may vary over the seasons, the relative contribution of contaminated to uncontaminated feed may be important. This is not a concern under the USEPA's risk assessment in which all feed was assumed to be contaminated. Since, however, this is viewed as unlikely for reasons outlined above, the relative dioxin concentration in milk seems likely to vary over time and ought to be addressed both deterministically (a time-weighted average) and probabilistically.

The issue is perhaps more profound for the beef cow than the dairy cow because of its shorter life span and different husbandry practices. The dose to the beef cow originates first from the mother's milk and then from feeding on contaminated plant materials. In the normal scheme of things, the beef cow is fed on grain the last third of its life and if this grain is uncontaminated as is likely for reasons discussed above, the growth of the animal in conjunction with the kinetics of the various congeners becomes a critical issue. Stevens and Gerbec (1988) used this husbandry information and first order kinetics to determine a BCF of 18.8 for 2,3,7,8-TCDD for the period equivalent to two-thirds of the animal's life. This value was combined with the concentration of dioxin ingested daily to arrive at the relevant dioxin fat concentration prior to the grain-only feeding. It is unlikely that grain fed a beef cow would be contaminated for reasons alluded and, therefore, a net loss of the relevant congeners would occur prior to slaughter. Stevens and Gerbec (1988) used an estimate of dioxin half-life in beef to determine the amount present at time of slaughter. This basically suggested a reduction of greater than 50% at the time the animal was sacrificed. This information is then combined with assumptions as to the amount of fat present in a cut of beef, the amount of beef consumed daily and the relative oral bioavailability of the congeners present in the diet to arrive at the daily dose. Including kinetics and husbandry information would influence and improve both deterministic and probabilistic evaluations of the exposure and the risk by further reducing uncertainty. On this basis, a reduction in the risk from beef ingestion of 50% may be appropriate.

Agency Response:

The commenter presents five primary issues relating to how the Agency evaluated biotransfer: 1) the commenter does not promote use of the Travis and Arms biotransfer factors; 2) the commenter does not agree with the Agency's method of multiplying the milk biotransfer by 5.4 to obtain a biotransfer factor for beef; 3) the commenter believes the Agency should assess the temporal variability of dioxins in milk by dividing the concentration of dioxin in the milk by the daily milk production; 4) the commenter believes that the Agency should incorporate the oral bioavailability of the congeners present in the diet to arrive at the daily dose, and 5) the commenter believes the Agency should incorporate into our analysis the impact of grain feeding of beef cattle prior to slaughter.

First, we wish to clarify that we did not use the beef and dairy biotransfer factors of Travis and Arms in our risk analyses for the chlorinated aliphatics listing determination. As clearly indicated in Appendix C of the 1999 Risk Assessment TBD, we used the beef and dairy biotransfer factors recommended by USEPA, 1995, a memorandum authored by EPA scientists Lorber and Rice. USEPA (1995) does in fact agree with the commenter's point, "Their interpretation of Firestone, et al. (1979) also supports the notion that decrease in PCDD/F transfer to milk with increasing Kow, a finding in conflict with Travis and Arms (1988)." USEPA (1995) goes on to state: "In any case, it is recommended that the Travis and Arms' biotransfer factor equations for beef and milk not be used for the seventeen dioxin congeners."

Second, USEPA (1995) provides justification for using the factor of 5.4 to calculate the beef biotransfer factor from the milk biotransfer factor. Specifically, we assume that milk is 3.5% fat and that beef is 19% fat. Assuming that the concentrations in milk fat and beef fat are the same, the biotransfer factors for beef are 5.4 (19/3.5) times higher than for milk.

Third, EPA does not believe that dividing the dioxin concentration in milk (mg/L) by the daily milk production (L/day) will provide meaningful units to assess the temporal variability of dioxin concentrations in milk. The calculations for dioxin concentrations in milk assume that steady state has been reached (that is, animals raised by subsistence or hobby farmers are exposed to the same feed long enough to essentially reach steady state conditions) and, therefore, temporal variability in daily time steps is not relevant to the risk assessment

Fourth, with regard to the commenter's suggestion that dose is a function of bioavailability, EPA traditionally assumes 100% absorption of dioxin either inhaled or consumed, an assumption that is supported by animal data showing absorptions in the range of 90% with feed.

Lastly, the commenter is correct is stating that animals put on a grain-only diet in a feedlot prior to slaughter will have a reduction of body tissue concentrations in comparison to the tissue concentrations before the grain-only diet. However, even though the practice of fattening cattle in feed lots may occur in 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. Consequently, risk assessments which assume consumption of home-produced animal food products assume beef cattle are butchered without any intense, purposive period of fattening on a grain-only diet, as is done in feedlots.

References:

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4.31 Vinyl Institute Comment

Exposure Duration for Child of Farmer

The exposure duration range for the Child of Farmer in the Monte Carlo Assessment appears to be inappropriately weighted and inadequately justified. Specifically, the exposure duration of a child is assumed to last up to 30 years, resulting in an unrealistic scenario (*i.e.,* a 30-year old child). If these are truly to be considered "child" scenarios, the probability distribution for exposure duration should be truncated by the duration of the time window of interest (1-5 years, 6-11 years, 12-18 years). Therefore cancer risk estimates for the 1-5 year old, 6-11 year old, and 12-18 year old child scenarios should be adjusted by a factor of 0.13 (4 years/30 years), 0.17 (5 years/30 years), and 0.20 (6 years/30 years), respectively. Alternatively, these scenarios should be labeled as child/adult to reflect the fact that the entire exposure duration is not spent as a child.

Agency Response:

The Agency already has adopted the commenter's alternative recommendation. The text of EPA's 1999 Risk Assessment Technical Background Document clearly states: "Consequently, the probabilistic risk estimates for the 'child' receptor actually correspond to an individual who initially is exposed to the contaminant source as a child in a given age cohort, but then whose exposure duration may or may not extend into

adulthood..." (p. 5-9 through 5-10, 1999 Risk Assessment Technical Background Document). By this we meant that, in the probabilistic analysis, although the child age cohort represents the age at initial exposure, the exposure can continue into adulthood.

4.32 Vinyl Institute Comment

Application of Monte Carlo Methods

The text states that exposure factors without 100th percentile values used an estimation method of multiplying the 95th or 99th percentile by 2. As indicated by some of the peer reviewers, this is an arbitrary application for estimating parameter ranges and may result in very unlikely, high-end parameter selection during the running of the Monte Carlo realizations.

Agency Response:

The Agency disagrees with the commenter's interpretation of the peer reviewers' comments. The peer reviewers' statements did not indicate that "this is an arbitrary application for estimating parameter ranges and may result in very unlikely, high-end parameter selection during the running of the Monte Carlo realizations."

EPA's Charge #9 to the Peer Reviewers stated: "EPA had to develop maximum and minimum intake rates for food items, soil intake rates for children, body weights, inhalation rates, and drinking water ingestion rates for the probability distribution functions (PDFs) used in the probabilistic risk assessment. These values are noted in Section 4 of the background document. Is EPA's rationale for developing each of the maximum and minimum values reasonable?"

The relevant portions of the peer reviewer responses to this charge are as follows:

> Travis: "The EPA rational [sic] for developing maximum and minimum values for intake rates seems reasonable"
> Aral: "The intake rates defined on pages 4-7 through 4-9 [peer review draft document] are reasonable."
> Eschenroeder: "Although I have always believed that some of the Exposure Factors Handbook values are on the high side (particularly for children's soil ingestion), the statement made above regarding comparative risk still holds. That is, if all agency generic risk assessments use standardized values, the results are valuable for setting priorities regardless of the absolute values of risk that may be produced by the calculation."

The Agency notes that the commenter provided no alternatives for us to consider in developing maximums and minimums for our intake distributions.

4.33 Vinyl Institute Comment

A hidden correlation lies in the manner in which the concentrations in the waste stream were sampled. Specifically, by randomly selecting one of the six samples for each iteration, the relationship between congener concentrations becomes fixed. For example, the highest (or near highest) concentrations for 2,3,4,5-PeCDF and 1,2,3,4,7,8-HxCDF were identified in sample GL-02. Therefore, the concentrations for these two congeners becomes perfectly correlated (i.e., the high concentration of one occurs only when the other is at its high concentration). This hidden correlation is contrary to USEPA's statements to the fact that there does not appear to be a consistent fingerprint for chemical congeners of a given waste stream.

Agency Response:

The Agency believes that the way that we sampled the dioxin concentration data in our probabilistic analysis is entirely consistent with our statement that chlorinated aliphatic wastewaters do not carry a distinct congener fingerprint. We do not believe that it would have been reasonable to create various combinations of congener concentrations by combining congener concentrations from each of the six samples into artificial sets of congener data. Such a methodology would have left us open to claims that we were making up sample data. In using the real distributions of congener data as they were reported for the industry samples, we ensured that we were not evaluating unrealistic combinations of congeners, but the actual dioxin congener "fingerprints" exhibited by the industry.

4.34 Vinyl Institute Comment

The correlation of body weight between child-age cohorts may not be a valid assumption. It is unlikely that body weight will remain within a specific percentile throughout for a long exposure duration. While it is likely that a general correlation exists, a less stringent correlation should be applied (*i.e.* <1.0), accounting for the period of great variability in children's weight as they grow from infancy to adulthood.

Agency Response:

EPA disagrees with the commenter. We realize that child body weights, expressed as a percentile of the distribution for the population, may both increase and decrease with age (that is, some children who at an early age weigh less with respect to other children of their age end up weighing more at a later age, and vice versa). However, given the lack of data to describe such variation (the commenter provides none), we maintain that it is more reasonable to assume that a child's body weight will fall into the same percentile as he/she ages than to assume it will vary randomly. We wish to point out that in our probabilistic analyses, child body weights were normalized to food ingestion rates, such that body weight was only varied directly when evaluating inhalation and ingestion of drinking water and soil, all of which are relatively minor routes of exposure in our analysis.

4.35 Vinyl Institute Comment

Adult Beef Ingestion

The adult farmer was assumed to ingest 0.3234 kg/day beef for the high end evaluations of the deterministic risk assessment. For the Monte Carlo analysis, beef intake was assumed to be lognormally distributed, with a mean of 2.5 g/kg-day (sd = 2.69). These values were obtained from the Exposure Factors Handbook (USEPA, 1997). These intake values correspond to a relatively small proportion of the surveyed population (<3%) who consume home produced beef (USEPA, 1997). The upper bound intake for the deterministic assessment corresponds roughly to the 90th percentile, and therefore appears reasonable. However, the mean intake for the Monte Carlo assessment appears to be elevated. Mean beef intakes for 20-69 year olds corresponds to a value of approximately 1.95 g/kg-day (USEPA, 1997). Therefore, we recommend that the Monte Carlo risk estimates for the adult farmer via beef ingestion be adjusted by a factor of 0.78 (1.95/2.5).

Agency Response:

We disagree that the beef intake rates for adult farmers used in the Monte Carlo risk analyses are too high. For the Monte Carlo analysis, beef intake data for farm populations were fit to a lognormal distribution, with a mean of 2.5 g WW/kg-day and a standard deviation of 2.69 (RTI, 1999).

When the Agency considered the Exposure Factors Handbook (EFH) data were considered adequate as in the case of beef ingestion data (where both percentile data and sample size were available), a maximum likelihood estimation technique was used to fit selected parametric models (gamma, lognormal, Weibull, and generalized gamma) to the EFH percentile data. We then used the chi-square measure of goodness of fit to choose the best distribution (in this case, lognormal), and derived parameter uncertainty information (e.g., for means, standard deviations) using the asymptotic normality of the maximum likelihood estimate. Because the EFH data are always positive and almost always skewed to the right (i.e., have a long right tail),[23] we selected three two-parameter probability models commonly used to characterize such data (gamma, lognormal, and Weibull) and a three parameter generalized gamma model. In short, we conducted a parametric analysis for the population estimated mean to produce the density function used in the Monte Carlo analysis. The EFH mean (i.e., the data mean) and the population estimated mean for beef consumption by farmers are 2.63 and 2.5 g/kg/day, respectively.

We disagree with the commenter's suggestion that the mean intake beef ingestion used in the Monte Carlo assessment is too high. We believe that it is more appropriate to use the home produced beef consumption data for "households who

[23]In preliminary goodness-of-fit tests, the normal distribution fit best in only 3 cases out of 69.

farm" to represent adult farmers in the chlorinated aliphatics risk assessment, because the EFH demonstrate that it is very reasonable to assume that home produced beef consumption is higher among farmers than among the general public. We consider the data on "households who farm" to be a more realistic source of information on beef consumption rates for farmers than data for the entire population of 20-69 year olds. Therefore, we believe the correct data from the EFH were used, and that no adjustment is necessary for the Monte Carlo risk estimates for the adult farmer.

4.36 Vinyl Institute Comment

Child Beef Ingestion

Time-weighted average beef ingestion factors for children between the ages of 1 and 19 were developed in the risk assessment. For the deterministic assessment, the child of a farmer was assumed to ingest up to 0.0059 kg/kg-d beef for the high end evaluation. For the Monte Carlo assessment, beef ingestion was assumed to be lognormally distributed, with a mean value of 3.88 g/kg-day (sd = 4.71). These values were obtained from the Exposure Factors Handbook (USEPA, 1997). Again, these intake values correspond to a relatively small proportion of the surveyed population (<5%) who consume home produced beef (USEPA, 1997). The upper bound intake for the deterministic assessment falls between the 75th and 90th percentile for 6-11 years olds, but exceeds the 100th percentile for 12-19 year olds. Therefore, this intake is likely to be appropriate for younger children, but overly conservative for teens. The mean intake for the Monte Carlo assessment appears to be elevated. Mean beef intakes for 6-19 year olds corresponds to a value of approximately 2.75 g/kg-day (USEPA, 1997). Therefore, we recommend that the Monte Carlo risk estimates for the adult farmer via beef ingestion be adjusted by a factor of 0.71 (2.75/3.88).

Agency Response:

We disagree that the beef intake rates for children of farmers used in the Monte Carlo risk analyses are too high. For the Monte Carlo analysis, the beef intake for 6-11 year olds was assumed to have a lognormal distribution, with a mean of 3.88 g WW/kg-day and a standard deviation of 4.71 (RTI, 1999); the data for this cohort were also used for 1-5 year olds because data for consumer intake of home produced beef for 1-2 and 3-5 year olds were not available. Beef intake for 12-19 year olds was assumed to have a gamma distribution, with a scale of 0.71 and shape of 2.47 (RTI, 1999); we calculated a population estimated mean of 1.77 g/kg/day.

When the Agency considered the EFH data adequate as in the case of child beef ingestion data (where both percentile data and sample size were available) a maximum likelihood estimation technique was used to fit selected parametric models (gamma, lognormal, Weibull, and generalized gamma) to the EFH percentile data. We then used the chi-square measure of goodness of fit to choose the best distribution (in this case, lognormal), and derived parameter uncertainty information (e.g., for means,

standard deviations) using the asymptotic normality of the maximum likelihood estimate. Because the EFH data are always positive and almost always skewed to the right (i.e., have a long right tail),[24] we selected three two-parameter probability models commonly used to characterize such data (gamma, lognormal, and Weibull) and a three parameter generalized gamma model. In short, we conducted a parametric analysis for the population estimated mean to produce the density function used in the Monte Carlo analysis. The EFH mean (i.e., the data mean) and the population estimated mean for beef consumption by the child of a farmer for 6-11 year olds are 3.77 and 3.88 g/kg/day, respectively. For 12-19 year olds the data mean and population estimated mean are 1.72 and 1.77 g/kg/day, respectively.

The upper bound intake for the deterministic assessment (5.88 g/kg/day) falls between the 99th and 100th percentiles for 1-2 year olds, between the 95th and 99th percentiles for 3-5 year olds, and between the 75th and 90th percentiles for 6-11 year olds, but exceeds the 100th percentile for 12-19 year olds (5.88 vs. 4.28 g/kg/day). This is because the 90th percentile for 6-11 year olds (11.4 g/kg/d) is 3- to 4-times higher than the 90th percentile for the other age groups (2.783-3.53), and the average was time-weighted. The upper bound intake for the deterministic assessment is protective for all child cohorts.

The commenter's suggestion that the Monte Carlo risk estimates for the child of a farmer be adjusted using a mean for beef intake rates for 6-19 year olds is not appropriate given the methods used in the Monte Carlo analysis. The commenter's calculation does not account for the fact that the Agency did not combine the 6-11 and 12-19 year old data in the Monte Carlo simulation; the risk estimates were based on independent sampling from each age cohort. The commenter possibly misunderstood what was actually done, and we cannot determine which age group the commenter was referring to. Assuming that the commenter was recommending an adjustment to the beef intake to avoid "overestimating" beef consumption rates for older ages, we believe that the Monte Carlo analysis accomplished the intent of the commenter (i.e., to avoid overestimating beef consumption for the12-19 year olds). Therefore, it is not necessary to adjust the Monte Carlo risk estimates for a child of the farmer.

4.37 Vinyl Institute Comment

Adult Dairy Consumption

The adult farmer was assumed to ingest up to 2.1 kg/day dairy products for the high end evaluations of the deterministic assessment. For the Monte Carlo assessment, dairy intake was represented by a Weibull distribution with a location equal to 0, a scale equal to 17.45, and a shape of 1.25 g/kg-day. These values were obtained from the Exposure Factors Handbook (USEPA, 1997). The deterministic

[24]In preliminary goodness-of-fit tests, the normal distribution fit best in only 3 cases out of 69.

intake also corresponds to a very small percentage (<1%) of the surveyed population. This value exceeds the 90th percentile of dairy intake for 20-39 year olds (15.4 g/kg-day or 1.08 kg/day assuming a 70 kg body weight) (USEPA, 1997). Similarly, a large fraction of the Weibull distribution exceeds this value. Intake of dairy products in older age groups, while not presented, is likely to be lower based on trends noted for dairy consumption in the general population (*i.e.*, not home produced). For this reason, we recommend that all cancer risk estimates calculated for the adult farmer via dairy ingestion be adjusted by at least a factor of 0.51 (1.08/2.1).

Agency Response:

We disagree that the intake rate of dairy products (defined as milk in this analysis) for adult farmers used in the Monte Carlo risk analyses is too high. For the Monte Carlo analysis, the dairy intake (i.e., milk ingestion) was represented by a Weibull distribution with a location equal to 0, a scale equal to 17.45, and a shape of 1.25 g WW/kg-day (RTI, 1999). The data mean and the population estimated mean for dairy consumption by adult farmers are 17.1 and 16.3 g/kg/day, respectively. RTI represented the dairy intake for adult farmers using the data for 20-39 year olds (U.S. EPA, 1997) fitted to a Weibull distribution.

When the Agency considered the EFH data adequate, as in the case of milk intake, we applied maximum likelihood estimation techniques to fit selected parametric models (gamma, lognormal, Weibull, and generalized gamma) to the EFH percentile data. We then used the chi-square measure of goodness of fit to choose the best distribution (in this case, lognormal), and derived parameter uncertainty information (e.g., for averages, standard deviations) using the asymptotic normality of the maximum likelihood estimate. Because the EFH data are always positive and almost always skewed to the right (i.e., have a long right tail),[25] we selected three two-parameter probability models commonly used to characterize such data (gamma, lognormal, and Weibull). The two-parameter models were selected for use in the analysis because a three-parameter generalized gamma model did not significantly improve the goodness of fit over the two-parameter models in 58 of 59 cases at the 5 percent level of significance. In short, we conducted a parametric analysis for the population estimated mean to produce the density function required for the Monte Carlo assessment.

The commenter noted that the intake of dairy products in older age groups may be lower based on trends noted for dairy consumption in the general population (i.e., not home produced). The commenter also noted that a large fraction of the Weibull distribution exceeds the 90th percentile for dairy intake for 20-39 year olds of 15.4 g/kg-day (1.08 kg/day assuming a 70 kg body weight) (U.S. EPA, 1997). The commenter recommended that the cancer risk estimates calculated for the adult farmer via dairy ingestion be adjusted by a factor of 0.51 (1.08/2.1, the ratio of the 90th percentile intake rate for the general population to the high end intake rate for adult

[25]In preliminary goodness-of-fit tests, the normal distribution fit best in only 3 cases out of 69.

farmers in the deterministic analysis). We disagree with the commenter's suggestion, and believe that it is more appropriate to use the home produced milk consumption data for the "households who farm" to represent adult farmers in the chlorinated aliphatics risk assessment. We consider the data on "households who farm" to be a more realistic source of information on milk consumption rates for farmers than data for the general population. Indeed, the survey data presented in the EFH demonstrate that it is very reasonable to assume that home produced milk consumption is higher among farmers than among the general public. Therefore, we believe the correct data from the EFH were used, and that no adjustment is necessary for the Monte Carlo risk estimates for the adult farmer. With respect to the commenter's concern that a "large" fraction of the Weibull distribution that exceeds 90th percentile intake rate, it is not clear as to which age cohort the commenter was referring. The 90th percentile intake rate of 15.4 g/kg-day is below the 90th percentile intake rate for all age cohorts with the exception of the 12-19 year olds (15.4 versus 12.75, respectively). Although the 90th percentile milk consumption rate (34.9 g/kg-day) for the adult farmer is substantially above the commenter's recommended value, the goodness of fit test applied to these data indicates that the Weibull distribution is, indeed, appropriate for this parameter.

4.38 Vinyl Institute Comment

Child Dairy Consumption

Time-weighted average dairy ingestion factors for children between the ages of 1 and 19 were developed in the risk assessment. The child of a farmer was assumed to ingest up to 0.024 kg/kg-d dairy products for the high end evaluation of the deterministic assessment. For the Monte Carlo assessment, intake was represented by three Weibull distributions (location, scale, shape) for ages 1-5 years (0, 26.47, 1.7), 6-11 years (0, 14.82, 1.56), and 12-18 years (0, 6.52, 1.14). This value was obtained from the Exposure Factors Handbook (USEPA, 1997), and falls between the 50th and 75th percentile for 1-5 years, the 75th and 90th for 6-11 years, and the 99th and 100th percentile for 12-19 years for the general population (i.e., not strictly home producers). As such, the deterministic intake value is appropriate for younger children (1-11 years of age), but is overly conservative for teens.

Agency Response:

EPA wishes to clarify that the deterministic high end dairy ingestion rate, 0.024 kg/kg-d, was not actually used to compute the dioxin high end deterministic risk estimate for chlorinated aliphatic wastewaters or EDC/VCM sludges managed in a land treatment unit. The high end value cited by the commenter was evaluated in the deterministic sensitivity analysis, but was not determined to be one of the two most sensitive parameters, thus was not set at its high end value in calculating the two-high end deterministic risk estimates for dioxins (the central tendency dairy ingestion rate was used; see Section 5 and Appendix H of the 1999 Risk Assessment TBD). Consequently, the commenter's concern that this value is too high is not relevant to the risk assessment results. The commenter did not take issue with the central tendency

child dairy ingestion rate or the rates evaluated in the probabilistic (Monte Carlo) analysis.

4.39 Vinyl Institute Comment

Fraction Beef Ingested

The percentage of beef from a contaminated source was assumed to be 48.5% in the risk assessment. While we have not yet been able to confirm an alternate value, it is our opinion that this percentage overstates the upper end homegrown beef consumption markedly. The value for this term applies only to a relatively small fraction of the surveyed population who farm, and as such is overly conservative by a factor of 12.7 (0.485/0.038) if applied to the general population (USEPA, 1997). The decision regarding which population should be assessed in the risk assessment (highly exposed vs. general population) impacts the decision as to what is an appropriate high end risk descriptor (see Selecting a High End Risk Descriptor comment below).

Fraction Dairy Ingested

The percentage of dairy products from a contaminated source was assumed to be 25.4% in the risk assessment. It is important to note that the value for this term applies only to a relatively small fraction of the surveyed population who farm, and as such is overly conservative by a factor of 21.2 (0.254/0.012) if applied to the general population (USEPA, 1997). While we have not yet been able to confirm an alternate value, it is our opinion that this percentage overstates the upper end homegrown dairy consumption markedly. Again, the decision regarding which population should be assessed in the risk assessment (highly exposed vs. general population) impacts the decision as to what is an appropriate high end risk descriptor (see Selecting a High End Risk Descriptor comment below).

Agency Response:

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). 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.

4.40 Vinyl Institute Comment

Loss from Cooking and Meat Preparation

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 chemical due to food preparation, cooking, and consumption practices. The Exposure Factors Handbook (USEPA, 1997) recommends that this important factor 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, because of the propensity that dioxin-like compounds have for fat, the cancer risk estimates associated with the beef ingestion pathway should be adjusted by a factor of 0.55 (0.73x0.76). Loss of residues from grilling or broiling of fish has been shown to reduce contaminant load by 50% or more and this "cooking reduction" value has been employed in deriving fish consumption advisories for PCBs.

Agency Response:

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 Exposure Factors Handbook (USEPA, 1997; "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 estimates for the farmer receptors. This factor has been included in the revised risk estimates presented for the adult farmer in the preamble to the final rule.

Reference:

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.

Chemicals that contribute significantly to the total cancer risk estimates include two dioxin-like chlorinated furans (2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF), and to a lesser extent chloroform. Only comments associated with the toxicity values for these chemicals are summarized below.

4.41 Vinyl Institute Comment

Toxicity Equivalency Factors (TEFs)

A hidden area of conservatism in USEPA's risk assessment lies 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, do not reflect central tendency values, but are instead upper bound values. Using the World Health Organization's database of Relative Potency (REP) estimates for these two congeners, it was 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. The geometric mean from these 59 studies corresponds to a value of 0.19. Similarly, 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. The geometric mean from these 10 studies corresponds to a value of 0.041. Therefore reliance on these upper-bound TEF values combined with an upper-bound cancer slope factor for TCDD results in cancer risk estimates that are overly conservative by a factor of approximately 2.5. Since Monte Carlo methods are used for other aspects of the risk assessment, a similar treatment of the TEF values would not be difficult to perform and would serve to eliminate this hidden conservatism. Alternatively, we recommend that the cancer risk estimates for these two congeners via all pathways be adjusted by a factor of 0.4 (0.19/0.5 or 0.041/0.1).

Agency Response:

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 judgement 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 judgement 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 statisical 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 downplays the importance of the more relevant studies and provides greater weight to acute and *in vitro* studies.

4.42 Vinyl Institute Comment

Cancer Slope Factor for TCDD

The risk assessment relies heavily upon a cancer slope factor of 156,000 (mg/kg-day)-1, as reported by USEPA (HEAST, 1997).

The existing slope factor for TCDD does not take into account mechanistic information that would suggest there is a threshold for TCDD carcinogenesis. 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) 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.*" Based on this consideration, the cancer risk posed by all of the dioxin-like dioxin and furans, may well be zero for all pathways considered in the risk assessment.

The existing cancer slope factor for TCDD is based on human equivalent doses calculated by scaling doses to body weight raised to the 2/3 power. This practice is obsolete, and does not reflect changes in USEPA policy for scaling doses to body weight raised to the 3/4 power (USEPA, 1992). The existing slope factor can readily be converted to the correct body weight scaling practice using the formula below:

$$\textit{Adjusted Slope Factor} = [\textit{Existing Slope Factor}]*[\textit{Unscaling Factor}]*[\textit{Rescaling Factor}]$$

Where,

$\textit{Existing Slope Factor} = 156{,}000\ (\text{mg/kg-day})^{-1}$

$\textit{Unscaling Factor} = (BW_{rat}/BW_{human})^{1/3} = (0.3\ \text{kg}/70\ \text{kg})^{1/3} = 0.16$

$\textit{Rescaling Factor} = (BW_{human}/BW_{rat})^{1/4} = (70\ \text{kg}/0.25\ \text{kg})^{1/4} = 4.09$

$\textit{Adjusted Slope Factor} = 98{,}000\ (\text{mg/kg-day})^{-1}$

Based on these calculations, the existing cancer slope factor serves to overestimate cancer risk from dioxin-like compounds by at least 35% even if a conservative, linear dose-response is assumed. As such, we recommend that all cancer risk estimates for dioxin-like compounds be adjusted by at least a factor of 0.65.

The USEPA has derived a cancer slope factor value of 6,200 (mg/kg-day)-1 for hexachlorodibenzo-p-dioxin mixtures. Curiously, this value was not used in USEPA's risk assessment for any of the hexachlorinated dioxins/furans. Instead USEPA has opted to use the cancer slope factor of 156,000 $(mg/kg\text{-}day)^{-1}$ and a TEF value of 0.1 (used for all 2,3,7,8-hexachlorinated dioxins and furans), yielding an effective cancer slope factor of 15,600 $(mg/kg\text{-}day)^{-1}$. This practice serves to overestimates cancer by a factor of approximately 2.5. The risk assessment for hexachlorinated dioxins/furans would be greatly improved if they were based on the value of 6,200 $(mg/kg\text{-}day)^{-1}$ for the following reasons:

This cancer slope factor is verified on USEPA's IRIS database, whereas the value for TCDD is not.

This cancer slope factor is based on exposure to a mixture of congeners, whereas the value for TCDD is based on exposure to a single congener.

It 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. In so doing, the inherent uncertainties associated with the application of the TEF approach would be eliminated.

For these reasons, we recommend that all cancer risk estimates calculated for hexachlorinated dioxins/furans 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 also based on scaling doses using body weight raised to the 2/3 power, the same adjustment factor of 0.65 (assuming a body weight of 0.3 kg for a rat, and 70 kg for a human) is applicable here. Therefore, the net adjustment factor for cancer risks attributed to exposure to hexachlorinated dioxins/furans is most appropriately 0.26 (0.40x0.65).

Agency Response:

TCDD Slope Factor

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, and is comparable to the TCDD slope factor published in the Health Effects Assessment Summary Tables (HEAST; USEPA, 1997), 150,000 $(mg/kg\text{-}day)^{-1}$*. 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 (see the preamble to the final rule), 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 (see the preamble to the final rule). 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.

* Note: 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 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, 1999). 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).

HxCDD Slope Factor

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 for chlorinated aliphatic wastewaters provided in the Risk Assessment Technical Background Document for the proposed rule (USEPA, 1999) 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.

References:

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

USEPA. 1997. Health Effects Assessment Summary Tables: Annual Update (HEAST). Office of Emergency and Remedial Response. Washington, D.C. July.
U.S. EPA. 1999. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Office of Solid Waste. July.

4.43 Vinyl Institute Comment

4.0 Risk Characterization

Background of Dioxins in Beef and Dairy

A number of studies have been conducted on the levels of dioxins found in foodstuffs available commercially to the general public that are instructive in considering the significance of the risk assessment being reviewed. While these studies are limited in terms of the number of data points, location and date, they are nonetheless useful for placing the draft report's findings in perspective.

The most recent of these (Schecter *et al.*, 1994) examined supermarket products (n = 18) from New York State and reported total dioxin concentrations in meat and dairy products ranging from 0.6 to 59.3 ppt and 0.6 to 14 ppt, respectively. The TEQ for these foods were 0.03 to 1.5 ppt for meat and 0.04 to 0.7 ppt for dairy. Specifically, ground beef, beef rib sirloin tip and beef rib steak were found to contain 4.1, 0.6, and 30.7 ppt of dioxins, respectively (The TEQs for combined dioxins and furans in these samples were 1.5, 0.04, and 0.3 ppt respectively). Cottage cheese, blue cheese, heavy cream, cream cheese and cheese slices were found to contain 0.6, 14.0, 5.0, 4.0, and 4.0 ppt of dioxins, respectively (The TEQs for combined dioxins and furans in these samples were 0.04, 0.7, 0.4, 0.3, and 0.3 ppt respectively). The risks associated with consumption of these foods are close to those that are identified as being of concern in this risk assessment.

A similar study in Germany in the late 1980s (Beck *et al.*, 1989) reported the combined TEQs for dioxins and furans as 0.86 (milk), 0.43 (butter), and 1.31 (beef) ppt. LeFleur *et al.* (1990) reported levels of 2,3,7,8-TCDD in various food products from Midwestern groceries and found 17 to 62 pg/kg in ground beef, 12 to 37 pg/kg in beef hot dogs, 7.2 to 9.4 pg/kg in canned corned beef hash, 24 to 25 pg/kg in whole milk, and 13 to 14 pg/kg for half-and-half. Milk obtained directly from dairies was found to contain 0.48 pg/g of 2,3,7,8-TCDD and levels increased as storage time in paperboard cartons increased (to a maximum of 2.7 pg/g after 288 hours). In contrast, a study by Schecter *et al.*, (1989) found no detectable amounts of 2,3,7,8-TCDD in milk samples collected, although the higher chlorinated congeners were present. Whole and lowfat (2%) cow's milk contained 3.6 and 3.3 ppt of HxCDD, respectively. HpCDD and OCDD were reported as 6.5 and 15 ppt in cow's milk and 8 and 21 ppt in lowfat (2%) milk, respectively. Given that these findings from what might be considered "pooled samples" from grocery stores have similar levels to that predicted to occur in the food stuffs of subsistence farmers from the impact of releases from the waste streams under review, it seems questionable that any significant risk is present. This is particularly true since the risk assessment relies on a variety of models and model inputs that are likely to over-predict the impact of releases from the

waste stream to the environment as identified by both USEPA's peer reviewers and our review. In the same vein, a number of exposure assumptions appear that seem too high and are unjustified in the text. For instance, dairy farmers typically do not raise beef cattle and vice versa. To assume that the same farm furnishes subsistence levels of both food groups appears overly conservative and inappropriate. Similarly, the levels of consumption selected for various foods and percent contribution to the diet appears too high and is often unsupported in the text. This issue was raised by the peer reviewers as well. This leads to suspicions that the risk may be significantly over-stated for some pathways.

Agency Response:

The Agency is very concerned about current background levels of dioxins and is taking significant steps to reduce those levels. In response to comments submitted by EDF, EPA compared exposure to dioxins attributable to chlorinated aliphatics wastes to background exposures using a margin of incremental exposure (MOIE) approach. The Agency's response to this comment in terms of our evaluation of wastewaters is provided in Section 1.11 of this document (responses to EDF, CALP 00008), and the complete evaluation conducted by EPA is provided in the 2000 Addendum to the Risk Assessment TBD.

EPA's MOIE analysis for the land treatment unit showed that the adult farmer's high end incremental exposure to dioxins resulting from EDC/VCM wastewater treatment sludges managed in a land treatment unit is approximately 68 percent of background exposure, and for nursing infants, is approximately 74 percent of background exposure, which the Agency believes is significant. This analysis is presented in EPA's Addendum to the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination (USEPA, 2000).

EPA responded to the commenter's concerns regarding the levels of consumption selected for various foods and percent contribution to the diet previously in this section (see our responses in Sections 4.6 and 4.35-4.39). In response to the commenter's final issue, that dairy farmers typically do not raise beef cattle and vice versa, EPA disagrees. EPA believes that it is plausible that a farmer might obtain both beef and dairy products from homegrown cattle.

4.44 Vinyl Institute Comment

Calculations

Attempts to reproduce some of the cancer risk estimates for the deterministic assessment have been unsuccessful. The majority of the cancer risk associated with indirect exposure to wastestream K173 is attributable to two pathways (ingestion of beef and dairy), and two chemicals (2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCDF). The highest deterministic risk estimate calculated for the adult farmer corresponded to a value of 2E-05. According to the equation presented in Table E-5.8, cancer risk was calculated using the following equation,

$$Cancer\ Risk = \frac{I \times ED \times EF \times CSF}{BW \times AT \times CF}$$

Where,

I Intake (mg/day): corresponding to high end deterministic evaluation of the adult farmer from 2,3,4,7,8-PeCDF (6.1E-09 and 5.9E-09 mg/day) and 1,2,3,4,7,8-HxCDF (9.6E-09 and 8.53E-09 mg/day) for the beef and dairy ingestion pathways, respectively, assuming upper bound concentration estimates and intake assumptions (presented in Tables H.1-1a and K-1 of the risk assessment).

ED Exposure Duration (yrs): 48.3

EF Exposure Frequency (days/yr): 350

CSF Cancer Slope Factor (mg/kg-day)-1: 78,000 (156,000 x 0.5) for 2,3,4,7,8-PeCDF, and 15,600 (156,000 x 0.1) for 1,2,3,4,7,8-HxCDF.

BW Body weight (kg): 70

AT Averaging Time (yrs): 70

CF Conversion Factor (days/yr): 365

When the calculations are performed, the cancer risk estimate obtained when exposure concentration, beef and dairy intake, and exposure duration are held at their high end values is 1E-05, or approximately one half of the value of 2E-05 reported in the risk assessment for these congeners and pathways (Table H.1.3c). Adding to our concern is the fact that the exposure point concentrations for chemicals in beef and dairy do not agree for the Farmer and Child of Farmer scenarios. A reason for the discrepancy is not obvious, but speaks to the lack of transparency and reproducibility of the risk assessment. Therefore, we recommend that the risk estimates for both the deterministic and Monte Carlo assessments should be re-evaluated carefully.

Agency Response:

The commenter's calculations are incorrect because the commenter: (1) adjusted the dioxin CSF by the congener-specific TEFs and (2) used the high end ingestion rates for beef and dairy to calculate risk. Table H.1-1.a clearly states that all EPCs are given in TEQs and, therefore, it is inappropriate to adjust the CSF by the TEFs a second time (this results in an underestimate of risk). This error was mitigated by the fact that the commenter chose to use the high-end ingestion rates for beef and dairy even though the table specifies that only waste concentration and exposure duration were set at high end values. Using the EPCs presented in Table H.1-1a, and the input parameters that are specified in the TBD, one can exactly reproduce the results of the table, indicating that the calculations are correct. The commenter is correct in asserting that the beef and dairy pathways for these two congeners drive the risk estimates. However, the contribution from other congeners to the beef and dairy pathway alone increases the risk estimate from 1.4E-05 to 1.7E-05, more than a 15% increase in risk.

With regard to the commenter's other concern that the EPCs for the farmer and child of farmer scenarios do not agree, this is because the two-high end parameter combination for the farmer is waste concentration and exposure duration whereas the two-high end parameter combination for the child is waste concentration and waste quantity. Because a different high end combination was used, we would not expect that the EPCs would be identical.

4.45 Vinyl Institute Comment

Role of the Deterministic and Monte Carlo Evaluations

Ideally, the deterministic and Monte Carlo risk assessments should be completed in a tiered approach, with the deterministic assessment conducted first, followed by the completion of the Monte Carlo assessment (if required). In this way, the deterministic assessment can be used to help guide the Monte Carlo assessment as to which pathways, chemicals, and assumptions require the most attention. Indeed, one of USEPA's guiding principles for Monte Carlo Analysis is to "*restrict the use of probabilistic assessment to significant pathways and parameters.*" Unfortunately, the deterministic and Monte Carlo evaluations do not appear to have been conducted sequentially. Rather, the two evaluations appear to have been conducted independent of one another. Evidence supporting this observation arises from the fact that the units for many of the intake assumptions are different for the two assessments (*i.e.*, kg/day vs g/kg-day). Also, while the deterministic assessment clearly identifies the dairy and beef ingestion pathways as very important to risk, many of the parameters for this pathway do not appear to have been included in the Monte Carlo assessment (*i.e.*, fraction of contaminated forage is fixed at 1.0, intake rates for beef and dairy cattle are fixed at constant values). On the other hand, non-driving pathways (ingestion of fruits and vegetables) are afforded full Monte Carlo treatment.

The independent nature of the deterministic and Monte Carlo assessments may be responsible for another troubling observation. It has been our experience that when Monte Carlo methods are applied to a deterministic risk assessment that has been based on several upper-bound assumptions (*i.e.*, compounded conservatism), the deterministic risk estimate will fall well above the 90^{th} or 95^{th} percentile of the resulting risk distribution. However, in the case of the adult farmer scenario, the application of Monte Carlo methods has resulted in a large tail of risk estimates (90^{th} percentile = 5E-05) that were even higher than those obtained from high end deterministic evaluation (2E-05). There are three possible explanations for this observation: (1) upper bound estimates for parameters in the deterministic were inappropriately identified, resulting in an under estimate of risk; (2) the distributions identified for parameters in the Monte Carlo assessment were inappropriately identified, resulting in an overestimate of risk; and/or (3) a calculation error has occurred in one or both of the assessments. However, we recommend that the assumptions and calculations of the risk assessment be checked thoroughly.

Agency Response:

EPA did, in fact, conduct the deterministic risk assessment prior to conducting the probabilistic (Monte Carlo) analysis. As we stated in our 1999 Risk Assessment

TBD and in the preamble to the proposed rule (64 FR 46476 at 46483), we conducted probabilistic risk analyses for those combinations of receptor, contaminant, and pathway for which risk or hazard estimated using a deterministic analysis exceeded the following criteria: a cancer risk of 1E-06 or a hazard quotient of 1. Obviously, we could not have implemented this approach if we had not performed the deterministic analyses first. We made a decision to use food intake rates normalized to body weights in our probabilistic risk assessment because, as explained in the Risk Assessment Technical Background Document (USEPA, 1997), it minimized issues associated with correlating food intake rates with body weights and allowed us to use intake rate data directly as reported in the Exposure Factors Handbook (USEPA, 1997). Our reasons for setting the fraction of contaminated forage at 1.0 are provided in Section 4.29 of this Response to Comments document (responses to the Vinyl Institute, CALP-00004). The commenter is correct that we probably could have eliminated ingestion of fruits and vegetables from the probabilistic analysis of the farmer receptor, however we included these exposures for the sake of completeness for the ingestion exposure route (we did not conduct probabilistic analysis of the clearly non-significant dioxin inhalation exposures [7E-08 for tanks, USEPA 1999]).

In making risk management decisions for chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges, EPA relied primarily on the results of the deterministic risk analyses. As explained in the preamble to the proposed rule (64 FR 46476 at 46483) EPA used the probabilistic analyses primarily to support (confirm) the deterministic results, and to allow EPA to quantify individual risk at selected percentiles of the risk distribution. The probabilistic results provided a sense of where the deterministic risk results fell on the risk distribution. In Section 2 of our Addendum to the Risk Assessment TBD (USEPA, 2000) we provide a possible explanation for why our probabilistic results may be somewhat overestimated, namely that we did not have a good basis for developing a distribution of distances to the nearest farm.

References:

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.

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

USEPA. 2000. *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, Addendum*. Office of Solid Waste. September 30.

4.46 Vinyl Institute Comment

Selecting a High End Risk Descriptor

Reliance upon a 95th, 97.5th, or 100th percentile as an upper bound is problematic, particularly given the uncertainties associated with characterizing the tail end of the distributions for the underlying assumptions. In identifying a high-end descriptor for risk, USEPA's *Guidance for Risk Characterization* (USEPA, 1995) recommends that emphasis should be placed on using the 90th percentile of the risk distribution, except in instances when a large number of individuals may be included in the high end (in which case a 95th percentile could be used). Because USEPA has identified a relatively small population (farmers living within a few hundred meters of a holding tank, who consume beef and dairy from home grown sources), the 90th percentile should be adopted as the high end descriptor for this population (in essence, providing an assessment of the high end of a high end consumer group). As such, we strongly recommend that reference to the 95th, 97.5th, or 100th percentiles be removed from the text and tables. As an alternative, we recommend that the resulting risk distributions be presented graphically (using either a frequency or cumulative probability plot) with the 50th and 90th percentiles and deterministic results being indicated by arrows.

Agency Response:

In making risk management decisions for chlorinated aliphatics wastewaters, EDC/VCM sludges, and methyl chloride sludges, EPA relied primarily on the results of the deterministic risk analyses. As explained in the preamble to the proposed rule (64 FR 46476 at 46483) EPA used the probabilistic analyses primarily to support (confirm) the deterministic results, and to allow EPA to quantify individual risk at selected percentiles of the risk distribution. The probabilistic results provided a sense of where the deterministic risk results fell on the risk distribution (thus our presentation of various increments of the probabilistic distribution between the 90th and 100th percentiles, since this is the range that the Agency defines as high end [USEPA, 1995]). As presented in the preamble to the proposed rule and the 1999 Risk Assessment Technical Background Document (USEPA 1999), the high end deterministic risk estimate for the adult farmer under the chlorinated aliphatic wastewater tank scenario fell between the 80th and 90th percentile of the probabilistic distribution; however, we believe these percentiles were somewhat low for the reasons discussed in USEPA (2000). The high end deterministic dioxin risks for the EDC/VCM sludges managed in a land treatment unit fell at approximately the 95th percentile of the probabilistic distribution. Therefore, we consider these results consistent with EPA's Guidance For Risk Characterization (USEPA, 1995) which 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." As explained previously, we have reduced our deterministic risk estimates for chlorinated aliphatics wastewaters and EDC/VCM sludges managed in a land treatment unit based on data and information provided by commenters. We also would expect our probabilistic risk estimates to drop in magnitude accordingly. In light of this information, we believe the commenter's concerns regarding our selection of a high end descriptor is unwarranted.

USEPA. 1995. Guidance for Risk Characterization. U.S. Environmental Protection Agency Science Policy Council. February.

USEPA. 1999. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Office of Solid Waste. July.

USEPA. 2000. *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, Addendum*. Office of Solid Waste. September 30.

4.47 Vinyl Institute Comment

Impact of Adjustment Factors on Total Risk

To illustrate the conservative nature of USEPA's risk assessment based on only a few assumptions we were able to quantify, adjusted deterministic risk estimates for the adult farmer scenario are calculated below.

Table 1. Impact of Adjustment Factors on Total Risk

Chemical	Pathway	High End Deterministic Risk Estimate for Adult Farmer*	Adjustment Factors for Exposure Assessment	Adjustment Factors for Toxicity Assessment	Adjusted Deterministic Risk Estimate
2,3,4,7,8-PeCDF	Beef	2.6E-06	0.5 (loss of chemical before slaughter) 0.55 (loss from cooking)	0.4 (conservative TEF value) 0.65 (BW scaling to 3/4 power)	1.9E-07
	Dairy	3.0E-06	0.51 (overly conservative intake rate)	0.4 (conservative TEF value) 0.65 (BW scaling to 3/4 power)	4.0E-07
1,2,3,4,7,8-HxCDF	Beef	4.1E-06	0.5 (loss of chemical before slaughter) 0.55 (loss from cooking)	0.65 (BW scaling to 3/4 power) 0.4 (use of HxCDD CSF)	2.9E-07
	Dairy	4.6E-06	0.51 (overly conservative intake rate)	0.65 (BW scaling to 3/4 power) 0.4 (use of HxCDD CSF)	6.1E-07
Other Dioxin-Like Congeners	Beef	1.2E-06	0.55 (loss from cooking)	0.65 (BW scaling to 3/4 power)	4.3E-07
	Dairy	1.4E-06	0.51 (overly conservative intake rate)	0.65 (BW scaling to 3/4 power)	4.6E-07
Total		**2E-05**			**2E-06**

*Although the contribution of each congener/pathway was not provided in the risk assessment, it can be estimated from the total risk estimates for each pathway and the relative contribution of each congener to the TEQ in each exposure media

Therefore, the conservative practices used in USEPA's deterministic assessment for the adult farmer scenario have produced risk estimates that are overly conservative by a factor of approximately 10. We anticipate that similar results would be obtained for other exposure scenarios (child of farmer), as well as for the Monte Carlo evaluations.

Agency Response:

In response to comments, we decided that some revisions in the modeling assumptions were appropriate. We agreed with the Vinyl Institute and other commenters who pointed out that our modeling assumptions should have accounted for cooking and post-cooking losses of beef (and therefore dioxin available for consumption). In addition, we were convinced by the Vinyl Institute and other commenters that our modeling assumptions should have accounted for the removal of wastewater solids prior to wastewaters entering aerated biological treatment tanks. Finally, we re-examined our analysis and the assumptions used in the risk assessment for the proposal, and we adjusted our original assumptions with regard to area of the pasture on which the cattle graze.

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 determined that available information provides sufficient basis to determine that chlorinated aliphatic wastewaters should not be listed as hazardous waste.

4.48 Vinyl Institute Comment

Transparency of the Risk Assessment

A major difficulty with this risk assessment is the lack of transparency. It is a goal, if not a mandate, that all USEPA risk assessments be transparent (USEPA, 1995). That is to say, the assumptions and techniques used be easily understood and reproducible by outside reviewers. This is unfortunately not achieved by this draft document as the sources and derivations of a number of assumptions are unknown or unclear. Similar issues arise when different values are used in the same model under different scenarios. While such differences may have legitimate explanations or justifications, they often remain undiscussed or unjustified possibly leading to the conclusion that USEPA is "shopping" for the values that lead to the results needed. Justification of these values and consistency in their application are particularly important in an assessment that relies heavily on models and assumptions to derive their conclusions as this one does. Aside from the initial (and small) sample that furnishes the environmental concentration term, most of the risk assessment is assumption and model-based. In fact the critical drivers in the risks that exceed the listing criteria for the adult farmer are the contaminant concentration and exposure duration. The concentration term is dependant, in turn, on the number of (positive) samples and levels detected followed by the modeling. In this case, a high amount of uncertainty is associated with all these parameters, especially due to the paucity of environmental data and the

modeling choices made. Similar problems exist for selection of exposure duration. In the case of the child farmer receptor, the amount of beef consumed is a critical assumption. Because of the lack of data, consumption rates of older children were apparently used to estimate the beef intake of small children. This may significantly over-estimate the beef intake at an age in which an estimated dose may disproportionately influence the lifetime risk estimates and so requires more than special attention. These areas of uncertainty create decision points that are often prone to abuse unless special care is taken to avoid bias and inconsistency (or to make clear what the uncertainties are and how they may influence the outcome of an assessment).

The peer reviewers also mentioned that the reliance on various assumptions seem unrealistic and unjustified particularly in the exposure assessment. In the case of the fisherman scenario, the assumption that all fish in a subsistence diet are derived from the same small source (within 100 meters of the putative source) is viewed as unrealistic. Likewise, the farmer scenario asserts that the same farm provides a significant percentage of fruits, vegetables, animal feed, beef, dairy, pasture, and so forth. Both the peer reviewers and our review suggest that the size and productivity of a typical farm is insufficient to meet the exposure requirements of this scenario. The risk assessment may be "double dipping" in a number of exposure assumptions in effect by using maximum values in a number of exposure routes that cannot logically exist side by side. Although certainly conservative, this approach can easily result in the compounding conservatism problem that has plagued many risk assessments in the past.

Careful consideration of background exposures would also seem to preclude any concern from the pathways dominated by diet (see discussion above), but little consideration is given to this fact by the authors or peer- reviewers. This again is in contrast to the risk assessment policy espoused by the USEPA in numerous guidance documents. Although a qualitative sensitivity analysis was performed, it is unclear how well done it was or whether the outcome was used to revise the document or inform the risk managers of the uncertainties and their impacts on the outcome of the risk assessment. A presentation of the uncertainty quantitatively would improve our understanding of the weight of various assumptions and approaches. An overestimation error was admitted to in terms of the groundwater modeling; however, it had little effect on the outcome and was only corrected in the cases where the overall risk estimate exceeded the listing criteria. Given the high reliance on assumptions, modeled data and outcome, the critical drivers and assumptions in each scenario in which risk was above the listing criteria, ought to have been identified, discussed, and their impact and certainty made clear in the text. For instance, the text mentions that inputs that are clearly correlated in reality (i.e., body weight and intake rates) are not necessarily related in the risk assessment. The implications of this failing are not further discussed or explored in terms of their potential contribution to the outcome. Nor is the justification for a 30-year exposure duration for a "child" in the probabilistic risk assessment satisfactorily defended. The risk characterization discussion is unsatisfying in this regard and leads one to the conclusion that all input and output conform to the best available science or professional judgement, which they clearly do not based on our review and some of the peer reviewers comments.

The purpose of a risk assessment is to thoroughly examine all potential risks posed by a technology or industry in order to understand both what is known and unknown. It also serves as a guide in the

endeavor to quantify or reduce uncertainty associated with the evaluation. This document succeeds on the first count, but fails on the second. Overall, we support the comment of one of the peer reviewers that the document would be well served by some careful editing or the addition of a well considered executive summary. Additional and clear discussion and justification of the assumptions made in those exposure scenarios and routes that resulted in risks above the listing criteria should be the focus of the revised text, leaving the scenarios and routes that did not exceed the criteria to an expanded appendix. Moreover, the meaning and degree of uncertainty associated with the identified exposure scenarios and routes needs much better and more thorough evaluation of the inputs, modeling effort, and the assumptions used.

Agency Response:

The Agency disagrees with the commenter. The large of amount of detailed information that comprises the chlorinated aliphatics risk assessment was difficult to present. However, EPA made every effort to present the information in a clear, concise manner, including providing detailed Appendices documenting the equations that we used in our indirect pathway analyses (the analyses most important to this risk assessment); documenting the contaminant fate and transport parameters and health benchmarks used in our analyses; and documenting the waste management unit, environmental, and receptor input parameters to our deterministic and probabilistic analyses. EPA also presented a qualitative uncertainty analysis, including an assessment of the impact that the various sources of uncertainty had on the overall results of the analysis. The commenter mentions "values" that EPA used that were not discussed or justified, but does not indicate which specific values they question. Concerns about specific aspects of our analyses (for example, the amount of beef consumed by the child of the farmer, the productivity of the farm, background exposures) are raised by the commenter in prior comments, and were addressed previously in this section of the response to comment document. The Addendum to our Risk Assessment Technical Background Document (USEPA, 2000) provides additional clarification of our risk assessment methodologies, as well as a comprehensive discussion of modifications made to the risk estimates that support the final listing determinations.

4.49 Vinyl Institute Comment

5.0 Peer Review Comments

The USEPA charge to the peer reviewers was, for the most part, very general and vague in scope. Therefore, it was both easy and difficult with which to comply. Easy in the sense that virtually any type of response could be said to be responsive to the charge and difficult in that the scope and details of the document require a wide area of expertise and time on the part of the reviewer to adequately understand the assessment and its nuances. USEPA chose three peer reviewers who are well-known as risk assessors and modelers, but who are not dioxin experts or toxicologists. In many respects, the peer reviewers confined their comments to their strengths. Other areas were either not commented on

or glossed over by the reviewers. This immediately suggests an uneven peer review. It would have been more appropriate to cede various sections to one or more of the peer reviewers with recognized expertise in statistics and sampling, fate and transport, exposure assessment (particularly of food borne hazards), toxicology and dose-response modeling (particularly for dioxin), uncertainty and sensitivity analysis, and risk characterization and ask them to comment on specific issues or sections (as well as anything else they felt strongly about).

It is difficult to comment on what the peer reviewers missed although chief among those are comments on the dearth of environmental measurements that form the basis for the concern and the subsequent assessment. One peer reviewer (CT) stated that he believed the samples to be adequate for risk assessment and a second (AE) expressed concern that some potentially hazardous constituent (*i.e.*, benzene) may have been overlooked because it was not present in the samples collected. The lack of data does not seem to deter them from favorably commenting on the remainder of the risk assessment on the whole. In this they seem to have forgotten de Balzac's admonition that "if your train is on the wrong track, every station you come to is the wrong station." The peer reviewers appear to have overlooked the fact that many of the modeling parameter values are internally inconsistent. The impact of these inconsistent parameter values on the outcome of the risk assessment is uncertain. However, it is likely that the "compounded conservatism" incorporated the analysis would tend to result in risk estimates that are more conservative, perhaps unrealistically so. In addition, the meteorological parameter values used in the deterministic calculations appear to result in a mass balance violation with respect to values for precipitation, runoff, evapotranspiration, and infiltration.

It is interesting to note that the peer reviewers point out a number of decisions and assumptions that they felt were overstated (primarily in the modeling and exposure assessment discussion), but are willing to accept such assumptions for the sake of conservatism (a risk management as opposed to a risk assessment decision). These include the dioxin vapor settling out onto plant surfaces that is then directly or indirectly consumed by humans. One reviewer provides discussion as to why dioxin in vapor form remains in vapor form long enough to contaminate the aerial parts of plants without discussing whether dioxin vapor would even occur or escape from the source material in the first place. The modeled erosion of contaminated soil is supported for impacts to an adjacent receiving stream, but rejected for impacts to adjoining land. Similarly, the peer reviewers suggest that many of the assumptions regarding dietary exposure to fish, fruits and vegetables or animal products are overstated. For instance, the assertion that all fish in a subsistence diet come after the adjacent water body, that a significant percentage of fruit and vegetables and other food stuffs (including animal feed) originate from a single farm, or that a sizable population (n = 1411) relies on beef solely raised within 2 kilometers of the source are examples of assumptions that are not credible and result in over-stated exposure and risk estimates. These and other inputs to the fate and transport models and exposure assessment are pointed out as areas of potential error in the risk assessment by the peer reviewers. It is likely that if USEPA addressed the peer reviewer comments into account when re-drafting this report that a reduction in risk values would occur. What cannot be predicted is how or to what degree USEPA will accept and include the peer reviewers' comments in a revision or what alternate values may be selected in the place of those at issue.

Agency Response:

The Agency does not agree that the peer review charge was inadequate. The charge was crafted to direct the peer reviewers to specific modeling and risk assessment issues while, at the same time, providing them with substantial flexibility in conducting their review. Based on the quality and depth of comments that we received, we believe that the peer review charge provided sufficient guidance for the peer reviewers to follow. The Agency attempted to ensure that we would have a balanced group of peer reviewers, however, we cannot control what the peer reviewers will choose to comment on or what they might say. The Agency agrees that the peer reviewers credentials are excellent and that they provided useful feedback; however, we do not believe that dioxin experts per se were essential to this peer review for two reasons. First, the Agency has substantial expertise in dioxins on staff, and we have solicited their review and comment on virtually all aspects of the dioxin modeling and risk assessment. Second, the Agency currently is conducting a comprehensive reassessment of dioxin carcinogenicity and toxicity. As a matter of policy because the reassessment is still underway, we decided to continue to use the Agency's existing dioxin benchmarks for this rulemaking.

The Agency believes that peer review is an important part of the rulemaking process and, therefore, submitted the Risk Assessment Technical Background Document for peer review with the intent of addressing peer review comments prior to finalizing the rule. As explained in the preamble, the time constraints imposed by the court-ordered deadline prevented us from addressing the peer review comments prior to the publication of the proposed rule. However, the peer review comments did provide useful feedback on the Agency's proposed risk assessment, and we fully addressed the peer review comments, as well as the public comments, for the final rule, using both the peer review and public comments in modifying the risk assessment. With respect to the commenter's assertion that we should have addressed the peer review comments prior to proposal, we agree that there are benefits to revising the risk assessment before the final rule. However, there are also benefits to providing the public and other interested parties with the peer review comments before they are addressed. These comments were included in the docket for the proposed rule for review by the public to facilitate a full and open discussion of the risk assessment approach and results. The peer review comments can be (and were) used to identify concerns or areas for improvement. It seems likely that the public comments were shaped by review of peer review comments and, in fact, the principal modifications that EPA made to the risk assessment were mostly the result of information received in public comments. Consequently, we believe that the peer review process and public comment were well-served in this analysis, despite the fact that the comments were not addressed for the proposed rule.

[end of Agency Response]

6.0 References

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SECTION 5
Borden Chemicals and Plastics
CALP-00005

Comment Summary

Borden Chemicals and Plastics Operating Limited Partnership (BCP) is an organic and inorganic chemical manufacturer with operations in Geismar and Addis, LA and in Illiopolis, IL. BCP manufactures acetylene, vinyl chloride monomer, polyvinyl chloride, ethylene dichloride, anhydrous hydrogen chloride, ammonia, urea, urea formaldehyde, formaldehyde, methanol, neo-esters, industrial gases (hydrogen and carbon monoxide), and air separation products (oxygen, nitrogen, and argon). BCP also operates industrial utility facilities including cogeneration and the production of steam, clarified water, and demineralized water. BCP has a significant economic and societal investment in Louisiana and Illinois.

BCP is submitting this letter in order to provide comments on the Environmental Protection Agency's (EPA's) notice of proposed rulemaking relating to the potential listing of certain wastes associated with the production of chlorinated aliphatic materials. The proposed rule was published in the August 25, 1999 "Federal Register" (64 FR 46475-46539). With respect to the proposed K173 and K174 listings, BCP has limited its comments to the economic and practical aspects associated with the proposed rule. BCP has provided more extensive comments on the proposed K175 listing, which affects BCP singularly. Despite limiting its comments on the proposed K173 and K174 listings, BCP wishes to stress that it has significant concerns regarding the way in which EPA has applied risk assessment in this proposed rule. BCP believes that there are several risk-related issues that warrant comment, particularly as they concern the uncertainty and haphazard application of risk assessment procedures with respect to current management of these materials. Although BCP is concerned about the overall application of risk assessment, it believes that the issue is more appropriately addressed in comments made by trade organizations representing industries impacted by these proposed rules. Consequently, BCP would like to express its support for comments submitted by various trade organizations such as the Vinyl Institute, the Chemical Manufacturer's Association, the Chlorine Chemistry Council, and the Louisiana Chemical Association. BCP is an active member in each of these organizations. Such organizations offer an industry-wide perspective and are able to offer pertinent comments about issues of vital concern to their member companies. In the comments below, BCP has presented the pertinent EPA quotation(s) it believes most represent the issue in question followed by BCP's comment.

5.1 Borden Comment

EPA Proposed Program Issue

64 FR 46504

"For the purposes of this listing, the headworks of the wastewater treatment system is assumed to be at a location directly after steam stripping."

BCP Comment

In performing its risk analysis related to the K173 listing, EPA's primary concern was ". . .air emissions of dioxins from uncovered and aerated biological treatment tanks." In the preamble discussion, EPA's main focus for the dioxin trigger level (1 ng/L) was the point before the proposed K173 wastewaters were combined with other streams fed into biological treatment plants. First, BCP believes that EPA's analysis doesn't even consider actual concentrations in the tanks used for its assessment. Given EPA's stated position regarding "dedicated streams", BCP believes that any sampling location for determining 1 ng/L trigger level compliance should at least be specified as a "location prior to co-mingling of waste streams" and should not be related to a specific piece of equipment (i.e., after steam strippers). Defining the sampling location as proposed ignores the fact that facilities may further treat wastewaters prior to co-mingling, which would result in a lower concentration of constituents (i.e., dioxins) at the point where the stream is co-mingled with other wastewaters. BCP's process represents such a situation. Wastewaters from the VCM-E Plant are routed through carbon beds prior to introduction into the plant biological treatment system. If the "risk driver" for this particular stream were related to air emissions from biological treatment tanks, it would seem that consideration should be given to any process that would further lower or eliminate air emissions from these units prior to commingling of these waste streams. Therefore, in BCP's case the appropriate sampling location would be the point at which the stream exits the carbon beds rather than at a point "directly after steam stripping."

EPA's proposed sample location is arbitrary and appears to have been chosen as a way of obtaining the highest concentrations possible for use in risk assessment. One might argue that not all facilities have additional treatment in place; however, designating a sampling location relative to a particular piece of equipment is not an appropriate way to ensure that the sample is representative of the stream in question. Furthermore, the sample location as currently proposed essentially penalizes companies for providing additional treatment. BCP believes that it would be more appropriate to allow a facility to sample at the true "headworks" of the biological treatment plant, subject to a demonstration that the location selected is prior to co-mingling with other wastewater streams and prior to introduction into the plant biological treatment system.

Agency Response:

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. Therefore, because we are not finalizing the listing for chlorinated aliphatic wastewaters, the proposed implementation 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

5.2 Borden Comment

EPA Proposed Program Issue

64 FR 46500

"As already described in the risk assessment results in Section III.D. 1 .f. of this preamble, we identified risks of concern associated with air releases of dioxins from wastewater treatment systems."

64 FR 46501

"Based on an analysis of the risks associated with current management practices, EPA is proposing to list wastewaters from the production of chlorinated aliphatic hydrocarbons as hazardous waste.

64 FR 46504

"It is important to note that the 1 ng/L trigger level described here for implementing the proposed tank cover requirement is not a concentration below which the wastewater does not meet the K173 listing."

"We seek comment on the alternative of using this level as criteria for the listing itself. The Agency could finalize a concentration based listing based on the 1 ng/L trigger level instead of the traditional listing proposed today."

BCP Comment

Throughout the preamble to this proposed rule, EPA describes in detail the process by which the K173 listing determination was made. Although EPA may have alluded briefly to "other criteria", it is apparent that the primary, if not the only, criteria for making this listing determination was the risk assessment related to dioxin air emissions from biological treatment tanks. BCP has serious concerns regarding

EPA's approach to this risk assessment. Those concerns aside, it would seem logical that any listing would be centered on the one criteria that resulted in the perception of risk in the first place. Basing the K173 listing on the 1ng/L trigger level would make sense for several reasons. First as EPA explains in the preamble, the trigger level is based on a risk level that is considered protective by EPA. Second, as mentioned in the preamble, EPA's basis for determining a "risk" was the single highest concentration of dioxin found during its testing, while the majority of companies had concentrations of dioxins that were well below that measured value (and below the 1 ng/L trigger as well). Making a "blanket" listing determination would make "generators" of facilities whose wastewaters essentially don't meet the criteria for listing and in some cases may be more than an order of magnitude below the trigger level. Finally, particularly because the K173 listing as proposed would be a more traditional listing option (i.e., listed no matter what the concentration), BCP is concerned about reporting and record keeping implications not addressed in the proposed rule. For example, what implications would the newly regulated "generation" of this material have with respect to biennial reporting and for the assessment of hazardous waste fees? This issue could have a tremendous economic impact since all wastewaters would have the listing once this stream enters biological treatment. BCP believes that should EPA decide to list the K173 stream, a concentration-based approach is the only way to address EPA's protectiveness concerns and to ensure that regulation is fair and equitable.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

5.3 Borden Comment

EPA Proposed Program Issue

64 FR 46505

"The Agency requests comment on the proposal to add air emission control requirements for tanks used to manage chlorinated aliphatic wastewaters."

BCP Comment

In previous sections of its discussion regarding tank emission controls, the EPA related that they considered, "... simply requiring that tanks be 'covered' to prevent air releases of dioxins...." However the Agency sought to provide more "guidance" to the regulated community as to how to ensure

compliance. The proposed requirements apparently retain this "simplistic" view of what the rule would mean in terms of retrofitting tanks, while adding layers of complication and thus compounding what would already be a significant engineering task. BCP has performed an assessment of the cost associated with covering and controlling the tanks in its biological treatment plant, even though it is likely that a newly constructed, dedicated system would be installed in lieu of retrofit (at a significantly greater initial capital expense). A discussion of this information is provided later in these comments when BCP addresses the economic analysis performed by EPA. Other facilities and trade organizations have also provided comments relating to EPA's risk assessment and the assumptions upon which it was based. Although those particular issues call into question EPA's approach toward determining the hazards associated with this waste stream, BCP would like to address in this comment the practical concerns associated with the proposed requirements for tanks.

BCP's biological treatment system, like the treatment systems at many other plants, relies on aeration and mixing of wastewater to obtain proper treatment of the constituents present. Unlike tanks used for storage of materials, tanks used for biological treatment are often equipped with various pieces of equipment that facilitate the desired treatment (e.g., clarifiers). If it were simply a matter of covering/controlling storage tanks (i.e., without any equipment concerns) the required action would amount to tank retrofit and the addition of piping, albeit at significant cost due to the size of the tanks involved. However, with biological treatment tanks there are many considerations over and above tank retrofit, which render re-design efforts considerably more difficult. There is the question of how equipment repairs will be effected. The re-design must allow for safe access as personnel would now be required to enter a confined space for routine maintenance of treatment plant equipment. This would present new hazards and would require additional monitoring to ensure against an unsafe work environment during maintenance and repair activities. Personnel would no longer be able to perform even the simplest of maintenance or repair tasks without significant effort and increased potential for personal exposure.

Facilities would also be forced to address the issue of water management when considering repairs. Production processes are such that large quantities of water must be managed on a daily basis. Presently, operation personnel have discretion over which situations require draining of tanks for equipment maintenance/repair and which situations do not. If the rule were made final as proposed, this discretion would be eliminated, since the tanks would have to be drained every time maintenance/repair is performed regardless of how minor the activity. Such a scenario would require either frequent plant shut down or the addition of substantial tank storage capacity. One must also consider the issue of equipment removal. There are certain instances when the removal of equipment is required. Many times, this removal cannot be accomplished through some relatively small access port. Rather, larger/heavier pieces of equipment would have to be removed by way of the top of the tank using heavy machinery. This presents the necessity of installing and using a removable top, a prospect that is impractical at best.

Finally, one key aspect of biological treatment plant operation that the EPA proposed requirement fails to take into account is the importance of inspection to ensuring proper operation. For certain pieces of equipment there is a visual aspect to monitoring proper operation that is as important, if not more important, than electronic monitoring of operations. Creating an enclosed space would not only hamper efforts at visual inspection of the process; it would transform a normally routine operation into a complicated procedure for vessel entry. In turn, the decreased effectiveness of visual inspection may result in an increase in wastewater NPDES difficulties and/or excursions. As mentioned, issues related to risk and the economic impact of these proposed regulations have been addressed below and by other companies/organizations. However, it appears that EPA failed to adequately consider practical implications related to this proposed rule and whether or not the added risk of personnel exposure and possible NPDES non-compliance were outweighed by the estimated risks to the general population.

Agency Response:

EPA appreciates the information submitted by the commenter regarding issues concerning implementation of the 40 CFR 264/265 subpart CC requirements for biological treatment tanks. However, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

5.4 Borden Comment

EPA Proposed Program Issue

64 FR 46510

"EPA requests comment on the type of records, documentation, and demonstrations that may be adequate for determining compliance with the contingent management listing."

BCP Comment

Wastewater treatment sludge generated at BCP's biological treatment plant is stored in roll-off boxes and shipped to an area Subtitle D landfill. All shipments are accompanied by a non-hazardous waste manifest that clearly identifies the waste, the quantity shipped, the destination landfill, and the transporter. Records of these shipments are maintained in BCP's files. BCP believes that documentation as described above, which is analogous to documentation for existing hazardous waste activities, should be sufficient proof of disposal in accordance with the conditions for exclusion from this hazardous waste listing. As for documentation of intent, such a concept would be difficult to prove by

means of paperwork. It would seem that sufficient tracking based on a history of proper disposal would be proof of intent to landfill. Additionally, agency inspection should be more than adequate to ensure that land treatment or storage on land is not taking place. Inspectors merely have to verify that sludge is stored in containers and that there is no visual evidence of placement on land. Given that inspections are random and unannounced, BCP believes that current practices should more than adequately satisfy concerns regarding intent.

Agency Response:

The Agency is finalizing, as part of the listing description, a flexible performance standard similar to the requirements in 40 CFR 261.2(f) for documenting claims that materials are not solid wastes, when they are managed (or will be managed) in certain ways.

The Agency agrees that the type of paperwork described by the commenter would be sufficient to show that previous shipments of EDC/VCM sludge had been disposed in accordance with the conditions of the K174 listing. EPA also agrees that an Agency inspection is sufficient to verify no land placement of EDC/VCM at the generator's facility. Regarding a demonstration that EDC/VCM sludge (that is located at the generator's facility at any particular moment) *will be* sent to a landfill in conformance with the K174 conditional listing, the Agency acknowledges the commenter's point that it may be difficult to demonstrate where a waste *will be* sent based on paperwork. EPA agrees that prior waste disposal activity, as successfully demonstrated by the generator, certainly can provide useful (and in many cases, sufficient) information concerning the likely disposition of EDC/VCM currently stored on site.

However, there may be specific situations where demonstrations of prior shipments may not be fully adequate to indicate where waste will be sent (*e.g.*, demonstrated prior waste shipments are infrequent and/or not very recent). This is likely going to be a situation-specific type of assessment. However, because EPA does not believe that landfills would typically accept industrial waste shipments on short notice, without having some type of agreement, contract, or other arrangement already in place that require some lead time (*e.g.*, where confirmatory chemical analysis is required on a waste sample by the landfill owner/operator, or where certain purchasing arrangements must be made first, etc.) EPA believes that there will likely be other types of information, other than demonstrations of prior shipments, that would serve to demonstrate where EDC/VCM sludge *will be* sent.

5.5 Borden Comment

EPA Proposed Program Issue

64 FR 46518

"EPA estimates the total industry compliance cost - excluding paperwork burden as separately estimated in the Information Collection Request - associated with the two wastestream components of the listing proposal (i.e., sludges and wastewaters) at $2.355 million in average annual cost, for annual waste management in conformance with the terms of the listing proposal."

BCP Comment

Although EPA appears to have considered some of the higher cost compliance requirements, EPA grossly underestimates both the annual costs and the initial capital costs associated with compliance. In addition, in providing an estimate for the compliance categories listed in Table IV- 1, the economic analysis fails to account for many manpower and material handling recurring costs. By approaching the proposed standards as an actual engineering project and developing costs accordingly, BCP has determined that an upgrade of our biological treatment system alone would exceed the EPA estimate of the total industry cost by over $5 million. It is important to note that BCP developed its site-specific estimate strictly on the basis of controlling biological treatment tanks. The estimate did not include control of storage tanks, etc. located upstream of the biological treatment plant and downstream of the wastewater strippers. Consequently compliance-related initial capital costs would have been even higher than the cost stated above. Clearly, the EPA understanding of the design, construction, and operating activities that this proposed rule would generate fall well short of a realistic estimation of implementation requirements and the associated costs.

Agency Response:

The Agency thanks the commenter for submitting information regarding potential costs for complying with the proposed requirements for controlling air emissions from biological treatment tanks. However, the Agency is finalizing a decision not to list chlorinated aliphatic wastewaters as hazardous waste. Therefore, the Agency is not finalizing the proposed air emissions control requirements and these requirements are not included in the economic impact analysis for the final rule.

5.6 Borden Comment

EPA Proposed Program Issue

64 FR 46510

"The Agency has concluded that the waste (VCM-A wastewater treatment sludge) meets the listing criteria in 40 CFR 261.11 (a)(3) and is capable of posing a substantial present or potential hazard to human health and the environment if mismanaged."

BCP Comment

BCP has devoted the remainder of its comments to the proposed listing for "VCM-A Wastewater Treatment Sludges". As mentioned in the proposed regulation, BCP is the sole facility generating this particular waste stream, which BCP refers to as VCM-A filter cake. Consequently, BCP has a keen interest in any proposed regulation related to this material. BCP is particularly concerned that any decision regarding the regulation and management of this material be based on a good understanding of the waste and a realistic assessment of the hazards it may present. In the comments below, BCP has addressed several criteria outlined in the proposal to list this waste as hazardous.

Where possible, comments include data and information based on BCP policies, independent analyses, and surveys of treatment or disposal facilities. Comments have also been based on an independent assessment relating to the fate and transport of constituents and the risks posed from this particular waste under current management (disposal) practices.

EPA Proposed Program Issue

64 FR 46480

"EPA assessed and considered these criteria for all six wastestreams through the use of risk assessments and risk modeling, as well as a consideration of other pertinent factors."

64 FR 46482

"Because full risk analyses were not necessary for VCM-A wastewaters, VCM-A sludges, or allyl chloride sludges...."

BCP Comment

One of the most curious aspects discussed within the preamble to the proposed rule is EPA's approach to the listing of filter cake from VCM-A. While EPA provides a detailed description of the approach

used to determine risks associated with the K173 and K174 proposed listings, similar information for the K175 stream listing is conspicuously absent. Although EPA makes reference to previous analyses for the proposed Hazardous Waste Identification Rule (60 FR 66344), groundwater modeling and exposure assessment are only briefly mentioned in the preamble and in the background document for the risk assessment. EPA's assessment of risk is even more odd given the extremely small volume of VCM-A filter cake when compared to the overall quantity of wastes placed in the landfill. Moreover, BCP does not believe that the EPA mismanagement scenario (i.e., disposal in an unlined landfill) represents a plausible situation. Even though BCP has and will continue to manage the material in a lined hazardous waste landfill, the EPA's risk determination assumes disposal in an unlined landfill. Compounding the error associated with this improbable management scenario, EPA seeks to bolster its position by what essentially amounts to a repudiation of two regulatory standards that are fundamental to EPA's hazardous waste management program. According to EPA, procedures for determination of toxicity characteristic and disposal of hazardous waste in landfills meeting Minimum Technology Requirements (MTR), although accepted and approved for the universe of solid wastes (including hazardous wastes) managed by industry, do not apply and cannot be relied upon for this specific waste stream.

As requested in the preamble, BCP has provided data and detailed information that supports the positions taken in these comments. The specific aspects of EPA's assessment as they relate to the VCM-A filter cake (proposed K175) will be addressed in more detail below. This will include a more detailed analysis of the risks associated with present management of this waste stream and data relating to leaching of mercury at varying pH. Contrary to EPA's assessment that full risk analyses are unnecessary, BCP believes that a more thorough examination of risks is warranted and that continued stabilization and landfilling of this material is a safe and sound approach.

Agency Response:

EPA acknowledges the commenter's observation that the assessment of risk for the VCM-A wastewater treatment sludge did not use the same approach that was used for the proposed K173 and K174 wastes. However, EPA did evaluate the risk and exposure pathway of the VCM-A waste in reaching its decision to list this waste, and after consideration of the listing criteria in 40 CFR Section 261.11(a)(3). EPA disagrees with the commenter's suggestion that the small volume of VCM-A sludge disposed relative to the overall volume of waste in the landfill is a reason not to list the waste. EPA's consideration of the listing criteria included the consideration of waste volume (120 metric tons/year), mercury concentration (approximately 1 percent), and the well-established toxicity of mercury. The high total mercury concentration in the waste results in the total loading to the landfill of approximately one metric ton of mercury per year. As noted in the proposal, one metric ton of mercury is approximately 20 times as much mercury as is received typically be a single municipal solid waste landfill from all sources in one year. EPA has determined this is a significant amount based on an analysis that showed potential risk to consumers of groundwater

due to a predicted exceedance of the MCL at the modeled receptor well that takes into account the toxicity and concentration of mercury in the waste (criteria at 40 CFR sections 261.11(a)(3)(i) and (ii)). The mercury MCL is based upon toxic human health effects from ingestion of mercury.

EPA acknowledges the commenter's claim that the commenter always has managed the VCM-A wastewater treatment sludge in a hazardous waste landfill. Given this information, the Agency agrees that management of the waste in a non-hazardous waste landfill is not plausible. In the final rule, the Agency based its listing determination on an assessment of potential risks from one plausible management scenario, disposal in a hazardous waste (subtitle C) landfill.

Responses to the commenter's claims regarding the applicability of the TCLP (and the commenter's claim that the Agency's analysis of the wastestream using additional evaluation tools is a repudiation of the TCLP) are provided below in the EPA's response to comment in Section 5.10.

5.7 Borden Comment

EPA Proposed Program Issue

64 FR 46510

"EPA's quantitative analysis of the potential groundwater risks posed by this waste assumes waste disposal in an unlined landfill."

"EPA is unable to quantitatively assess the potential risk this waste poses when disposed in a subtitle C landfill without prior treatment."

BCP Comment

In order to make a better determination as to whether the current method of managing the VCM-A filter cake represented an unacceptable risk, BCP retained a risk assessment contractor to perform an evaluation. The contractor was asked to evaluate the fate, transport, and corresponding risk of mercury in both the organic and inorganic forms, even though the material as generated is an inorganic form. In addition, fate and transport modeling showed that the concentration went to zero before the edge of the disposal site was reached (over a 70-year period). The 60-foot water-bearing zone, which is not used for drinking water, was used in the evaluation. With these results, there would be no risk to human health since mercury would not have reached the nearest receptor well. Nonetheless, the contractor was asked to evaluate risk by assuming that the concentration at the distance step (modeled location)

just before the mercury concentration went to zero was the concentration at the point of exposure. Also, in every instance that required a physical constant or assumption of some parameter, the contractor was instructed to defer to EPA reported values or default assumptions, unless a site-specific value was available. For example, the EPA reported total mercury and leachable mercury concentrations were used in lieu of any values derived by BCP. Even using these unlikely assumptions, the calculated non-cancer hazard was well below the EPA accepted hazard quotient of 1. The full report of the contractor's risk assessment is included as an attachment to these comments.

Agency Response:

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, the Agency is not persuaded by BCP's analysis. These issues are described below.

1. ***Instantaneous Mixing of Leachate in the Saturated Zone.*** In the chlorinated aliphatics listing determination, EPA used EPACMTP to model contaminant fate and transport in groundwater. EPACMTP was specifically designed to simulate leachate migration from land disposal facilities. Conversely, BCP used AT123D, which is a general-purpose groundwater flow and transport model. AT123D relies on analytical transport solutions, so it inherently uses more restrictive assumptions (e.g., uniform, one-dimensional groundwater flow) than EPACMTP, which incorporates a combination of analytical and numerical solutions tailored to provide a more realistic modeling simulation of leachate plumes released from land disposal units. Whereas the EPACMTP model used by EPA consists of separate vadose zone and saturated zone modules, AT123D is designed for saturated zone groundwater modeling.

In the analysis performed by BCP, AT123D was used to simulate saturated zone transport only. As stated in BCP's risk assessment report (Appendix A): "*Vertical migration of mercury*

seeped from the bottom of the landfill (about 8 feet above water table) through the vadose zone and the clay layers was assumed to have occurred. The hypothetical contaminants (organic or inorganic mercury) were assumed to exist already in this layer beneath the landfill." In EPA's analysis, EPACMTP physically simulates the mixing process that occurs underneath the waste management unit when leachate enters the ambient groundwater at the water table, and its impact on the vertical (depth) and lateral extent of the resulting groundwater plume. In most cases (unless the aquifer is very thin), the plume will be present in the upper portion of the saturated zone; it will show only partial vertical penetration into the saturated zone. As previously stated, BCP ignored the unsaturated zone portion of the subsurface pathway, and modeled a source that was placed directly in the saturated zone. They also assumed that the source would extend throughout the entire saturated thickness of the aquifer. This approach is equivalent to assuming that the leachate is instantaneously mixed over the entire saturated thickness of the aquifer. This assumption is not protective, and since BCP used a very small source area of only 1 meter by 1 meter, is physically unrealistic.

2. ***Modeling Timeframe.*** 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.

3. ***Landfill Size.*** 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 ($3{,}273m^3$).

4. ***Hydraulic Conductivity.*** In its AT123D modeling efforts, BCP assumed an aquifer hydraulic conductivity of 1E-04* centimeters per second (cm/s). BCP provides no specific reference or explanation for this value, but Table 4-2 in BCP's risk assessment report identifies the Chicot aquifer as occurring at the BCP VCM-A WWTS disposal site . The Chicot is the primary aquifer in the southwestern part of Louisiana. The Chicot aquifer is described in USGS (1984) as "thick beds of sand and gravel divided by beds of silt and clay to the south." The median hydraulic conductivity value for sand and gravel aquifers presented in the American Petroleum Institute's hydrogeogic database

(Newell, et al.,1989) is 8E-03 cm/sec. This is the hydraulic conductivity value that we would have selected to correspond to the location of the landfill where BCP disposes of their waste. The range of values from which the median is derived is 1E-05 to 4E-01 cm/s (USEPA, 1997). (For comparison, in our EDC/VCM landfill analysis the central tendency hydraulic conductivity evaluated by EPA was 5E-03cm/s, 50 times greater than that evaluated by BCP.) In the context of BCP's analysis, it does not appear that the hydraulic conductivity value BCP 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 (BCP did not provide a source for their hydraulic conductivity value). This could result in a significant underestimation of predicted contaminant migration.

*Note: This value was mistakenly written as 1E04 cm/s in BCP's report (page 20; Appendix A, page 1), however the value presented in units of ft/day, 0.283 ft/day, corresponds to 1E-04 cm/s, and a value of 0.0036 m/hr (equivalent to 1E-04 cm/s) was shown in the printouts of the model runs.

5. ***Dispersivity.*** 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 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 (and increased

the hydraulic conductivity of the aquifer materials), as discussed above, such that they could have more accurately predicted contaminant concentrations at their designated receptor well distance.

Conclusion

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 that the conclusions of BCP's analysis are valid or supportable. EPA does not believe BCP's risk analysis can be used to support a listing determination for VCM-A sludge.

References:

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, DC.).

USEPA. 1997. Analysis of EPA's Industrial Subtitle D Databases used in Groundwater Pathway Analysis of the Hazardous Waste Identification Rule (HWIR). Office of Solid Waste, Washington, DC.

USGS (U. S. Geological Survey). 1984. National Water Summary (Section entitled "State Summaries of Groundwater Resources" by R. C. Heath). USGS Water-Supply Paper 2275.

5.8 Borden Comment

EPA Proposed Program Issue

64 FR 46511

"...Based on information EPA has, including information on liner performance and the mobility of mercury under certain pH conditions, EPA believes that even when disposed in a landfill that is compliant with Subtitle C landfill standards, this waste is likely to leach significant quantities ... and has the potential to pose a substantial hazard when this waste is so managed…."

"EPA requests comment on the basis for the rationales described above…(for) the disposal scenario in a landfill compliant with subtitle C landfill standard."

64 FR 46512

"Congress clearly expressed its intent that the Agency is not to place excessive reliance or confidence in landfill design and liners for problematic wastes.

"The EPA bases its listing determinations on an evaluation of risk from plausible management practices. For the reasons just described, EPA believes that disposal of untreated VCM-A sludge represents one plausible management scenario and that this scenario could lead to significant problems."

BCP Comment

In earlier comments, BCP stated that EPA's approach to listing "VCM-A wastewater treatment sludge" amounted to a repudiation of existing standards for toxicity determination and landfill management of hazardous waste, since standards already exist to address mercury toxicity. A discussion of the leach potential of this particular waste stream is addressed in other comments concerning BCP's own leaching tests. In this particular comment, BCP would like to address EPA's stated position on landfill liner integrity and what constitutes proper liner function. Under the 1984 Hazardous and Solid Waste Amendments (HSWA), new standards for land disposal were developed. Those standards (modified by later amendments), set forth requirements for a double liner and leachate collection system and for facilities to install a system for leak detection. There were also standards from later amendments that required a facility to establish an action leakage rate, develop a response action plan, and to implement a quality assurance program to ensure that any construction activity would conform with the established system integrity standards. Landfills meeting MTR as defined by regulation must comply with rigid specifications on liner durability, resistance to chemical attack, and physical properties such as permeability. In addition, the facility must provide for monitoring and collection of leachate and for monitoring of groundwater at a pre-determined point of compliance. Also, the landfill operator must propose an "action leakage rate" subject to Agency approval to ensure that the unit leak detection system is capable of removing enough fluid to ensure that the head on the bottom layer does not exceed one foot within an adequate margin of safety. Prior to accepting waste for disposal, the operator must have an approved response action plan that outlines the steps to be implemented in the event that the action leakage rate is ever exceeded. Such standards are applicable to any Subtitle C landfill. In addition, the landfill presently receiving the VCM-A filter cake is equipped with a groundwater pumping system that is designed to reduce external hydraulic forces on the liner system due to static head. The cells are also surrounded by a slurry wall system that is anchored into the upper-most clay layer underlying the landfill. Clearly, a landfill meeting these standards cannot be equated with an unlined landfill for the sake of risk determination.

EPA frequently states that there is "inherent uncertainty" associated with liner integrity in a Subtitle C landfill. While one may argue that long term integrity is a factor with any liner system, it would seem that this uncertainty is not any greater with respect to the VCM-A filter cake than it is for any other waste that is currently placed in these landfills in accordance with EPA standards. BCP addresses issues regarding the leaching potential of this material and the application of the leaching standard (TCLP) elsewhere in these comments. Aside from any argument regarding the potential of this material to leach

mercury, BCP does not believe that the material is a "problematic waste" as described in the preamble. The cake is typically of low to moderate pH and may contain relatively high concentrations of total mercury, which has been bound up in the sulfide treatment process and thus does not leach by TCLP. There are no properties that would render the material as particularly likely to attack liner material. The VCM-A filter cake does not contain any type of aggressive solvent material nor are there any other organic materials that would prove problematic for a liner. The land disposal restrictions frequently include concentration-based standards for constituents that would be far more likely to pose problems for unsuitable liners. Some of these chemicals are heavier than water, and may therefore be more likely to come in direct contact with liners in the form of a non-aqueous phase material. Yet the EPA believes (rightfully so) that such materials can be safely managed in a landfill designed and operated to meet MTR, especially if one were to consider that liner suitability must be demonstrated prior to the liner's use. Liner durability and resistance to chemical attack must be demonstrated by testing. Such tests are often conducted with full immersion of the liner material in a concentrated or pure chemical of interest. BCP questions why a similar case cannot be made for its VCM-A filter cake, especially given the physical properties of the waste and the considerable uncertainty surrounding the materials propensity to leach. EPA's singling out of this material amounts to an arbitrary and capricious application of EPA discretion in making a hazard determination.

Finally, BCP would like to make one more point related to the concept of long term management of a landfill. In accordance with EPA directives, the "life" of a facility includes not only the period of time when the unit is actively receiving waste. This period also applies to any post-closure period to which the unit is subject. Among other things, post closure care must include maintenance and monitoring of the final cover, the leak detection system, and the groundwater monitoring system. The post closure care period must continue for at least 30 years after final closure of the unit/site in question; however, this period may be extended as appropriate to "protect human health and the environment". Specific examples provided in the regulation include situations when "leachate or ground-water monitoring results indicate a potential for migration of hazardous wastes at levels which may be harmful…." Liners are designed to withstand degrading forces even absent any mitigating action by the operator. Long term system integrity is further ensured by the requirements in place for continued maintenance and monitoring after closure. Clearly, with these regulations in place, operators will not be allowed to simply walk away from a site once active disposal operations have ceased. While BCP can appreciate EPA's unwillingness to base any sort of hazard determination solely upon the performance of a liner, the EPA analysis should take into account the many other circumstances and characteristics that determine whether long term risks are expected or are even plausible.

Agency Response:

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 in section VI.C.1 of the preamble to the final rule, 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 small 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 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.

5.9 Borden Comment

EPA Proposed Program Issue

64 FR 46510

"…EPA believes that it is plausible that this waste may be mismanaged and disposed of in an unlined and uncovered landfill…"

64 FR 64512 -46513

"...The Agency questions whether the current waste management practices are the only practices that will be employed by the facility in the future. That is, the Agency believes other management practices are plausible. First, information available to the Agency documents only that the facility has sent VCM-A wastewater treatment sludges to a subtitle C landfill for disposal for some periods after 1990. Specifically, information provided by the facility in response to a specific RCRA Section 3007 request from EPA indicates this waste was sent to a subtitle C landfill from 1990 to 1994; and according to the facility's response to the RCRA Section 3007 survey, this waste was sent to a permitted hazardous waste landfill for disposal in 1996. In addition, we have no information with regard to the disposal prior to 1990. The Agency does know that the facility had as many as 800 drums of the mercuric sulfide sludge stored on site in 1985; however the Agency has no information with regard to the ultimate management of the waste. Given the fact that the Agency does not have a complete record of how the VCM-A sludge was managed in the past, the Agency believes that it is reasonable to assume that the VCM-A sludge may be managed in an (sic) non-subtitle C landfill in the future."

64 FR 465 15

"We also request any available information on whether or not the VCM-A wastes were previously disposed in non-hazardous landfills."

BCP Comment

The EPA statements highlighted above concern BCP for several reasons. First, in its preamble discussion, the Agency is insinuating that BCP may be inclined to employ some disposal method that is contrary to regulations in order to dispose of this material. The basis for this "plausible" assumption is apparently the fact that BCP has disposed of its VCM-A filter cake in a permitted and compliant hazardous waste landfill, even though the filter cake was not a hazardous waste. BCP does not understand how what it has always believed was prudent, responsible, and conservative management of this material can be construed as evidence that the material may be "mismanaged" in the future. Second, BCP has made every effort to answer any inquiries made by the EPA regarding this waste. If, as stated in the preamble, EPA perceived some data/information gaps in any of the responses, those gaps could have easily been addressed by simple follow-up inquiries made directly to the facility. As it was, these perceived gaps were viewed by the EPA as possible evidence of mismanagement of this particular waste stream. Moreover, BCP takes umbrage at the inconsistent manner by which EPA applies its analysis of mismanagement. During its discussion of the proposed K174 listing, EPA appropriately assumes that if a "conditional listing" were applied, facilities can be trusted to dispose of this waste in a subtitle C or D landfill. Yet given essentially the same scenario for the proposed K175 listing, EPA assumes that a conditional listing may lead to mismanagement by BCP. The agency has no basis for this assumption; in fact, more specific management information has been provided and is available for the VCM-A filter cake than is cited for the proposed K174 waste. Clearly, BCP has been arbitrarily singled out in EPA's analysis due to assumptions that have no basis in fact.

Finally, in all of the time since BCP has had responsibility for operation of the VCM-A Plant, the VCM-A filter cake has been disposed at a facility that was constructed and operated in accordance with the hazardous waste regulations that existed at the time of disposal. Although BCP could have been well within the regulations by disposing of the filter cake as a solid (non-hazardous) waste in a subtitle D landfill, this method was not used. BCP chose to manage the filter cake in accordance with hazardous waste regulations primarily because BCP was concerned about future regulations and assertions of mismanagement of the kind detailed in the preamble to this rule. With respect to the "800 drums of the mercuric sulfide sludge stored on site in 1985" as referenced above, the drums in question were disposed as hazardous waste between March and May of 1985. Based on this information and on BCP's documented management of this material, BCP believes that it has demonstrated that the VCM-A filter cake has been and will continue to be managed in a prudent and conservative manner.

Agency Response:

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, EPA sees no compelling information to suggest the company would do otherwise. Accordingly, EPA agrees that disposal in an unlined landfill is not plausible.

5.10 Borden Comment

EPA Proposed Program Issue

64 FR 465 11

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

64 FR 46522

"However at pH 10, 1 .63mg/L mercury was solubilized. Current landfill disposal site conditions for this waste are reported to be pH 9.48-9.57."

BCP Comment

Within the preamble to this proposed rule, EPA makes several references to increased leaching of mercury at higher pH (approaching 10). The testing upon which this assertion is based consists of one sample analyzed by the University of Cincinnati using a draft protocol. EPA goes as far as characterizing the analytical results as significant evidence of increased leaching of mercury with high pH and uses the analytical results as one of the primary bases for its hazard determination. After reviewing the analytical results and EPA's application of them in the hazard determination, BCP has significant concerns about EPA's approach. These concerns arise not only from the results themselves but also from EPA's extrapolation of analytical results to the circumstances surrounding disposal of the VCM-A filter cake.

The Toxicity Characteristic (TC) Rule, promulgated in 1990, was the result of EPA's efforts to revise existing methods for determining the toxicity characteristic. The TC rule refined and broadened the scope of existing regulations by adding 25 organic chemicals of concern. The analytical method used for complying with the rule was also revised, with the existing Extraction Procedure Toxicity Characteristic

(EPTC) being replaced with the Toxicity Characteristic Leaching Procedure (TCLP). In developing the TC rule and the TCLP upon which it was based, the EPA had to consider several "mismanagement" scenarios and the relative effect each would have on leaching. Ultimately, the EPA retained the management scenario involving co-disposal of these wastes with municipal solid waste as most representing the reasonable worst-case scenario. According to the discussion in the preamble for the TC rule, EPA believed that the acidic leaching media from decomposition of putrescible wastes in a Subtitle D landfill was typically more aggressive than leaching media that would be expected from typical industrial landfills. The TCLP extraction procedure was therefore designed to simulate this condition. Within the preamble to the chlorinated aliphatics proposed rule, EPA explains that "preliminary" studies show that the mercury in the VCM-A filter cake may be more likely to leach at a higher pH. Consequently, EPA argues that the TCLP is not a sufficient indicator of the risks posed by this particular waste. In fact, EPA's argument raises the question as to whether the TCLP is an accurate indicator of toxicity characteristic for any of the constituents listed under 40 CFR 261.24, since for any of the constituents listed under that section the leach potential may be linked to the various species and complexes formed by the chemical in a specific waste stream. One may assume that it is possible, perhaps even likely, that under certain circumstances increased leaching may be demonstrated for the majority of the listed chemicals. Short of testing each species or complex of a particular chemical under each anticipated disposal scenario, there is no sure way to determine whether a chemical would exceed its respective TC level. Clearly, EPA realized that such an approach to determining the toxicity characteristic would be difficult, if not impossible, to implement and that very little benefit would be realized. Rather than single out particular waste streams and exponentially expanding the list of hazardous wastes, EPA sought to apply a reasonable worst case management scenario. At the time, EPA's own discussion of the TC rule identified the assumptions upon which the rule was based as being protective. With this proposed rule, EPA has chosen to identify what may or may not be (see discussion on BCP testing) a single exception to those original assumptions (of which there may be many more) and has effectively invalidated its own regulatory procedures for this particular stream. Again, BCP is concerned with the arbitrary and capricious manner in which EPA employs unconventional methods to single out this particular waste stream. Moreover, EPA appears to be basing its determination on a single sample of the VCM-A filter cake as well as a draft report of findings. Similar analyses performed by BCP contradicted those results. BCP has provided a discussion of the analytical testing of the VCM-A filter cake in comments below.

Per the EPA discussion, the mercury leach potential for the VCM-A filter cake is based on "a collected sample of VCM-A wastewater treatment sludge." The EPA takes care to qualify the result since the study is considered "preliminary". At 64 FR 46510, EPA makes the following qualifying statement: "Please note that this is a draft EPA document not yet peer reviewed. Also, data within the report is still undergoing QAJQC review, and the text, data, and conclusions in the report may change before the document is finalized." While BCP is not necessarily disputing the results obtained from that analysis, it would seem reasonable that any sort of decision made on this material would be based on peer-reviewed final analytical reports with a full disclosure of raw (including QAJQC) data, methods used, and results obtained. Even though BCP firmly believes that the TCLP remains the appropriate method

by which to determine the toxicity characteristic for mercury, samples of the VCM-A filter cake were collected in an effort to corroborate or dispute the results obtained by EPA. Each of the samples was analyzed for total mercury concentration. The samples were then extracted. In the absence of any information regarding how the EPA contractor samples were extracted, BCP proceeded according to the extraction method described in the TCLP, except that the pH during extraction was varied as appropriate. Two of the samples were extracted at a pH of 6, one sample was extracted at a pH of 8, and two samples were extracted at a pH of 10. The deviation in mercury concentration from the highest to the lowest was 0.03 mg/L, with all results right at the TCLP limit of 0.2 mg/L. BCP results did not agree with those obtained by the EPA contractor, which found a deviation of over 1.6 mg/L or over 280 times greater when comparing sample aliquots extracted at a pH of 6 and sample aliquots extracted at a pH of 10. Such a disparity in results calls into question methods used for analysis (on the part of either party) and the assumptions based on the analyses. Regardless of which results reflect reality, BCP does not believe that leaching of mercury is a valid concern. BCP will explain further below why it believes that leaching of mercury from its VCM-A filter cake is less of an issue than is purported by EPA.

Agency Response:

EPA disagrees with the commenter's assertion made here and in Section 5.6 above that EPA should rely on the existing TCLP in determining whether VCM-A sludge is hazardous waste, and that doing otherwise repudiates the validity of the TCLP and that EPA is singling out the commenter's waste in an arbitrary and capricious manner. 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. 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 points 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 they 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 at the TCLP limit of 0.2 mg/L. BCP points out that contradicting results casts doubt on EPA's conclusions that mercury is more mobile at elevated pH when in the mercuric sulfide state.

While we did indicate at proposal that the EPA/ORD study was preliminary, we believed it was important to present these results as they represented direct studies on the instant waste being evaluated for listing. These results are consistent with other scientific literature cited in the proposed rule supporting the assertion that the behavior and solubility of mercury in the sulfide form is highly pH-dependent, with more mercury becoming soluble at higher pH.[1] The EPA/ORD study has not yet been peer reviewed and is still considered a draft study. However, we still believe as we did at proposal that the results are consistent with well-established geochemical principles.

In response to the comments disputing the EPA/ORD study results in particular, and the pH-dependent stability of mercuric sulfide in general, we performed additional calculations using the geochemical assessment model MINTEQA2. We calculated the solubility of mercuric 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

[1] 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.

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 can be reasonably applied to the VCM-A waste as well.[2] Also, a recently-published study on mercury speciation in the presence of polysulfides corroborates our finding 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.[3]

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."[4] While EPA does not have enough information on BCP's experiment 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. 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.

5.11 Borden Comment

At 64 FR 465113, EPA cites information obtained from the disposal facility that manages the VCM-A filter cake. The information indicates that the "…pH levels of actual leachate collected from the landfill cell in which the VCM-A wastewater treatment sludge currently is disposed show that the pH is greater than 9." The citation provided at the heading to this comment characterizes this information as indicative of "current landfill disposal site conditions." The conclusions drawn by the EPA using this information are questionable for two basic reasons. First, the pH of the filter cake, as generated, ranges from 3-6 with an average of approximately 5. In addition, testing has shown that the material has a fairly high buffering capacity. In fact, during the recent testing mentioned above, the pH had to be adjusted several times to achieve pH's in the 8 and 10 range. This is significant particularly when considering the manner in which the VCM-A filter cake is generated and disposed. Within the preamble, EPA alluded to the landfill cell in which the material is disposed. The cell comprises approximately 39 acres and, based on

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

[3] See 64 *FR* 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.

[4] 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.

scaled drawings, was approximately 35 feet deep. If one were to estimate volume based on a conservative depth of 20 feet, the total volume of this cell would be 1,507,959 cubic yards of material. The VCM-A plant typically generates two roll-off boxes per year of filter cake, each with a volume of approximately 20 cubic yards. Assuming that the VCM-A filter cake was sent to this particular cell exclusively since 1985, the total volume of filter cake disposed in the cell is only 600 cubic yards. Thus the filter cake comprises only a miniscule percentage of the total cell volume (0.0398%). Considering the relatively small percentage of volume comprised by the VCM-A filter cake, and the relatively high volume percentage of higher pH stabilization materials and filler/cover, a correspondingly higher pH of leachate is not surprising. However, the pH of the leachate does not necessarily correlate with the pH of all material disposed within the cell. Neither can the leachate pH necessarily be considered indicative of "disposal site conditions". One condition of disposal in a landfill is the prohibition against free liquids. Consequently, there is little if any opportunity for matrix-derived liquids to leach and thus influence pH of surrounding wastes. The VCM-A filter cake (as disposed) is a relatively dry, solid material, which is not easily mixed with other materials and cannot be easily spread without some sort of mechanical process. Although the EPA preamble questions the stability of the material, BCP's own experience with this waste stream shows that the VCM-A filter cake is very stable. Not only does the sulfide treatment process reduce the mercury leach potential as demonstrated by TCLP; the lower pH at disposal, the buffering capacity, and the fairly solid nature of the filter cake serve to limit the influence by other co-disposed materials. EPA's bench-scale tests are considered indicative of increased mercury leach potential at higher pH. BCP would like to point out that these bench scale tests, which require particle size reduction and vigorous mixing in a liquid extraction medium, do not accurately reflect actual disposal conditions, where the filter cake is a relatively solid mass of material with a reduced surface area exposed to external (higher pH) influences. Thus, EPA claims of "significant potential for leaching" may be exaggerated based on a consideration of site disposal conditions (conflicting analyses of leach potential notwithstanding).

Agency Response:

EPA disagrees that the factors listed by BCP: 1) relatively small volume of the VCM-A waste disposed in the landfill cell since 1985; 2) the alleged absence of free liquids in a subtitle C landfill based upon regulatory prohibitions on placing liquids in landfills; 3) the lower pH and resultant buffering capacity of the VCM-A waste itself; and 4) the fairly solid nature of the VCM-A waste, would change the conclusion EPA draws from the actual measured pH of the leachate removed from the landfill cell where the VCM-A waste has been disposed. In addition to these leachate pH measurements cited in the proposed rule, additional information from the landfill facility confirms these leachate pH measurements are consistent with, and representative of, the landfill leachate for this landfill.[5] In fact, to the extent that the factors mentioned by BCP may

[5]See Memorandum dated 7/12/00 from Ross Elliott to RCRA Docket concerning discussion with Carl Carlson of ChemWaste Management.

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. BCP'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. In fact, BCP even acknowledges that the leachate in the landfill has a high pH, the very point EPA is making, when it says "Considering the relatively small percentage of volume comprised by the VCM-A filter cake, and the relatively high volume percentage of higher pH stabilization materials and filler/cover, a correspondingly higher pH of leachate is not surprising." 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.

5.12 Borden Comment

At 64 FR 46522, two LDR treatment standard conditions are proposed. EPA proposes to require that, "... the waste residue itself, if in the mercuric sulfide form, must itself be pH 6.0 or below." EPA proposes as a second condition that, "co-disposal will be restricted to wastes with similar pH (i.e., not greater than 6.0)." As mentioned elsewhere, the VCM-A filter cake, as generated, is at or below a pH of 6.0. Therefore, BCP has no trouble whatsoever meeting this first condition. However, BCP has been informed that the assurance of co-disposal with similar pH material is not possible given the relatively small quantity of VCM-A filter cake and the large overall quantity of waste received. One alternative to the co-disposal option would be macro-encapsulation. Macro-encapsulation involves enclosing the filter cake in an HDPE vault. This other option is viable for several reasons. First, the waste would be isolated from other materials thus eliminating concerns about mixture with higher pH wastes. Second, the vault would serve as tertiary containment and encapsulation, preventing both the infiltration of liquids into the filter cake and the migration of any liquids from the filter cake into the landfill. Although BCP believes that such conservative measures are not necessary in light of the analysis performed for these comments, should EPA persist in their overly conservative approach to listing this filter cake, macro-encapsulation should be considered.

Agency Response:

We agree, the alternative suggested by the commenter would provide an additional measure of protection and isolation for the waste, that could be readily implemented. Crushing, puncture, or other degradation of the container integrity would degrade these benefits. To insure that the K175 wastes do not present a long-term hazard once landfill liners eventually fail, we are finalizing a treatment standard that requires that the wastes, as currently generated, be treated to obtain a TCLP leachate concentration of 0.025 mg/L mercury, and that disposal be restricted to units to which disposal of wastes in excess of pH 6.0 is prohibited. We agree with the commenter's suggestion about the practical advantages of macroencapsulation in some situations, and

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 understand 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. As discussed in the above, we have therefore adopted an alternative that allows land disposal in landfill cells following macroencapsulation of the waste (assuming the waste meets other applicable standards, *i.e.*, Hg concentration and pH 6.0 or less). Based on a discussion with a hazardous waste management facility (Chemical Waste Management, Inc., Lake Charles, LA), 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.

5.13 Borden Comment

EPA Proposed Program Issue

64 FR 46513

"In our decision to list this sludge as hazardous, the Agency considered several factors.... Mercury has been identified by several different government agencies.. . as a significant human toxicant.

Wastewater treatment sludges from the VCM-A process using mercuric chloride catalyst contain significant levels of total mercury.... As outlined in the *Draft EPA Action Plan for Mercury,* and EPA's Waste Minimization National Plan, it is important to the protection of human health and the environment that all anthropogemc sources of mercury emissions to the environment be minimized."

BCP Comment

In the preamble to the proposed rule, EPA provides considerable discussion regarding the listing decision for the VCM-A filter cake; however, the essential elements of the decision are those summarized above. Although BCP acknowledges that mercury is a constituent deserving of increased scrutiny and evaluation, the real issue with respect to this particular waste stream is whether there are significant hazards associated with the material as generated, handled, and disposed. EPA has regulations in place to address this waste stream (TC Rule). The TC Rule was/is based on extensive efforts at fate and transport modeling and risk characterization. With respect to EPA's concerns as to the suitability of the TCLP, BCP believes that it has compiled data and information that raise doubt about EPA's assessment of this stream. At the very least, BCP believes through its own analysis that the current method for managing the VCM-A filter cake is safe and effective and is sufficiently protective of human health and the environment. Even if EPA were to decide against listing this waste stream, BCP fully intends to continue disposal in a subtitle C landfill. BCP's conservative management of this stream has been demonstrated over several years; there is no logical reason for EPA to discount this demonstrated intent and raise the issue of possible "future mismanagement". Finally, in keeping with a sound policy of environmental stewardship, BCP maintains an active program to ensure that the generation of waste is minimized to the fullest extent possible. As has been addressed elsewhere in these comments, those efforts include an examination of raw materials and catalysts and a frequent review of existing management practices. BCP has extensively studied its acetylene-based vinyl chloride production process. Given Agency concerns with respect to mercury, BCP has explored any and all possible alternatives to the mercuric chloride catalyst. BCP has also reviewed alternative processes for treating its wastewater. To date, BCP has identified no alternative that can be suitably applied to large-scale production.

Agency Response:

As discussed in response to issues raised 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 of mercury to groundwater that potentially poses significant risk to human health and the environment. Section VI. C. 1. of the final rule preamble explains in detail the rationale for the Agency's final decision to list this waste as hazardous.

5.14 Borden Comment

EPA Proposed Program Issue

64 FR 465 13

"The Agency believes that listing these wastewater treatment sludges as hazardous will provide incentive for the facility to find ways to reduce the overall quantity of mercury-containing VCM-A

sludges generated. EPA believes that there may be opportunities for this type of reduction through improved catalyst handling practices."

64 FR 46522

"We believe significant opportunities exist for source reduction and waste minimization to reduce or eliminate the generation of this waste. For example, the need to hydroblast spent mercuric chloride catalyst from reactors could be eliminated by internal segmentation of the reactor bed that would allow the segments to be sent intact for mercury recovery. Thus generation of the waste could be eliminated or significantly reduced. Beyond modifications to the physical plant, the treatment of wash waters could be modified to incorporate addition of caustic and organic phase separation. This would result in a mercuric oxide sludge more amenable to recovery by retorting prior to sulfide treatment of the resulting brine.... We ...request comment on the feasibility of source reduction and waste minimization alternatives described above."

BCP Comment

BCP understands EPA desire to promote the reduction of any waste generated by petrochemical manufacturing processes. BCP shares the belief that source reduction and the active exploration of waste minimization opportunities is beneficial both in terms of protecting human health and the environment and in terms of more efficient production. BCP has established an "Omni-Media Pollution Prevention Program (OP3), which is a plant wide effort to identify and investigate opportunities for waste minimization and pollution prevention. OP3 is implemented by assigning teams to review processes in each of BCP's manufacturing plants (including the VCM-A plant). The mercuric chloride catalyst used at BCP's VCM-A plant is fundamental to the Vinyl Chloride manufacturing process. The amount of catalyst (and hence mercuric chloride) depends strictly on process/product demands and is not used indiscriminately in the process. One critical issue drives both the use and the management/disposal of mercuric chloride catalyst. The greatest incentive toward proper use and management is cost. Catalyst of any kind is a relatively expensive component of a manufacturing process. Facilities are therefore not apt to use more than is necessary for plant needs. On the other hand, depleted catalyst and associated wastes require proper handling and disposal. This is also an expensive process, which would motivate any facility to make any reasonable effort to reduce the amount of waste generated.

Through the years, BCP has explored various means to reduce mercury-related waste at the plant. In fact, the sulfide treatment process is a means to reduce the volume of storm water with concentrations of mercuric chloride sent out via the NPDES system. Although, any new or innovative approach advanced as a possibility would be welcome, source reduction is not always a simple matter of discontinuing or reducing use. For example, EPA refers to "internal segmentation" of the reactor as a means of reducing materials handling. EPA' s reference to segmentation was confusing since the

material is currently charged as a loose catalyst in a fixed tube reactor. Since BCP was unclear as to what EPA intended by that term, EPA was contacted so that they might provide clarification. The explanation provided was that the term was believed to mean breaking up of a solidified catalyst into pieces in lieu of washing. This concept was unrealistic since the catalyst is not a solid mass; rather the catalyst consists of fragments of carbon impregnated with mercuric chloride. BCP was therefore uncertain as to what EPA meant except that some method of separating the catalyst into discrete sections for removal intact was intended. Although this proposed method might have some merit in other circumstances, further internal segmentation of VCM-A's mercuric chloride catalyst is impossible due to the thermodynamics involved. Further segmentation or consolidation of the catalyst as is implied by EPA would be problematic, primarily because the mercuric chloride catalyst is extremely sensitive to high temperatures. As it is presently charged into the reactor, heat is more evenly dispersed in the reactor. If the reactor were further segmented or if the catalyst were in some way consolidated, heat dispersion would be difficult. Further segmentation of the catalyst might tend to concentrate heat, and the reactor would be more likely to develop hot spots, which would in turn more rapidly deplete the mercuric chloride catalyst.

Agency Response:

EPA commends BCP for its efforts in the area of pollution prevention, including BCP's establishment of an "Omni-Media Pollution Prevention Program. In addition, the Agency acknowledges BCP's explanation of the complications and impracticalities associated with potential segmentation of the catalyst prior to removing it intact as a substitute for hydroblasting it from the production unit.

5.15 Borden Comment

EPA Proposed Program Issue

64 FR 46513

"The proposed listing description is shown below.

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

BCP Comment

As has been demonstrated throughout these comments, BCP does not believe that the information related to the VCM-A filter cake is sufficient to support a decision to list this material as a hazardous waste. However, should there be a final decision to list this waste, it would seem most appropriate to tie any specific listing to the mercuric sulfide cake as opposed to the proposed broad category quoted

above. All of the discussion of risk in the preamble to the proposed rule centers on mercuric sulfide. This includes EPA's discussion of the perceived unique leach potential of the filter cake at higher pH. As the listing description is currently phrased, any innovative alternative treatment process that results in some form of solid waste would still be subject to the hazardous waste listing regardless of the mobility of the mercury in the resulting material. Thus any incentive for transition to an alternative wastewater treatment process based on elimination of a hazardous waste stream would be minimal. Also, EPA's own discussion of this issue mentions the possible generation of a "larger volume" of waste to be handled. The principle behind any "Waste Minimization" program is the actual reduction of hazardous waste. Although alternative treatment processes may exist, BCP has always evaluated such alternatives on the basis of materials handling. An increased volume would have ramifications not only for the cost of treatment and disposal. BCP would also be required to modify its hazardous waste report and possibly Toxic Release Inventory (TRI) report to reflect a larger volume of waste generated. This would expose the facility to increased criticism from area stakeholders and an increase in hazardous waste taxes.

As it has been explained in the preamble to the proposed rule, EPA's listing decision is based upon the properties of the material that is currently generated. While BCP does not agree with the position taken by EPA for the VCM-A filter cake, it most definitely does not believe that the listing should apply to an alternate treatment process (hence alternate form) if it can be shown that the resulting cake is stable under varying pH conditions and does not fail the TCLP.

Agency Response:

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.

5.16 Borden Comment

EPA Proposed Program Issue

64 FR 46514

"The alternative listing option EPA is proposing today is to list the VCM-A wastewater treatment sludges as hazardous waste, unless the waste is disposed in a subtitle C landfill. In addition, under this alternative option, VCM-A wastewater treatment sludges that exhibit the toxicity characteristic for mercury would be listed as hazardous."

BCP Comment

Under EPA's proposed alternative listing for VCM-A wastewater treatment sludge, the conditional listing option is immaterial since BCP currently manages its filter cake in a subtitle C landfill even in the absence of regulation. However, BCP is supportive of this option for several reasons. The material, as generated and managed does not pose a significant risk to human health and the environment, as has been addressed previously in comments regarding risk assessment. BCP questions whether or not mercury would leach from the filter cake at the "substantial" rate determined by EPA, given the low pH of the material as generated and the results of leach testing performed by BCP contract laboratories. Finally, disposal of this material in a subtitle C landfill is the most logical approach if one were to factor in the increased handling requirements and treatment difficulties that are encountered via retorting the material. Specific information regarding these general observations has been provided in comments appearing elsewhere in this document.

Agency Response:

EPA proposed the alternative listing option in the event that the Agency 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 system uncertainty is insufficient to predict a risk to consumers of groundwater. As discussed in response to issues raised by the commenter above and in the preamble to the final rule, 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. Therefore, EPA is not finalizing the proposed alternative listing option for K175.

In addition, as discussed in the preamble to the final rule, (Section VI. I. 3) EPA believes that it is important that this waste 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 co-disposed with wastes of appropriate pH 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, consistent with the legislative history[6] of Section 3004(m) of RCRA, was considered by EPA when making its final listing decision.

5.17 Borden Comment

EPA Proposed Program Issue

64 FR 465 19

"For K175, EPA is proposing a metals recovery requirement as the treatment standard, namely roasting and retorting.... Available information shows that these wastes can be managed in existing treatment and reclamation units that routinely manage similar or as-difficult-to-treat hazardous wastes that currently are prohibited from land disposal."

"The Agency has contacted a treatment vendor of RMERC technology who indicated that treatment of the subject wastes may be difficult but is possible."

BCP Comment

At various locations, throughout the preamble to this proposed rule, EPA mentions the difficulties associated with the retorting of mercuric sulfide. EPA also provides a detailed discussion of the difficulty associated with retorting mercuric sulfide wastes in its Advanced Notice of Proposed Rulemaking (ANPR) regarding potential revisions to the land disposal restrictions-treatment standards for mercury wastes (Federal Register for 5/28/99, 64 FR 28949-28963). This ANPR fully highlights the need to consider alternate treatment (including those that would allow for landfilling) for mercury wastes. This need is overlooked in the discussion for this proposed listing rule. Although overcoming this difficulty may be technically feasible, BCP's experience with this waste stream and with treatment of its mercury waste streams in general indicates that what may be possible from a technical perspective

[6]The legislative history to RCRA 3004(m) states that this section "makes Congressional intent clear that land disposal without prior treatment of these wastes with significant concentrations of highly persistent, bioaccumulative constituents is not protective of human health and the environment." (130 Cong. Rec. S 9178; daily ed. July 25, 1984).

may not be possible from a logistical and practical perspective. Given the nature of its VCM-A operation BCP has had ample opportunity to interact with vendors of retort services. First, it is important to note that vendors often make claims about processing capabilities, which do not withstand further scrutiny. BCP's independent survey of these companies (through contractors) indicates an unwillingness to accept the VCM-A filter cake. The survey has even included the company referenced in the preamble to this proposed rule. In the majority of cases, the issue is not a matter of money (i.e., paying higher rates for treatment services). Rather, permit and processing considerations are the overriding concern for providers of retort services.

One of the first hurdles to overcome is the 500-ppm by weight exclusion limit on organic compounds listed in 40 CFR 261, Appendix VIII. Many, if not all, companies operate their retort units under the metals recovery exclusion of 40 CFR 266.100, which excludes a "metals recovery" unit from permit requirements, provided that the facility comply with certain operating restrictions. Consequently, retort units are usually unable to accept waste with concentrations of organic constituents in excess of 500 ppm. Another provision of the permitting exclusion is a requirement that the hazardous waste contain "recoverable" levels of metals, although the concept of recoverable metals is also an issue for permitted facilities. The regulations do not provide a definition of what constitutes a recoverable level of metals. Treatment facilities often define this concept in terms of treatment efficiency Obviously, those wastes with higher concentrations of metals can be processed for metals recovery more efficiently. A given quantity of such waste can be processed more quickly and will yield a higher quantity of the metal of interest. This in turns translates into a lower cost of operation and a lower disposal cost to the generator. A generating facility can sometimes simply pay a higher disposal rate for wastes with lower concentrations of a particular metal. However, depending on the economic value of the metal in question, treatment providers may turn down waste material with parts per million quantities of a recoverable metal due to permit-related storage capacity. In other words the facility would rather store and treat those wastes that would yield a larger quantity of a valuable metal, than to store/stockpile wastes with poor yields.

Even if a unit has obtained an operating permit (and thus can accept waste with over 500 ppm organics), the unit may still have permitting and/or operating concerns that preclude treatment of the waste in question. For example, the chloride content in BCP's mercuric chloride catalyst has often caused retort vendors to turn down the opportunity to treat this waste stream. Vendors have expressed a similar concern with respect to sulfides. BCP has also had difficulty in identifying facilities willing to accept wastes with low (in relative terms) levels of mercury. Treatment difficulties often translate to extended storage time, since the retort facility will have to campaign difficult to treat wastes and, consequently, treat them more slowly When deciding whether or not to accept a stream, treatment vendors often think in terms of percent concentrations of mercury; whereas, even the highest levels in the VCM-A wastewater treatment sludge only approach 10,000 ppm or 1% This reluctance is related to the economic benefit of processing this material and company concerns regarding storage.

Agency Response:

EPA acknowledges that for this particular waste, successful retort has not been demonstrated. The commenter cites a general reluctance on the part of vendors they surveyed and the Agency lacks any treatment data demonstrating that the subject waste is recoverable. EPA, therefore, established a numerical treatment standard for K175 based on stabilization and is not requiring RMERC as the treatment standard for this waste. EPA notes that generators can use any treatment technology (except impermissible dilution) to meet this numerical standard. EPA expects that sufficient commercial treatment capacity exists to treat K175. Details of this analysis are presented in "Background Document for Capacity Analysis for Land Disposal Restrictions: Newly Identified Chlorinated Aliphatics Production Wastes (Final Rule)," September 2000.

In addition to the numerical treatment standard for K175 (TCLP leachate concentration of 0.025mg/L mercury), we also require that the waste must be at or below a pH 6.0 and that the waste be macroencapsulated in accordance with 268.45 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 or less. EPA finds that commercial treaters can customize their treatment process to immobilize the waste and meet the disposal requirements.

In absence of specific market data, and to introduce possible additional cost for treatment difficulty because of its unique mercury chemical form, and to achieve treatment residual pH of 6.0 or less, the economic analysis for the K175 part of the August 1999 proposed listing rule, applied a 1.5 unit cost multiplier to simulate possible higher (or premium) waste management unit cost assumptions for both: (a) the proposed RMERC roasting/retorting BDAT treatment requirement (i.e. 1.5 x $857/ton = $1284/ton for RMERC), and (b) the proposed low pH landfill co-disposal cell conditions (i.e. 1.5 x $130/ton = $195/ton for landfilling), based on the national average prices for standard RMERC treatment, and for standard RCRA Subtitle C hazardous waste landfilling, respectively. Because of the fact that the RMERC BDAT is dropped from the final rule and replaced with a treatment performance standard of 0.025 mg/L TCLP mercury concentration in sludge, the 1.5 multiplier is replaced in the final economic analysis with a unit cost for sludge stabilization (national range of $120/ton to $2.300/ton for sludges containing metals). However, the <6.0 pH landfill cell condition is maintained, so the 1.5 unit cost multiplier is also applied in the final economic analysis to allow for uncertainty of possible higher cost for conditional landfill co-disposal.

SECTION 6
DuPont Dow Elastomers L.L.C. (DuPont Dow)
CALP-00001

Introduction

Date: November 19, 1999

DuPont Dow Elastomers L.L.C. (DuPont Dow) has significant concerns regarding the proposed Chlorinated Aliphatics Production Wastes Rule (64 FR 46476-46539 and 64 FR 49052-49053) to list wastewaters from chlorinated aliphatic hydrocarbon production processes as RCRA hazardous wastes (K173). Specific comments on this Proposed Rule are delineated in the Enclosure.

DuPont Dow also participated with the Chemical Manufacturers Association (CMA) and the Louisiana Chemical Association (LCA) in developing comments on the proposed Chlorinated Aliphatics Production Wastes Rule and and incorporates by reference the CMA and the LCA comments within this submittal.

Attached to this original are two copies of the comments from DuPont Dow and copies of two letters that DuPont Dow has submitted previously to the USEPA on this listing determination. No Confidential Business Information is included with these submittals.

Sincerely,

R. Martin Guidry
Technology Associate – Environmental

EXECUTIVE SUMMARY

DuPont Dow Elastomers L.L.C. (DuPont Dow) is a 50/50 joint venture company between E. I. du Pont de Nemours and Company and Dow Chemical Company. DuPont Dow has approximately 1,466 employees worldwide (1,232 working in the United States) and in 1998 had revenues of approximately $1.1 billion. DuPont Dow will be impacted significantly by the K173 Chlorinated Aliphatic Wastewater Listing as currently proposed with capital costs estimated to be at least $11,000,000 and annual recurring costs to be approximately $17,000,000 per year.

During the mid-1990's DuPont Dow spent over $10,000,000 to convert its chlorinated aliphatic production operations from free radical-catalyzed to ionic-catalyzed technology – thus eliminating F024 and F025 chlorinated aliphatic organic hazardous wastes and substantially reducing the overall quantity of wastes generated from the production process. Promulgating the K173 Listing Rule will cause wastewaters from this production process to be listed K173 hazardous wastes with no risk reduction to the offsite population since the wastewaters contain no hazardous constituents in toxic quantities and

they will continue to be managed in the same manner as previously. There will be a significant negative cost impact on DuPont Dow, however, to meet the stringent requirements of the K173 Listing Rule.

DuPont Dow is commenting on ten aspects of the K173 Listing Rule:

The K173 Listing Rule should be limited to only free-radical-catalyzed processes. In promulgating the F024 and F025 Chlorinated Aliphatic Organic Listing Rules, the USEPA demonstrated that only free radical-catalyzed processes generate hazardous constituents in toxic amounts. Experience at DuPont Dow with both types of processes confirms the USEPA conclusions. Organics in the wastewaters from these processes result from direct contact with the organic streams; therefore, wasewaters from ionic-catalyzed processes do not have hazardous organic constituents in toxic amounts. Furthermore, the *EDF vs. Carolyn Browner* Consent Decree from which the K173 Listing Rule was developed only requires that the USEPA consider listing as hazardous wastes those wastewaters and wastewater treatment sludges generated from production processes described in the F024 Listing Rule (i.e., from free radical-catalyzed processes).

The K173 Listing Rule should be limited to only C_1-C_3 chlorinated aliphatic production processes. Of the 25 U. S. facilities that generated C_1-C_5 chlorinated aliphatic hydrocarbons, only four generate C_4-C_5 chlorinated aliphatic hydrocarbons and these four facilities generate less than 5% of the total chlorinated aliphatic hydrocarbon production in the United States. Furthermore, for these four facilities none of the wastewater streams delineated in the Listing Background Document for K173 has greater than 1 nanogram/liter TCDD TEQ dioxins and furans. The 1 nanogram/liter TCDD TEQ level is a criterion below which the USEPA has demonstrated no significant risk to human health and, therefore, is proposing as a concentration-based exemption level from the K173 Listing Rule.

The use of underground injection wells should be a contingent management option. Class 1 underground injection wells are one of the safest waste disposal methods and, therefore, are protective of human health and the environment.

The use of covered tanks should be a contingent management option. The basis for the K173 Listing Rule is uncovered, agitated, biological treatment tanks. This management method has very minimal risk to human health (i.e., only one receptor/pathway slightly above the significance level of 1×10^{-5}); therefore, the use of covered tanks will have no significant risk to human health.

DuPont Dow supports using a 1 nanogram/liter TCDD TEQ trigger level as a concentration-based listing criterion. The USEPA demonstrated in its risk assessment that dioxin and furan levels below 1.0 nanogram/liter TCDD TEQ do not pose a significant risk (i.e., at or greater than 1×10^{-5}) to human health; therefore, wastewater streams with dioxin and furan levels below 1.0 nanogram/liter TCDD TEQ should not be listed as hazardous wastes.

DuPont Dow supports amending the 'Derived-from' Rule to exempt wastewater treatment sludges 'derived-from' treating K173 wastewaters as hazardous wastes. The USEPA has demonstrated that these sludges do not contain hazardous constituents in toxic amounts; therefore, they should not be listed as hazardous wastes.

The USEPA economic analysis for the proposed K173 Listing Rule is inaccurate and should be adjusted upward. The economic impact on the two affected DuPont Dow facilities is at least $11,000,000 in captial costs with annual recurring costs of approximately $17,000,000 per year. This is significantly greater than the USEPA projected costs of $1,320,000 initial capital costs and $766,900 annual recurring costs for the entire United States. In fact, the economic impact on the affected industry will probably exceed $100,000,000. This would require the USEPA to perform a cost-benefit analysis per the Unfunded Mandates Reform Act of 1995.

The USEPA must include a national capacity variance as part of the K173 Listing Rule. The quantities of wastewaters that would be impacted by the K173 Listing Rule are very large. At least one facility would need to temporarily transport K173 wastewaters offsite until it could complete permit and 'No Migration' modifications associated with the K173 Listing Rule. Undoubtedly, other affected facilities would need to transport their K173 hazardous wastewaters to offsite commercial facilities also. It is doubtful that adequate commercial capacity permitted to accept these K173 hazardous wastewaters exists in the United States.

RCRA-exempt wastewater treatment units should not be required to comply with RCRA Subpart CC standards. The USEPA has a long history of avoiding overlap between the hazardous waste regulatory program and other regulatory programs within the USEPA. Wastewater treatment units subject to either Section 402 or Section 307(b) are regulated under the Clean Water Act and are exempt from hazardous waste regulatory requirements. If the USEPA determines that controls are needed on some wastewater treatment units impacted by the K173 Listing Rule, then the hazardous waste program should defer to the wastewater program for implementing regulations to address this concern.

The USEPA risk assessment is overly conservative and demonstrates that K173 chlorinated aliphatic hydrocarbon process wastewaters do not pose a significant risk to the individual or population. K173 wastewaters, therefore, should not be listed as a hazardous waste. Despite the very conservative assumptions used in the K173 risk assessment, only one receptor/pathway combination showed any risk above the significant level of 1×10^{-5}. This farmer/inhalation combination had a risk of 2×10^{-5} for the most conservative, high-end deterministic risk model. The two other risk models tested for this combination did not demonstrate risk above the 1×10^{-5} significant level.

DuPont Dow's Stake in the Issue

DuPont Dow Elastomers L.L.C. (DuPont Dow) is a 50/50 joint venture company formed April 1, 1996 from the elastomer businesses and technologies of E. I. du Pont de Nemours and Company and

Dow Chemical Company. With headquarters in Wilmington, DE, DuPont Dow had revenues of approximately $1.1 billion in 1998 and has 1,466 employees worldwide - of which 1,232 work in the United States. DuPont Dow manufactures a suite of elastomeric products including Neoprene, Kalrezä, Vitonä, Hypalon™, Tyrin™, Nordel™ IP and Engage™ that are used in the automotive, wire and cable, adhesives, semiconductor, aerospace, chemical processing, construction and rubber industries. Its U.S. manufacturing facilities are located in Louisiana, Kentucky, Texas, New Jersey, Delaware and Maryland.

DuPont Dow Neoprene operations will be impacted significantly by the K173 Listing Rule as currently proposed. Capital costs that DuPont Dow Neoprene operations would spend to meet the K173 Listing Rule as proposed would be at least $11,000,000 while annual recurring costs would be approximately $17,000,000 per year. These recurring costs comprise over 1.5% of 1998 annual revenues of DuPont Dow Elastomers. DuPont Dow manufactures Neoprene at its Pontchartrain Site in LaPlace, LA and at its Louisville Plant in Louisville, KY. Neoprene is the workhorse of the DuPont Dow product line and in 1998 accounted for a major percentage of the after-tax earnings of DuPont Dow. Combined the Pontchartrain Site and Louisville Plant have 547 DuPont Dow employees. Because of the significant economic impact that the K173 Listing Rule as proposed may have on its Neoprene operations, DuPont Dow has a vital interest in ensuring that the final rule regulating wastewaters from chlorinated aliphatic hydrocarbon production processes is appropriate.

Regulatory and Policy Background

Organic residuals, as well as spent filters, filter aids and desiccants, from free radical-catalyzed processes producing chlorinated aliphatic hydrocarbons with chain lengths of one to five carbon atoms are F024 and F025 listed hazardous wastes. Also, certain chlorinated aliphatic hydrocarbon production wastes may be listed hazardous wastes from a specific source (K-Codes) or may be hazardous wastes due to a characteristic (D-Codes). Wastewaters from chlorinated aliphatic production processes are not currently regulated as listed hazardous wastes, but may be hazardous wastes due to a characteristic of the wastewater stream (D-Codes) or because of the mixture or 'derived-from' rules.

This is the initial proposal of the K173 Listing Rule for wastewaters from chlorinated aliphatic hydrocarbon production processes. On February 10, 1984 the USEPA promulgated an Interim Final Rule [49 FR 5308] which listed as hazardous wastes organic residuals from free radical-catalyzed processes producing chlorinated aliphatic hydrocarbons with chain lengths of one to five carbon atoms (F024 Listing Rule). On December 11, 1989 the USEPA promulgated a Final Rule [54 FR 50968] which listed as hazardous wastes condensed light ends, spent filters, filter aids and desiccant wastes from the same processes as described in the 1984 Interim Final Rule (F025 Listing Rule). In 1989 the USEPA published the Listing Background Document for the Production of Certain C_1-C_5 Chlorinated Aliphatic Hydrocarbons by Free Radical Catalyzed Processes – Final – November 21, 1989 (also referred to as Listing Background Document for F024).

6.1 DuPont Dow Comment

Listing Chlorinated Aliphatics Hydrocarbon Production Wastewaters As Hazardous Wastes Will Have Significant Negative Impacts

Listing of chlorinated aliphatic hydrocarbon production wastewaters as hazardous wastes will have significant negative implications on the DuPont Dow Neoprene production operations at the Pontchartrain Site (LaPlace, LA) and the Louisville Plant (Louisville, KY). In mid-1993 Pontchartrain Site personnel implemented new reaction technology to convert from free radical-catalyzed production of chlorinated aliphatic hydrocarbons to ionic-catalyzed production of these chlorinated aliphatic hydrocarbons. This eliminated the F024 and F025 hazardous waste listings from the waste streams generated onsite - including F024 'derived-from' and mixed wastewater streams being disposed onsite by underground injection. Converting the chloroprene production process from free radical to ionic catalysis took approximately four years and costs approximately $10,000,000. Listing chlorinated aliphatic hydrocarbon production wastewaters as K173 hazardous wastes would again cause wastewaters disposed onsite by underground injection to be hazardous wastes and would negate a major driving force in the reaction technology change.

Furthermore, in 1996 the Pontchartrain Site modified its chlorinated aliphatic production technology to eliminate the corrosivity characteristic from the brine wastewater stream generated from the process and to ensure that, as generated, this stream would be non-hazardous. Installing and implementing this technology change required approximately two years and cost over $1,000,000. Listing all chlorinated aliphatic hydrocarbon production wastewaters as hazardous wastes would result in this brine wastewater stream being a K173 listed hazardous waste and would negate the results of the technology change. As generated, this brine wastewater stream meets the USEPA Region 6 concentration-dependent criteria to be delisted should it become a hazardous waste; however, delisting a hazardous waste is a costly and time-consuming regulatory process.

Agency Response:

The Agency acknowledges and appreciates the efforts described by DuPont Dow in the way of pollution prevention and waste minimization activities. We note that in the final rule we are finalizing a decision not to list chlorinated aliphatic wastewaters as hazardous waste, as described in detail in the preamble to the final rule and associated background documents.

6.2 DuPont Dow Comment

The K173 Listing Rule Should Be Limited to Only Free Radical-Catalyzed Processes

When the USEPA promulgated the F024 and F025 Listing Rules in 1984 and 1989, respectively, it limited the chlorinated aliphatic hydrocarbon production wastes impacted by the rules to those generated only by free radical-catalyzed processes. At 64 FR 46479-46480 of the preamble to the proposed K173 Listing Rule the USEPA briefly addresses this issue.

The preamble to the F024 Listing Rule [49 FR 5308-5312] and the Listing Background Document for F024 [pp. 25-26] both demonstrate that the higher temperature, free radical-catalyzed process generates specific, toxic residual constituents that other lower temperature, non-free radical-catalyzed processes do not generate. Furthermore, the Listing Background Document for F024 [pp. 32-33] states that analytical data from one C_4 plant using a low temperature, acid-catalyzed process generated substantially lower amounts and concentrations of specific toxicants in the byproducts as compared to other C_4 processes using free radical catalysis.

The current Pontchartrain Site ionic-catalyzed production process for chloroprene (i.e., 2-chloro-1,3-butadiene - a C_4 chlorinated aliphatic) operates at a temperature approximately 200°C lower than the former free radical-catalyzed production process and generates significantly less reaction byproducts. The ionic-catalyzed process operates at well below 100°C. The Louisville Plant chlorinated aliphatic hydrocarbon production process, which produces 2,3-dichloro-1,3-butadiene (a different C_4 chlorinated aliphatic), is also ionic-catalyzed and operates within the same temperature range as the Pontchartrain Site process.

As recognized by the USEPA in the preamble to the F024 Listing Rule and in the Listing Background Document for F024, there are significant process and residual differences between free radical-catalyzed processes and other low temperature processes (e.g., ionic-catalyzed processes) for producing chlorinated aliphatic hydrocarbons. Comparing the former free radical-catalyzed process and the current ionic-catalyzed process at the Pontchartrain Site, these differences include:

Reaction Media Phase - the free radical-catalyzed process occurred within the gas phase while the ionic-catalyzed process occurs within a liquid phase. Reactions occurring within the liquid phase are more selective than gas phase reactions and, thus, generate less variety and quantity of byproducts.

Reaction Temperature - the current ionic-catalyzed process operates at a reaction temperature approximately 200°C lower than the free radical-catalyzed process. The ionic-catalyzed process operates at well below 100°C. [Listing Background Document for F024, pp. 25-26]

Process Efficiency - the ionic-catalyzed process has higher yields and thus converts a significantly higher percentage of the raw materials to chloroprene product thus generating significantly less waste (as much as 40% less organic wastes). [Listing Background Document for F024, pp. 23-24 and pp. 32-33]

Less Coke and Tars Produced - the lower temperature of the ionic-catalyzed process generates essentially no cokes or tars whereas the higher-temperature free radical-catalyzed process generated several hundred thousand pounds per year of byproduct coke. Furthermore, cokes and tars generated by the free radical-catalyzed process fouled process equipment such as heat exchangers causing lower efficiencies and more waste generation. Little, if any, fouling of process equipment occurs with the lower temperature, ionic-catalyzed process. [Listing Background Document for F024, pp. 23-24]

Lower Levels of Organics in Process Wastewaters - As shown by the USEPA sampling of Pontchartrain Site chlorinated aliphatic hydrocarbon process wastewaters in mid-1993 (free radical-catalyzed process) and mid-1997 (ionic-catalyzed process), significantly lower levels of organics were detected in wastewaters generated by the ionic-catalyzed process than by the free radical-catalyzed process. [Listing Background Document for F024, pp. 25-26]

Wastes Not F024 and F025 - Because the ionic-catalyzed process does not generate toxic waste constituents at levels of concern as does the free radical-catalyzed process, waste streams from the ionic-catalyzed process are not F024 and F025 listed hazardous wastes.

Organics in the wastewaters generated by chlorinated aliphatic hydrocarbon production processes result from direct contact with organic streams in the process. The solubility of these organics in water is extremely low; therefore, only very small amounts of the organics are present in the process wastewater. The organics in the wastewater streams, therefore, are a subset of the constituents in the residual organic streams contacted. Since the USEPA has demonstrated in the preamble to the F024 Listing Rule and in the Listing Background Document for F024 that only free radical-catalyzed processes generate significant levels of toxic constituents, the K173 List Rule should be limited to only free radical-catalyzed processes.

The only constituents for which K173 wastewaters may be listed as hazardous are dioxins and furans [64 FR 46483-46484, 46532-46533]. In July 1997 the USEPA sampled three chlorinated aliphatic hydrocarbon production process wastewater streams at the Pontchartrain Site - CD Brine from Steam Stripping, DCB Isom Scrubber Water and HCl Recovery Unit Effluent. The Pontchartrain Site uses a low temperature, ionic-catalyzed process for producing chlorinated aliphatic hydrocarbons. The level of dioxins and furans on a toxicity equivalents (TEQ's) basis in these wastewaters was only 0.0017 nanograms/liter TCDD TEQ in the CD Brine from Steam Stripping, no specific dioxin and furan congeners were detected in the DCB Isom Scrubber Water and there was 0.084 nanograms/liter TCDD TEQ in the HCl Recovery Unit Effluent. [Listing Background Document for the Chlorinated Aliphatics Listing Determination (Proposed Rule) - Final - July 30, 1999 (also referred to as Listing Background Document for K173), page 141]. These levels of dioxins and furans are extremely small

compared to the proposed USEPA listing criterion for K173 wastewaters of 1 nanogram/liter TCDD TEQ [64 FR 46503-46504].

In May 1997 the USEPA sampled four chlorinated aliphatic hydrocarbon production process wastewater streams at the Louisville Plant: Scrubber Water from the DC Process, Scrubber Water from the TCB Process, Stripper and Decanter Water from the DCD Process and the Combined Headworks to Wastewater Treatment. The Louisville Site uses an ionic-catalyzed process for producing chlorinated aliphatic hydrocarbons. No dioxin and furan congeners were detected in any of the wastewaters sampled [Listing Background Document for K173, page 131]. These undetectable levels of dioxins and furans are to be compared to the proposed USEPA listing criterion for K173 wastewaters of 1 nanogram/liter TCDD TEQ [64 FR 46503-46504].

These extremely low levels of dioxins and furans compared to the risk-based proposed listing criterion trigger level of 1 nanogram/liter TCDD TEQ demonstrate that low temperature, ionic-catalyzed processes, including those at the DuPont Dow Elastomers Pontchartrain Site and Louisville Plant, should not be part of the listing description. The listing description should be limited to high temperature, free radical-catalyzed processes. [64 FR 46480 - Comment Request III.A.1].

The *Environmental Defense Fund (EDF) vs. Carolyn Browner* Consent Decree (Civ. No. 89-0598 D.D.C) only requires that the USEPA consider listing as hazardous wastes wastewaters and wastewater treatment sludges generated from production processes described in the F024 Listing Rule. The F024 Listing Rule only encompasses free radical-catalyzed production processes. As noted on pages 5 and 6 in the amended Consent Decree of June 9, 1997:

m. Chlorinated aliphatics - EPA shall promulgate a final listing determination for chlorinated aliphatics wastes on or before [July 31, 1997] September 30, 2000. This listing determination shall be proposed for public comment on or before [June 12, 1997] July 31, 1999. This listing determination shall include wastewaters and wastewater treatment sludges generated from the production of the chlorinated aliphatics specified in the F024 listing.

In the proposed K173 Listing Rule the USEPA has gone beyond the mandate of the EDF Consent Decree by including all processes that generate C_1-C_5 chlorinated aliphatic hydrocarbons rather than limiting the scope of the proposed rule to only free radical-catalyzed processes. Neither in the preamble to the proposed rule, in the proposed rule nor in the background information documents does the USEPA identify analytical data and other relevant information as being from free radical-catalyzed production processes or other low temperature production processes (e.g., an ionic-catalyzed process). Thus it is impossible for persons reviewing the analytical data that formed the basis for the proposed K173 Listing Rule to identify differences in the waste constituents and constituent levels

based on the type of production process and how these differences would impact the risk assessment conducted by the USEPA.

Based on the limited analytical data available to DuPont Dow from its own facilities, the concentrations of dioxin and furan congeners in the wastewaters generated from ionic-catalyzed production processes are significantly below the values input into the USEPA risk assessment model and would not result in a significant risk (i.e. greater than 1×10^{-5}) to any population segment via any risk pathway. Because of the lower temperatures of non-free radical-catalyzed processes, it is believed that non-free radical-catalyzed processes generate very low levels of dioxin and furan congeners and thus do not pose a significant risk to human health or the environment. Furthermore, in conducting its risk assessment, the USEPA appears not to have included the results of the dioxin and furan analyses from the DuPont Dow Pontchartrain Site wastewater stream in the risk assessment model input data. The sample for this analytical data was taken from a dedicated wastewater headworks - one of only eight such streams in the proposed K173 Listing Rule analytical database. Using the DuPont Dow Pontchartrain Site dioxin and furan analytical data may have reduced the risks identified by the risk assessment results. [Listing Background Document for K173, pages 47-52, Tables 4-4 and 4-7].

Before promulgating the final K173 Listing Rule, the USEPA should determine if non-free radical-catalyzed processes are a significant (i.e., greater than 1×10^{-5}) risk to human health and the environment. If these processes are not a significant risk to human health or the environment, then the K173 Listing Rule should be limited to free radical-catalyzed production processes. Furthermore, the Listing Background Document for K173 should be amended to identify the type of production process generating each wastewater and wastewater treatment sludge stream.

Agency Response:

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. As described in Section VI.A.4.a of the preamble to the final rule, this decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units.

The commenter cites at great length the differences EPA has previously acknowledged between the composition and toxicity of process wastes (e.g., tars, distillation bottoms, reactor cleanout wastes, etc.) from manufacturing chlorinated aliphatics using free-radical catalyzed reactions, versus other manufacturing processes. In 1989, this differentiation led EPA to limit the scope of the current F024 listing to process wastes from the free-radical process only. However, the commenter does not provide any information explaining why these differences in manufacturing processes might lead to differences in the constituents EPA found (e.g., dioxin) in the wastewaters and wastewater treatment sludges in the more recent proposed rulemaking. In the

preamble to the August 25, 1999 proposed rule, EPA stated that "..our primary reason for not restricting our evaluation of wastewaters and wastewater treatment sludges to those generated by free radical catalyzed processes is that our preliminary analysis of these wastes indicated that the constituents of concern (i.e., dioxins, chloroform, arsenic) were not the same as the constitutes of concern associated with the previously-listed F024 and F025 wastes" (64 FR at 46480).

In the August 25, 1999 proposed rule EPA requested comment and data to help determine whether different manufacturing processes (such as free-radical catalyzed versus other processes) would result in different levels of dioxins in the resultant wastewaters and wastewater treatment sludges. Although the commenter correctly points out that their specific process, which is not free-radical catalyzed, generates wastewasters with low dioxin concentrations, EPA points out that the record has wastewater data from facilities which are likely utilizing free-radical catalyzed processes (as indicated by the generation of F024 waste at these facilities) showing dioxin wastewater levels below the proposed 1 ng/L trigger level, and as low or lower than levels cited by the commenter as representing non free-radical catalyzed processes. Absent any other information, EPA still cannot say with certainty that wastewaters from the free-radical catalyzed process, as a class, will have characteristically higher (or lower) dioxin concentrations than wastewaters from other types of chlorinated aliphatic manufacturing processes.

6.3 DuPont Dow Comment

If the Final K173 Listing Rule Includes All Chlorinated Aliphatic Production Processes, Then the K173 Listing Should Be Limited to Those Carbon Chain Lengths Posing a Signifi cant Risk to Human Health and the Environment

If the USEPA determines that the production of certain chain lengths of chlorinated aliphatic hydrocarbons (e.g., C_2 chlorinated aliphatic hydrocarbons) poses a significant risk to human health and the environment while the production of chlorinated aliphatic hydrocarbons of other chain lengths (e.g., C_4-C_5 chlorinated aliphatic hydrocarbons) does not pose a significant risk, then the USEPA should limit the listing description to only those chain lengths for which the production poses a significant risk.

Of the 25 U. S. facilities that generate C_1-C_5 chlorinated aliphatic hydrocarbons the Listing Background Document for K173 [Table 2-2 on page 9] identifies only four U. S. facilities that generate C_4-C_5 chlorinated aliphatic hydrocarbons – DuPont Dow Elastomers (LaPlace, LA), DuPont Dow Elastomers (Louisville, KY), Velsicol Chemical Corporation (Memphis, TN) and FMC Corporation (Baltimore, MD). Furthermore, the Listing Background Document for K173 (Table 2-1 on page 8) confirms that these four facilities generate less than 5% of the total chlorinated aliphatic hydrocarbons produced in the United States.

The USEPA is proposing to list chlorinated aliphatic hydrocarbon production wastewaters as K173 hazardous wastes due to dioxin and furan levels in the wastes. As demonstrated from the USEPA sampling in 1997, the chlorinated aliphatic hydrocarbon production wastewaters at these facilities all have extremely low levels of dioxins and furans – well below the proposed 1 nanogram/liter TCDD TEQ listing criterion in the proposed K173 Listing Rule [64 FR 46503-46504]. Dioxin and furan levels measured by the USEPA during the 1997 record sampling were:

* DuPont Dow Elastomers Pontchartrain Site in LaPlace, LA
* DCB Isom Scrubber Water (DD-03) – no specific dioxin and furan congeners detected
* HCl Recovery Unit Effluent (DD-04) – 0.084 nanograms/liter TCDD TEQ
* CD Brine from Steam Stripping (DD-05) – 0.002 nanograms/liter TCDD TEQ

  [Listing Background Document for K173, page 141]
* DuPont Dow Elastomers Louisville Plant in Louisville, KY
* Scrubber Water from the DC Process (DK-01) - no specific dioxin and furan congeners detected
* Scrubber Water from the TCB Process (DK-02) - no specific dioxin and furan congeners detected
* Stripper and Decanter Water from the DCD Process (DK-03) - no specific dioxin and furan congeners detected
* Combined Headworks to the Wastewater Treatment Facility (DK-04) - no specific dioxin and furan congeners detected

  [Listing Background Document for K173, page 131].

· Velsicol Chemical Corporation in Memphis, TN
  * VT-01 Wastewater Stream - 0.200 nanograms/liter TCDD TEQ
  * VT-02 Wastewater Stream - 0.004 nanograms/liter TCDD TEQ
  * VT-03 Wastewater Stream - 0.017 nanograms/liter TCDD TEQ
  * VT-04 Wastewater Stream - 0.503 nanograms/liter TCDD TEQ

  [Listing Background Document for K173, page 125]

· FMC Corporation in Baltimore, MD

  The USEPA did not sample wastewaters at this facility in 1997; however, the Listing Background Document for K173 (page 20) states that this facility produces very little chlorinated aliphatic hydrocarbons. Apparently it is one of the two facilities referenced in the proposed rule that manufacture *de minimis* quantities of chlorinated aliphatic hydrocarbons. [64 FR 46481]

In addition, according to the Listing Background Document for K173, none of the four facilities manages their wastewaters onsite in uncovered, aerated, biological treatment tanks – the management

scenario upon which the proposed K173 listing is based and for which the listing risk assessment was conducted. [64 FR 46484] DuPont Dow Elastomers in LaPlace, LA manages its wastewaters in onsite covered tanks followed by onsite underground injection. DuPont Dow Elastomers in Louisville, KY collects and treats its wastewaters in onsite tanks with discharge to a municipal POTW. The wastewaters from Velsicol Chemical Corporation in Memphis, TN are managed in onsite tanks with some of the wastewaters discharged to a POTW and some reclaimed/reused. FMC Corporation in Baltimore, MD treats its wastewaters in onsite tanks with discharge to a POTW.

Because the four U. S. C_4-C_5 chlorinated aliphatic hydrocarbon manufacturing facilities produce significantly less than 5% of the total U. S. chlorinated aliphatic hydrocarbon production volume and because none of the production wastewaters from these facilities contains significant levels of dioxins and furans (all wastewater streams are well below the proposed 1 nanogram/liter TCDD TEQ exemption criterion for K173 wastewaters), these facilities do not pose a significant risk to human health or the environment. The USEPA, therefore, should limit the K173 listing description to C_1-C_3 chlorinated aliphatic hydrocarbons.

Agency Response:

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. As described in Section VI.A.4.a of the preamble to the final rule, this decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units.

6.4 DuPont Dow Comment

Use of Underground Injection Wells Should Be A Contingent Management Option

At 64 FR 46480, the USEPA states:

> . . . the Agency has evaluated the ways in which the wastes are likely to be managed and has determined that certain waste management activities would present significant risks but that others would be protective of human health and the environment. Under a contingent management approach, EPA is proposing to list particular wastes as hazardous only if the wastes are managed in a way other than the manner in which the Agency has determined is protective of human health and the environment.

In the proposed K174 Listing Rule the USEPA has proposed allowing the use of Subtitle D or Subtitle C landfills for EDC/VCM wastewater treatment sludges as a contingent management option. If

promulgated without changes, the rule would exempt EDC/VCM wastewater treatment sludges managed at Subtitle D or Subtitle C landfills from being a K174 listed hazardous waste at the point of origin of the waste. [64 FR 46508-46510] The USEPA has determined that this management option does not pose a significant risk to human health or the environment.

DuPont Dow strongly supports the contingent management approach when it can be demonstrated that a specific waste management practice does not pose a significant risk to human health or the environment. This eliminates from the hazardous waste arena those waste streams that are properly managed to protect human health and the environment and thus do not pose a significant risk.

The USEPA should allow Class 1 underground injection wells as a contingent management option for K173 wastewaters. Class 1 underground injection wells have a long history of use demonstrating that they are very protective of human health and the environment. In 1992 the USEPA Office of Pollution Prevention stated that "Class I underground injection wells are safer than virtually all other waste disposal practices."

Class 1 underground injection wells discharge the wastewater stream several thousand feet below ground and far below the lowest available drinking water aquifer. Furthermore, the Class 1 standards require that the well operator demonstrate that a sufficient depth of impermeable clay exists between the bottom of the lowest available drinking water aquifer and the top of the injection zone. Class 1 well construction requires at least four mechanical layers of protection from the surface through the bottom of the lowest available drinking water aquifer and a well-operated annulus system to detect any potential leaks in the injection tubing. Class 1 underground injection wells must be tested annually to ensure mechanical integrity of the well casing and annulus piping and to verify that no cracks exist in the injection zone clays. The influent piping and wellhead must be inspected daily to ensure mechanical integrity.

Prior to injecting wastewaters into the Class 1 underground injection wells, DuPont Dow Pontchartrain Site personnel aggregrate the wastewaters in centrally located, covered tanks. They then transfer the wastewaters to the underground injection wells via hard piping after adjusting the pH and filtering the wastewaters to remove particulates. The tank systems and piping are inspected and tested on a periodic basis to ensure mechanical integrity. The tanks have air pollution control equipment such as condensers to minimize the release of organic constituents to the atmosphere and are regulated by the Louisiana Department of Environmental Quality (LDEQ) through its air quality control and hazardous waste regulations and through permits by both divisions of the LDEQ. It is believed that most, if not all, users of Class 1 underground injection wells have similar closed systems and programs for managing their wastewaters prior to injection. The wastewater management systems used by underground injection well operators differ significantly from the uncovered, agitated, biological treatment tanks that form the basis of the proposed K173 Listing Rule.

Class 1 underground injection wells and their associated wastewater management systems, therefore, do not expose the hazardous constituents in the wastewater stream to the environment where they can pose a significant risk to human health and the environment. Thus Class 1 underground injection wells should be a contingent management option under the K173 Listing Rule such that wastewaters managed by this practice are not a hazardous waste at the point of origin. [64 FR 46508]

Users of onsite Class 1 underground injection wells typically have records on the quantity of wastewaters discharged to the underground injection wells and on the times of operation of the wells. These records will be adequate documentation for demonstrating compliance with the contingent management option. Users of offsite Class 1 underground injection wells have manifest or shipping records demonstrating the quantity of wastewaters transported to the well site and the identification of the well site. These records will be adequate documentation for demonstrating compliance with the contingent management option. [64 FR 46510]

Agency Response:

EPA acknowledges the commenter's support for the contingent management approach for wastewater treatment sludges, but notes that the Agency did not propose this approach for wastewaters. However, 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. As described in Section VI.A.4.a of the preamble to the final rule, this decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units.

6.5 DuPont Dow Comment

In developing this contingent management option, the USEPA should clarify that *de minimis* losses of wastewaters as generally specified in 40 CFR 261.3(a)(2)(iv)(D) do not result in a K173 listed hazardous waste. Additionally, the USEPA should expand the *de minimis* exclusion to include all listed hazardous wastes contained in wastewaters of which the discharge is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act or Section 1421 of the Safe Drinking Water Act and should not limit the *de minimis* exclusion to only those hazardous wastes listed in 40 CFR 261.3(a)(2)(iv)(D) and contained in wastewaters of which the discharge is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act. In establishing the original *de minimis* exemption, the USEPA recognized that facilities efficiently and properly managed small losses of materials listed in 40 CFR 261.33 in onsite wastewater collection systems without posing a substantial risk to human health and the environment. Similarly, small losses of materials listed in 40 CFR 261.31 and 40 CFR 261.32 are just as efficiently and properly managed in onsite wastewater collection systems.

Agency Response:

The Agency is finalizing a decision not to list chlorinated aliphatic wastewaters as hazardous waste. Therefore, the commenter's concern regarding de minimis losses of wastewaters is moot with regard to chlorinated aliphatic wastewaters.

6.6 DuPont Dow Comment

Use of Covered Tanks Should Be A Contingent Management Option

In developing the K173 Listing Rule, the USEPA used uncovered, aerated biological treatment tanks as the management option for the risk assessment. Air emissions from these uncovered tanks were modeled to determine if a significant indirect risk (i.e., greater than 1×10^{-5}) occurs. [64 FR 46484-485, 46500-46501] At 64 FR 465401 the USEPA indicated that uncovered, aerated biological treatment tanks are the predominant method for managing chlorinated aliphatic process wastewaters; however, the USEPA confirms that not every facility uses these uncovered tanks for managing their chlorinated aliphatic process wastewaters.

Despite the large wastewater surface area and the aeration process which enhances the transfer to the environment of the wastewater contaminants in uncovered, aerated biological treatment tanks, the risk from managing chlorinated aliphatic production wastewaters in these tanks was barely above the significant risk level of 1×10^{-5}. For chlorinated aliphatic production wastewaters the greatest high-end deterministic risk estimate was 2×10^{-5} for a farmer ingesting dioxins and furans that had deposited from the air onto the soil and vegetables. All other receptors had maximum high-end deterministic risk estimates from 10 to 10,000 times less than that of the farmer. The central tendency deterministic risk estimates for all receptors were an order of magnitude less than the equivalent high-end deterministic risk estimates. [64 FR 46489-46490] Furthermore, the USEPA determined that the population risks resulting from managing chlorinated aliphatic production wastewaters in uncovered, aerated biological treatment tanks were not significant. [64 FR 46496]

Covered tanks have a relatively low rate of exchange of wastewater contaminants between the water and the air compared to uncovered tanks; therefore, had the USEPA modeled indirect risks for covered tanks containing chlorinated aliphatic production wastewaters, one would expect the high-end and central tendency deterministic risk estimates to be significantly lower than for uncovered tanks and certainly much less than 1×10^{-5}. Covered tanks managing chlorinated aliphatic production wastewaters do not pose a significant risk to human health or the environment.

Because managing chlorinated aliphatic production wastewaters in covered tanks does not pose a significant risk to human health or the environment, the USEPA should allow using covered tanks as a contingent management option in the K173 Listing Rule such that wastewaters managed by this practice are not a hazardous waste at the point of origin. [64 FR 46508] Operators of tank systems typically

have either records of tank levels over time or tank influent and effluent flow rate records. These records will be adequate documentation for demonstrating compliance with the contingent management option. [64 FR 46510]

In developing this contingent management option, the USEPA should clarify that *de minimis* losses of wastewaters as generally specified in 40 CFR 261.3(a)(2)(iv)(D) do not result in a K173 listed hazardous waste. Additionally, the USEPA should expand the *de minimis* exclusion to include all listed hazardous wastes contained in wastewaters of which the discharge is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act or Section 1421 of the Safe Drinking Water Act and should not limit the *de minimis* exclusion to only those hazardous wastes listed in 40 CFR 261.3(a)(2)(iv) and contained in wastewaters of which the discharge is subject to regulation under either Section 402 or Section 307(b) of the Clean Water Act. In establishing the original *de minimis* exemption, the USEPA recognized that facilities efficiently and properly managed small losses of materials listed in 40 CFR 261.33 in onsite wastewater collection systems without posing a substantial risk to human health and the environment. Similarly, small losses of materials listed in 40 CFR 261.31 and 40 CFR 261.32 are just as efficiently and properly managed in onsite wastewater collection systems.

Agency Response:

EPA notes that the Agency did not propose this approach for wastewaters. However, EPA is finalizing a decision not to list chlorinated aliphatic wastewaters as hazardous waste, therefore EPA did not consider the merits of promulgating a "contingent management" approach to listing chlorinated aliphatic wastewaters.

6.7 DuPont Dow Comment

DuPont Dow Supports Using a 1 nanogram/liter TCDD TEQ Trigger Level As A Concentration-Based Listing Criterion

At 64 FR 46504 the USEPA has requested comment on the alternative of using a one nanogram/liter (ng/L) TCDD TEQ trigger level as a criterion for listing wastewater streams as hazardous under the K173 Listing Rule. DuPont Dow strongly supports the USEPA implementing a 1 ng/L TCCD TEQ trigger level as a concentration-based listing criterion similar to the USEPA plans to implement a concentration-based listing criterion in the Dyes and Pigments Industry Proposed Rulemaking of July 23, 1999. [64 FR 40192-40230] The concentration-based listing should be self-implementing based on the waste constituent data determined by the generator of the wastewater stream [64 FR 40210]. Furthermore, DuPont Dow urges the USEPA to adopt the 1 ng/L TCDD TEQ trigger level such that, if at any point in the waste management process from the point of generation to the point of discharge, the concentration of dioxins and furans in the wastewaters falls below 1 ng/L TCDD TEQ (except by

impermissible dilution), then the wastewater would not be a K173 listed hazardous waste from that point forward.

In making the analytical determination of the TCDD TEQ level in the wastewater stream, DuPont Dow supports sampling the wastewater stream a minimum of four times and using the maximum value from the four (or more) samples as the value to compare against the 1 ng/L TCDD TEQ listing criterion; however, the USEPA also should allow generators the option to apply statistical methods to determine an acceptable upper confidence limit on the mean as the value to compare to the listing criterion. DuPont Dow suggests a 95% upper confidence limit to ensure that the wastewater stream does not pose a significant risk to human health or the environment. Because of the time required for laboratories to analyze for dioxins and furans, the increased number of dioxin and furan analyses being conducted today and the limited number of commercial laboratories qualified to conduct these analyses, DuPont Dow suggests that the USEPA allow 120 days after the effective date of the final K173 Listing Rule as the completion deadline for sampling and analysis and the waste determination.

DuPont Dow further supports resampling the non-hazardous wastewater stream annually or when a process change occurs that may increase the dioxin and furan concentration in the wastewater stream. DuPont Dow supports a single, annual confirmatory sample; however, the USEPA should allow the generator the option of additional samples to conduct a statistical determination based on the upper confidence limit on the mean. With the above changes DuPont Dow supports and encourages the USEPA to promulgate a concentration-based listing criterion of 1 ng/L TCDD TEQ for K173 wastewaters as outlined in 64 FR 40210-40212.

In an extremely conservative risk assessment using uncovered, aerated biological treatment tanks as the wastewater management option [64 FR 46498], the USEPA demonstrated that chlorinated aliphatic production wastewaters with dioxin and furan concentrations at or below 1 ng/L TCDD TEQ do not pose a significant risk to human health and the environment. [64 FR 46504] Thus a 1 ng/L TCDD TEQ concentration should be the listing criterion for potential K173 chlorinated aliphatic production wastewaters.

Agency Response:

The Agency thanks DuPont Dow for its suggestions with regard to a concentration-based listing alternative for chlorinated aliphatic wastewaters. However, as discussed above, 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. As described in Section VI.A.4.a of the preamble to the final rule, this decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units.

Given the Agency's finding that chlorinated aliphatic wastewaters do not pose significant risk to human health and the environment, and our decision not to list these wastewaters as hazardous, we therefore 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.

6.8 DuPont Dow Comment

DuPont Dow Supports Amending the 'Derived-From' Rule to Exempt Wastewater Treatment Sludges 'Derived-From' Treating K173 Wastewaters As Hazardous Wastes

The USEPA has evaluated wastewater treatment sludges from the chlorinated aliphatics industry and has made independent hazardous waste listing determinations for several categories of these sludges. These independent hazardous waste listing determinations supercede the application of the 'derived-from' rule that assumes risk absent any information on the toxicity of the treatment sludge. [64 FR 46502]

DuPont Dow strongly supports the USEPA determination that wastewater treatment sludges 'derived-from' K173 wastewaters do not pose significant risks to human health and the environment. Furthermore, DuPont Dow encourages the USEPA to amend the 'derived-from' rule at 40 CFR261.3(c)(2)(ii) to exclude as K173 hazardous wastes any wastewater treatment sludges 'derived-from' treating K173 wastewaters. [64 FR 46502] The USEPA should expand this excellent concept to derived-from residues of other listed hazardous wastes where the residues are known not to be a hazard to human health or the environment.

Agency Response:

Because we are not finalizing the listing for chlorinated aliphatic wastewaters as proposed, wastewater treatment sludges derived from such wastewaters will not become hazardous as a result from being derived-from K173, therefore we are not finalizing the proposed regulations at 40 CFR 261.3(c)(2)(ii).

6.9 DuPont Dow Comment

The USEPA Economic Analysis for the Proposed K173 Listing Rule Is Inaccurate And Should Be Adjusted Upward

At 64 FR 46518 the USEPA estimates that the total U.S. economic costs for implementing the K173 Listing Rule as proposed for wastewaters will be $1,320,000 initial capital costs and $766,900 recurring annual operating and maintenance costs. In developing these cost estimates the USEPA considered only tank modifications and analytical costs for dioxins and furans. Other associated costs to the regulated community, such as temporary offsite disposal of wastewaters while retrofitting facilities to comply with the K173 Listing Rule, permit and 'No Migration' Petition modification costs, costs of constructing and operating new loading facilities for wastewaters and major piping modifications needed to comply with the K173 Listing Rule, were not considered. Although DuPont Dow Elastomers does not have access to information on the cost impacts for other companies affected by the K173 Listing Rule as proposed, impacts within DuPont Dow Elastomers facilities alone would far exceed the USEPA estimates of cost impacts nationwide.

The DuPont Dow Elastomers Pontchartrain Site currently disposes of approximately 450,000,000 lbs/year (95 gallons/minute) of hazardous wastewaters in three onsite hazardous waste underground injection wells. In addition, it disposes of approximately 300,000,000 lbs/year (63 gallons/minute) of non-hazardous brine wastewaters in an onsite non-hazardous waste underground injection well. All of these wastewaters would become K173 hazardous waste under the K173 Listing Rule as proposed.

If these wastewaters become K173 listed hazardous wastes and associated Land Disposal Restrictions should be subsequently promulgated, then DuPont Dow Elastomers Pontchartrain Site personnel will no longer be able to dispose of these hazardous wastewaters in the four onsite underground injection wells until significant, time-consuming permit and 'No Migration' Petition modifications are approved. For the three hazardous waste underground injection wells the USEPA must approve a revised "No Migration" Petition, the Louisiana Department of Environmental Quality (LDEQ) must issue a revised Act 803 Determination and the Louisiana Department of Natural Resources (LDNR) must issue a revised operating permit. For the non-hazardous waste underground injection well the USEPA must approve a 'No Migration' Petition, the LDEQ must issue an approved Act 803 Determination and the LDNR must issue a hazardous waste underground injection well operating permit. In addition, the site hazardous waste permit must have a Class 3 permit modification approved by the LDEQ to add the two wastewater storage tanks that feed the non-hazardous underground injection well.

Discussions with UIC personnel at the USEPA Region 6 in Dallas, TX confirm that modifying the Pontchartrain Site "No Migration" Petition will require additional modeling to include the K173 wastewater streams. In addition, the current non-hazardous underground injection well will need to be included within the revised 'No Migration' Petition. Performing the additional modeling and developing the revised "No Migration" Petition for submittal to the USEPA will require at least 12 months. The USEPA Region 6 UIC Division estimates that they will require at least 12-24 months to review the modeling and petition information and to approve the requested modification. Furthermore, the LDNR and the LDEQ will not act until the USEPA approves the revised "No Migration" Petition. Once the "No Migration" Petition is approved, the LDNR and LDEQ will require an additional 6-12 months minimum to review the submitted information, revise the site underground injection well operating permit

and approve the revised Act 803 Determination to include the K173 wastewaters for the current hazardous waste injection wells and convert the current non-hazardous waste underground injection well to a hazardous waste underground injection well. The total time required from the K173 Listing Rule promulgation date to final approval of all modifications is estimated to be a minimum of 30 to 48 months. The cost is estimated to be approximately $500,000.

Additionally, preparing the Class 3 Permit Modification to add the two wastewater storage tanks to the site hazardous waste permit will require approximately four months. The LDEQ will require approximately 24 to 36 months to approve the request; therefore, the total time required for adding the two wastewater storage tanks to the site hazardous waste permit is estimated to be a minimum of 28 to 40 months. Associated costs are estimated to be approximately $40,000.

During this minimum 30 to 48 month period DuPont Dow will only be able to dispose of K173 wastewaters in the underground injection wells from the promulgation date to the effective date of the regulation – typically a period of 6 months. Thus, for at least 24 to 42 months site personnel must use an alternative, approved disposal method for the K173 wastewaters. The only feasible alternative is to transport the wastewaters to an offsite commercial underground injection well approved to accept these K173 wastewaters. At this time it is uncertain if any permitted commercial underground injection wells will be approved to accept K173 hazardous wastewaters by the effective date of the K173 Listing Rule.

Loading and transportation costs associated with disposing of the K173 hazardous wastewaters in an offsite commercial underground injection well would be significant. Using 5000-gallon capacity trucks would require one truck loaded and shipped offsite every 32 minutes (46 trucks/day), 365 days per year. The roundtrip transportation costs are estimated at approximately $1000 per truck. In addition, Dupont Dow Elastomers would need to hire dedicated operators working 24 hours per day, 365 days per year at a cost of approximately $300,000 per year to load the trucks. Loading and transporting this wastewater to the offsite commercial underground injection well would have a negative economic impact of approximately $17,000,000 per year to DuPont Dow Elastomers. This estimate does not include direct treatment and disposal costs that are assumed to be similar for onsite and offsite underground injection wells and, therefore, have been excluded from the cost calculation. Any additional treatment and disposal costs charged by the offsite commercial underground injection well facility would increase the negative economic impact on DuPont Dow.

Furthermore, during this interim period Pontchartrain Site personnel will need to construct additional loading facilities to manage the increased volume of hazardous wastewaters being shipped offsite. The cost of constructing the additional loading facilities is estimated to be approximately $1,000,000. Other unplanned capital projects may be required at the Pontchartrain Site such as additional storage and treatment facilities. It is estimated that approximately 36 months will be required at the Pontchartrain Site for planning and constructing the loading facilities and other uplanned capital projects associated with the K173 Listing Rule. Since the full scope of these projects is not known at this time, it is not

possible to estimate the significant costs that the site will incur. Capital secured for projects associated with the K173 Listing Rule would compete with and potentially eliminate other business or voluntary environmental improvement projects that could offer greater overall benefit.

The DuPont Dow Elastomers Louisville Plant currently disposes of approximately 13,500,000,000 lbs/year (2850 gallons/minute) of potential K173 wastewaters to a Publicly-Owned Treatment Works (POTW) after onsite, non-biological treatment in tanks. These wastewasters, which are currently non-hazardous, consist of three small chlorinated aliphatic production wastewater streams (totaling 378,000,000 lbs/year or 80 gallons/minute) commingled with other plant wastewaters. Due to the mixture rule [40 CFR 261.3(a)(2)(iv)] the total plant wastewater stream will become hazardous waste if the K173 Listing Rule is finalized as proposed.

The Louisville Plant wastewater transport facilities to the POTW would have to be upgraded if the site wastewaters become hazardous wastes. Capital costs are estimated to be at least $10,000,000. These improvements would require a minimum of 36 months to complete. Should the POTW determine that it could no longer accept the DuPont Dow wastewaters, the Louisville Plant would need to permit and construct an onsite wastewater treatment facility with an NPDES outfall at a cost of approximately $20,000,000. The timeframe to receive a revised NPDES permit, design the wastewater treatment facility and construct it is estimated to be at least 48 to 60 months.

The costs to the two DuPont Dow Elastomers facilities impacted by the K173 Listing Rule as proposed are quite significant. Capital costs are estimated to be at least $11,000,000 and annual operating costs for the interim period of permit and "No Migration" Petition modification approval are estimated to be at least $17,000,000 per year. Should the Louisville Plant need to construct an onsite wastewater treatment facility, then significant additional annual operating costs would be incurred.

DuPont Dow owns and operates two of the 25 C_1-C_5 chlorinated aliphatic hydrocarbon production facilities in the United States. It is expected that other affected facilities will experience capital and annual recurring costs similar to the DuPont Dow facilities. The USEPA needs to further evaluate these cost estimates and revise its economic analysis on the impact of the K173 Listing Rule to the regulated community. It is anticipated that the actual economic impact of this chlorinated aliphatics rulemaking to affected facilities will exceed $100,000,000 and, therefore, will require that the USEPA perform a cost-benefit analysis under the Unfunded Mandates Reform Act of 1995. DuPont Dow Elastomers requests that the USEPA withdraw the proposed chlorinated aliphatics rulemaking until it can perform the required cost-benefit analysis under the Unfunded Mandates Reform Act of 1995.

Agency Response:

As already described in EPA responses above, the K173 wastewater listing (conditionally requiring tank covers) is dropped from the final rule. The private sector annual compliance cost for the final rule, which includes a decision not to list chlorinated

aliphatic wastewaters, is well under UMRA's $100 million threshold, so a benefit-cost analysis is not required by UMRA.

6.10 Dupont Dow Comment

The USEPA Must Include a National Capacity Variance As Part of the K173 Listing Rule

As demonstrated in the previous section, significant permit and "No Migration" Petition modifications will be required by impacted facilities if the K173 Listing Rule is finalized as proposed. In addition, major capital investment projects will need to be constructed. For the DuPont Dow Pontchartrain Site the permit and "No Migration" Petition modification approvals will require at least 30 to 48 months after the promulgation date of the final K173 Listing Rule. For DuPont Dow major capital projects required by the rulemaking will require at least 36 months to secure the permits and plan and construct the projects.

After the effective date of the rulemaking (usually 6 months after promulgation) the impacted facilities requiring these approvals and projects will no longer be able to manage their wastewaters onsite until they receive the necessary approvals and complete construction of the projects. Because of the large volumes of impacted wastewaters as demonstrated above, it is doubtful that sufficient treatment and disposal capacity specific to K173 wastewaters will exist in the commercial arena. Furthermore, it is uncertain if sufficient transport vehicles will be available to ship the wastewaters to the commercial facilities.

The USEPA needs to evaluate the total impact of the K173 Listing Rule on the regulated community, determine the quantity of wastewaters that would need to be treated and disposed offsite while permit approvals are being obtained and projects constructed and then ascertain if approved treatment and disposal facilities and transportation vehicles are available for this additional wastewater volume.

Should sufficient treatment and disposal capacity not be available, then the USEPA should grant a 2-year national capacity variance from the Land Disposal Restrictions for K173 wastewaters.

Agency Response:

The commenter correctly outlines permit modification requirements that would result as a consequence should K173 have been listed. If the facility could not come into compliance by the effective date of a newly identified hazardous waste, then the facility may petition for a case-by-case extension. However, the Agency in its final deliberations determined that the wastes proposed as K173 did not pose significant hazards to human health to justify identifying the wastewaters as hazardous wastes. EPA is finalizing a

decision to not list K173 as hazardous. Therefore, the commenter's request for a national capacity variance is unnecessary.

6.11 DuPont Dow Comment

RCRA-Exempt Wastewater Treatment Units Should Not Be Required to Comply with 40 CFR 264 and 265 Subpart CC Standards

When initially promulgating the RCRA hazardous waste regulations in the late 1970's and early 1980's, the USEPA determined that there should not be overlap between the hazardous waste regulatory program and other regulatory programs administered by the USEPA. Where, for example, the USEPA wastewater program regulated a specific waste stream under regulations promulgated under the authority of the Clean Water Act, then the hazardous waste program would defer to the wastewater regulations and would not regulate the same stream. Consistent with this determination, the USEPA promulgated regulations now codified as 40 CFR 264.1(g)(6) and 40 CFR 265.1(c)(10) which exempt from the hazardous waste regulations wastewater treatment units subject to either Section 402 [the NPDES Program] or Section 307(b) [the POTW Program] of the Clean Water Act.

The determination by the USEPA to not regulate the same stream or entity under two sets of environmental regulations has proven very effective during the past twenty years and should not be compromised at this time. Where a facility is already controlling specific emissions under a regulatory program such as the Clean Air Act, then the RCRA program would defer to the initial regulatory program and not impose similar requirements. The proposed regulation of currently exempt wastewater treatment units under the 40 CFR 264 Subpart CC and 40 CFR 265 Subpart CC rules erodes this basic cornerstone of the USEPA regulatory program. [64 FR 46503] Having two USEPA programs simultaneously regulating the same waste stream or facility will create additional complexity in an already complex set of regulations and will lead to significant concerns both for the regulated community and the regulatory agency in the enforcement and the permitting programs.

If the USEPA determines that controls are needed on some currently exempt wastewater units, then the hazardous waste program must defer to the wastewater program either to implement regulations requiring these controls or to include the necessary requirements in facility NPDES permits or POTW pretreatment standards.

Agency Response:

EPA disagrees with the commenter that the Agency "must defer" to the wastewater program to implement controls on wastewater treatment tanks managing hazardous waste. However, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

6.12 DuPont Dow Comment

The USEPA Risk Assessment Is Overly Conservative and Demonstrates That K173 Chlorinated Aliphatic Hydrocarbon Process Wastewaters Do Not Pose A Significant Risk to the Individual or Population And, Therefore, Should Not Be Listed As A Hazardous Waste

In developing the input data for the risk assessment on chlorinated aliphatic hydrocarbon process wastewaters, the USEPA used very conservative assumptions that overestimate the risk to human health. For example, in determining the manner in which facilities manage these wastewaters, the USEPA selected uncovered, aerated, biological treatment tanks – the management method that would lead to the greatest release of wastewater constituents to the atmosphere – and assumed the total U. S. volume of chlorinated aliphatic hydrocarbon process wastewasters is managed in this manner. Although some facilities managing these wastewaters use uncovered, aerated, biological treatment tanks, many facilities use covered tanks and do not agitate the wastewaters in the tanks. [64 FR 46501] It is unfortunate that in Appendix D of the Listing Background Document for K173 the USEPA did not identify which facilities use uncovered, aerated, biological treatment tanks and which use covered tanks so that a better assessment of volumes managed by each method could be determined.

Per the discussion at 64 FR 46489, the USEPA considers a decision to list a waste as hazardous when the carcinogenic risk is 1×10^{-5} or greater or when the noncancer hazard quotient (HQ) is 1 or greater. In developing a risk assessment, the USEPA uses three different methods to estimate the potential risks – the high-end deterministic risk analysis, the central tendency deterministic risk analysis and the probabilistic risk analysis. The high-end and central tendency deterministic risk analyses use single values for each parameter in the risk assessment program and produce a point estimate of the risk or hazard for each receptor/pathway combination. The high-end deterministic risk analysis identifies the most sensitive variables and sets these parameters at their high-end (generally 90^{th} percentile) values and is used to estimate risks to individuals exposed at the upper range of the distribution of exposures. The central tendency deterministic risk analysis sets parameters at their mean (average) or 50^{th} percentile (median) values and is used to estimate risks to the average receptor in the population. The probabilistic risk analysis allows some of the parameters to have a range of values thus producing a distribution of risk or hazard for each receptor/pathway combination. [64 FR 46482-46483]

Despite the very conservative assumptions used in the risk assessment as detailed in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination - July 30, 1999, the USEPA determined that there was only one receptor/pathway combination for

which the risk exceeded the significant level of 1×10^{-5} for proposed K173 chlorinated aliphatic hydrocarbon process wastewaters. [64 FR 46489] This receptor/pathway combination was an adult farmer ingesting dioxins. Furthermore, only the high-end deterministic risk estimate (the most conservative of all risk assessments estimated) for this receptor/pathway combination exceeded the significant level. Both the central tendency deterministic risk estimate and the probabilistic risk estimate at the 50^{th} percentile for this receptor/pathway combination were below the significant level of 1×10^{-5}. In fact, the extremely conservative high-end deterministic risk estimate for the farmer ingesting dioxins was only 2×10^{-5} – slightly above the significant level and well within the potential error of the risk estimate. Additionally, none of the wastewater contaminants had a non-cancer hazardous quotient (HQ) greater than 1 nor did the sum of the contaminant hazardous quotients exceed 1. [64 FR 46489 – 46490] The extremely conservative assumptions used in developing the risk assessments have caused the true risks to the exposed individual and to the population as a whole to be significantly overestimated.

Agency Response:

The Agency agrees that revising some of our modeling assumptions is appropriate. The Agency's complete response to this comment is provided in Section 4 of this Response to Comment document (responses to comments from Dow, CALP-00012).

6.13 DuPont Dow Comment

Since the USEPA risk assessment for proposed K173 chlorinated aliphatic hydrocarbon process wastewaters used extremely conservative assumptions and since only the most conservative high-end deterministic risk analysis for one receptor/pathway combination slightly exceeded the significant risk level, it is improbable that any member of the public would be exposed to a realistic risk from facilities managing these wastewaters. In making the determination whether to list K173 wastewaters, the USEPA should significantly weigh the population risks and not rely solely on the risks to those individuals who are significantly exposed.

Based on the relatively low estimated risks to those individuals who are significantly exposed, it is expected that the population risks resulting from managing proposed K173 chlorinated aliphatic hydrocarbon process wastewaters will be insignificant. The central tendency deterministic risk estimates strongly suggest this result. [64 FR 46498]

In evaluating the results of the K173 risk assessment and considering that the extremely conservative assumptions used in the risk assessment have caused the true risks to be overestimated, the USEPA should determine that the chlorinated aliphatic hydrocarbon process wastewaters do not pose a significant risk to the individual or to the population and should not be listed as a K173 hazardous waste. [64 FR 46496, 46501]

Agency Response:

We note that in the final rule we are finalizing a decision not to list chlorinated aliphatic wastewaters as hazardous waste, as described in detail in the preamble to the final rule and associated background documents. The Agency's complete response to the commenter's concerns regarding population risk is provided in Section 7.4 of this Response to Comment document (response to comments from American Petroleum Institute CALP-00002).

SECTION 7
American Petroleum Institute (API)
CALP-00002

The American Petroleum Institute (API) is pleased to provide these comments on the Proposed Listing of Chlorinated Aliphatics Production Wastes at 64 FR 46476, August 25, 1999. API is a non-profit organization representing approximately 400 companies engaged in all aspects of the petroleum industry including exploration and production, refining, transportation and marketing. The proposed rulemaking includes numerous provisions that may serve as precedents for the Solid Waste Program and may therefore have a substantial impact on our industry.

API provides the following comments regarding potentially precedent-setting issues raised in this proposal.

7.1 API Comment:

Conditional Listing

In this proposed rulemaking, EPA states that the placement of EDC/VCM wastewater treatment sludges in lined landfills does occur and would lessen the potential risks from these wastes, and requests comment on a conditional listing approach. 64 Fed Reg. 46509.

API has historically advocated a contingent management (i.e., conditional listing) approach as appropriate for wastes that may pose significant risks when mismanaged, but not when properly managed. API continues to advocate that any listing of hazardous waste should be limited in scope, whenever possible, to only those waste streams that are shown to pose significant actual or potential risks to health or the environment when improperly managed in a plausible mismanagement scenario. Specifically, when EPA has determined that a waste stream may pose significant risks when managed by a given plausible method (e.g., disposal in unlined landfills), but not when managed by other methods (e.g., disposal in lined landfills), EPA should condition the listing by making it applicable only to wastes disposed of in the manner that poses significant risks.

API continues to urge EPA, as a general matter, to use the more tailored, conditional listing approach as an alternative to the overly-conservative "across-the board" listing approach, which frequently subjects wastes that pose no significant risks to the costs and other regulatory burdens of RCRA Subtitle C requirements.

Agency Response:

EPA thanks the commenter for its stated support of a conditional listing approach. EPA is finalizing a conditional listing approach for EDC/VCM wastewater

treatment sludges. However, EPA points out that this listing approach is different than the approach that the commenter advocates. The conditional listing, as promulgated, requires that EDC/VCM wastewater treatment sludges be managed in the manner in which the Agency has determined is safe for the waste to be excluded from the listing. Note that the Agency is excluding from the hazardous waste listing only EDC/VCM sludges managed in the manner found by the Agency to be safe. This is in contrast to the commenter's advocated approach that would include in the listing description only those waste management practices found to pose significant risks.

The Agency is not excluding from the hazardous waste listing EDC/VCM wastewater treatment sludges managed in any other manner other than disposal in a landfill. Waste management practices that were not identified by EPA as plausible management, because such practices are currently not used by generators of the waste, were not evaluated by EPA. EPA has not determined that such practices, should they be used in the future, are without significant risk. Given that EPA has found that one plausible management practice for EDC/VCM wastewater treatment sludges results in significant risk, the Agency concludes that the waste meets the criteria in 40 CFR 261.11 for being listed as a hazardous waste. However, given that the Agency found that the predominate approach for managing EDC/VCM wastewater treatment sludges poses no significant risks 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.

It does not make sense to list all EDC/VCM wastewater treatment sludges based upon a management approach used by a few facilities. On the other hand, even though the predominate management approach used by the chlorinated aliphatics industry does not result in significant risks, we do not believe that it is appropriate to promulgate a no list determination, given the fact that the Agency's risk assessment shows significant risks from one management approach. Therefore, the Agency is promulgating a contingent management listing to ensure that EDC/VCM wastewater treatment sludges are managed only in a manner that does not present significant risks to human health and the environment.

7.2 API Comment:

Concentration-Based Requirements

In this rulemaking, EPA proposes a concentration level for waste waters that would trigger RCRA Subpart CC controls for wastewater treatment tanks if the listed waste water exceeds a level of contamination (i.e., 1 ng/L of dioxin equivalents). EPA also requests comments as to whether it would

be more appropriate to apply the implementation approaches described in the July 23, 1999 rulemaking for the dyes and pigments industry. 64 FR 46504

In principle, API supports the use of a tailored concentration-based implementation approach rather than an across-the-board mandate that all listed wastes must comply with the Subpart CC requirements. Assuming the level of contamination is appropriately set and is based on sound-science and consideration of the substantial hazard posed, such an approach would be protective of human health and the environment and would allow for alternative methods to reduce emissions, including source reduction or other pollution prevention methods.

The Agency should go one step further and extend this conditional approach to setting concentration levels that would regulate a wastewater stream as hazardous only if it exceeds that trigger level. Such an approach is preferable and analogous to the recent dyes and pigment proposed rulemaking, in which the described wastes would be broadly listed as hazardous, unless a generator determines that a stream did not contain any of the constituents of concern in concentrations above certain levels. If the generator could do so, that batch or stream would no longer be considered hazardous (provided that certain recordkeeping and notification requirements are met). 64 Fed. Reg. 40197-198.

Assuming that there is an adequate basis for listing a waste in the first place, a concentration-based listing approach is preferable to an across the board listing, which subjects all waste of a certain description to Subtitle C regulations, no matter how miniscule the constituent concentrations - and thus the potential risk - may be in a given case. API has long advocated that the traditional listing approach frequently results in needless over-regulation of wastes that pose little or no risk, and that a more tailored approached should be used wherever possible. API urges EPA to consider a concentration-based listing - in addition to the concentration-based controls - as a general principle in its listings program.

Agency Response:

The Agency acknowledges API's comments on the use of a waste concentration approach for both the implementation of controls, and also as an basis for the listings themselves. However, for reasons described in the final rule and accompanying background documents, EPA has made a decision to not list chlorinated aliphatic wastewaters as hazardous waste.

7.3 API Comment:

Furthermore, in this rulemaking, EPA clearly states that the risk assessment for WWT tanks was based on aerated (and uncovered) tanks from which air emissions will be substantially higher than from a non-aerated, covered tank. It is not appropriate to extend the proposed requirement to cover an aggressive

biological treatment tank to non-aggressive biological treatment tanks without modeling the potential releases from the latter type of tanks. It has not been demonstrated that non-aerated covered tanks contribute significantly to any risk, or that Subpart CC controls would result in any meaningful reduction in any such risk.

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.

Agency Response:

Given the Agency's decision not to list chlorinated aliphatic wastewaters as hazardous due to a re-assessment of our original risk analysis, the Agency did not evaluate the merits of a conditional listing for chlorinated aliphatic wastewaters.

7.4 API Comment:

Population Risk

The proposal to list the K173 waste rests primarily upon EPA's assessment of the "high-end individual risk," i.e., the chance that a theoretical individual exposed to pollution from a waste under assumed, worst-case conditions will become ill (e.g., develop cancer). However, after this individual risk assessment, EPA failed to adequately consider "population risk." As set forth in previous, more detailed, comments (API Comments on the Refinery Residual Listings Proposed Rule, March 21, 1996, pp.84-86 and 98; API Comments on the Refinery Residual Listings Notice of Data Availability, July 11, 1997, pp.5-10), API again strongly reiterates that the consideration of population risk is not only appropriate in making listing determinations, in many cases it should be a determining factor, and not merely a discretionary balancing factor (as currently employed).

For the waste waters in question, EPA's indicated that "the population risks resulting from management of chlorinated aliphatics waste waters in tanks and EDC/VCM sludges in on-site land treatment units and landfills is **not significant**." [p. 5-28 Risk Assessment, emphasis added]

While reducing any amount of risk might be laudable, Congress has directed that only those wastes that pose a "substantial present or potential hazard to human health or the environment" be regulated as hazardous.

Several court decisions have evaluated EPA's discretion in determining what is a "substantial present or potential hazard." In *Dithiocarbamate Task Force* v. EPA ("DTF"), 98 F.3d 1394, 1400 (D.C. Cir. 1996), the Court has emphasized that the term "substantial" is critical and does not afford EPA unlimited discretion: "Again, one should bear in mind that the ultimate question under § 261.11(a)(3) . . . is whether the waste poses a 'substantial' hazard."

Further, the term "substantial . . . hazard" must be given its ordinary meaning, absent relevant evidence of legislative or regulatory intent to the contrary. *See, e.g., Securities Industry Ass'n v. Board of Governors*, 468 U.S. 137, 149(1984). The ordinary meaning of the word "substantial" is: "not imaginary or illusory: REAL, TRUE" and "considerable in quantity: significantly large." Webster's Ninth New Collegiate Dictionary 1176 (1988). There is nothing to indicate that Congress or EPA intended the word "substantial" to have other than its ordinary meaning. Thus, to be listed as a hazardous waste, a waste must pose hazards that are "real," not merely theoretical, and those risks must be considerable in quantity or significantly large.

EPA, as discussed above, based the K173 listing on its projection of theoretical "high-end individual risk." Such projections of risk are meaningless without consideration of the number of persons likely to be exposed. Were it otherwise, EPA could find "substantial hazard" even if not one person was ever expected to be harmed. Thus, population risk is not merely a "factor" or an "alternative" to be considered in determining hazard to human health -- it should be an essential factor in the determination. It is the second part of what should be a two-part process for assessing hazards.

Thus, if the only real, and not purely theoretical, hazards that EPA found were negligible, and not considerable in quantity or significantly large, then EPA should reach a no-list decision on this residual stream. EPA may enjoy some measure of discretion to determine what is or is not a "substantial hazard," but at some point risks and exposure are so low that they cannot be considered "substantial" within the ordinary meaning of the term, as understood by reasonable people. Residuals that do not meet this reasonable "substantial hazard" criterion should not be listed as hazardous wastes under RCRA.

Agency Response:

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.[1] For specific discussion of how EPA 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.

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[1] "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 at between 10^{-4} and 10^{-6}.

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.[2] 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*,"[3] 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." [4]

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

[3] 1992 Memorandum from the then Deputy Administrator F. Henry Habicht, "*Guidance on Risk Characterization for Risk Managers and Risk Assessors.*"

[4] 1995 *Guidance for Risk Characterization* (section III.C.2), page 17.

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 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.[5] 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.[6] 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.

7.5 API Comment:

Moreover, API is aware that other commenters, including the Chemical Manufacturers Association, have calculated that-- based on population risk estimates—the cost of a single cancer case avoided by this proposed rule would be on the order of billions of dollars. API is also aware that comments are being submitted showing that the proposed cost of control is significantly out of line with a substantial number of other regulatory decisions. If, as API urges, EPA gives the proper weight to population risk estimates in hazardous waste listing determinations, then EPA should also factor into its determination estimates which show that costs of listing the wastes as hazardous would be grossly disproportionate to any miniscule population risk benefits.

Agency Response:

In contrast to some other Federal agencies, and to some authorizing statutes for other USEPA programs (e.g. the economic achievability criterion for effluent guidelines of Section 301(b)(2)(A) of the 1977 Clean Water Act), Congress' 1976 RCRA hazardous waste authorizing statute (with 1984 amendments) does not direct the USEPA to apply economic analysis criteria, such as measures of cost-effectiveness, in either (a) promulgating RCRA Subtitle C hazardous waste regulations in general, or in (b) developing and promulgating criteria for identifying and listing hazardous wastes, in particular (see RCRA Subtitle C Sections 3001(a) & (b)(1)). For additional information about this specific aspect of RCRA, see USEPA's 1980 review of the legal

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[5] 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.

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

history of RCRA (Federal Register, Vol.45, No.98, 19 May 1980, p.33089), which arrived at the following determination:

> "*Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most cost effective regulation among various alternatives... There is no explicit requirement in the Act directing EPA to consider costs in the development of its initial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from other major pollution control statutes... The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration... Congress was aware that the hazardous waste regulation would impose substantial costs on the regulated community. Despite this recognition, Congress deliberately rejected provisions that would require consideration of cost burden on industry or to moderate the Act's environmental objectives. For these reasons, the Agency concludes that the Act prohibits it from considering such costs in the development of Subtitle C regulations as a basis for lessening the standards it considers necessary to ensure protection of human health or the environment.*"

As of 1999, two other Congressional statutes direct Federal regulatory agencies to conduct benefit-cost analyses in special circumstances where (a) unfunded Federal mandates may exceed $100 million in direct cost in any single year (1995 UMRA), or if (b) small entities are disproportionately affected (1980 RFA & 1996 SBREFA). Furthermore, the Executive Branch (Executive Order 12866 of 30 Sept 1993) only directs Federal regulatory agencies such as the USEPA to conduct benefit-cost analyses in cases of economically "significant" rulemakings, which are defined as having adverse effects greater than $100 million on the national economy. Based on USEPA's cost/impact estimates, both the proposed and final listing rules were not expected to exceed any one of these various benefit-cost analysis criteria. Consequently, the USEPA did not develop a cost-effectiveness measure for either the proposed or final listing rule.

7.6 API Comment:

EPA's Decision to Exempt Waste Waters Returned to Clean Water Act-Compliant Systems Is Logical and Consistent with EPA Policy

API supports the exemption of any leachate derived from a listed waste that is returned to a Clean Water Act-compliant system located on the same facility. This exemption allows for cost effective treatment of the leachate in a manner that is protective of human health and the environment. A similar exemption (deferral) was granted on a temporary basis for leachate derived from recently listed petroleum refinery wastes. A similar deferral was proposed for leachates from dye and pigment wastes currently being considered for listing. All of these leachate exemptions or deferrals should be made permanent. Furthermore, this approach should additionally be extended to include leachate derived from all previously listed wastes, especially K148-K152 and F037-F038 wastes.

Agency Response:

Please see EPA's response to comment in Section 3.33 of this Response to Comment Document regarding the leachate exemption that was proposed for the chlorinated aliphatics rule. EPA acknowledges the commenter's request regarding other leachate containing other petroleum refinery wastes, but notes that these wastes are beyond the scope of this rulemaking.

SECTION 8
Pentachlorophenol Task Force
CALP-00003

8.1 Pentachlorophenol Task Force Comment:

These comments are submitted by the Pentachlorophenol Task Force ("PTF") in connection with the proposed rule entitled, "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, 64 Fed. Reg. 46, 476 (Aug. 25, 1999)." Specifically, the PTF comments address that portion of the proposed rule that would add octachlorodibenzo-p-dioxin ("OCDD") and octachlorodibenzofuran ("OCDF") to the list of hazardous constituents at 40 C.F.R. part 261, appendix VIII. We also take issue with the proposal to establish UTS treatment levels for OCDD and OCDF that are identical to that applied to tetrachlorodibenzofuran.

Agency Response:

The commenter provided no rationale or data on treatment effectiveness. The wastewater standards were transferred from tetrachlorodibenzofuran performance data. However, the nonwastewater standard was developed from method performance data for OCDD and OCDF. Absent any rationale, we note only the commenter's opposition.

8.2 Pentachlorophenol Task Force Comment:

The PTF has been organized to support the continued registration of pentachlorophenol ("PCP") in the U.S., Canada, and elsewhere. It is comprised of the two registrants of PCP — Vulcan Chemicals, a division of Vulcan Materials Company, and KMG-Bernuth Inc. As part of its charter, the PTF is committed to ensuring that regulatory decisions implicating PCP (which contains OCDD and OCDF as microcontaminants) are based on sound science,

EPA acknowledges in the preamble to the proposed rule that "OCDD and OCDF contribute very little to the actual risk attributable to dioxin compounds." 64 Fed. Reg. at 46, 497. The PTF submits that that conclusion is correct. Indeed, the toxicological evidence does not support the designation of OCDD and OCDF as Appendix VIII hazardous constituents which be definition must "have been shown in scientific studies to have toxic, carcinogenic, mutagenic, or tetratogenic effects ..." 40 C.F.R. § 261.11(a) (emphasis added).

We recognize that OCDD and OCDF have been assigned non-zero toxicity equivalency factors ("TEFs"). But, the assignment of non-zero TEFs to OCDD and OCDF cannot form the basis for regulatory decision to list the compounds as hazardous constituents. The TEFs are intended only to be

used as a tool to aid risk managers in thinking about potential health risks associated with exposure to complex mixtures of polychlorinated dibenzo-p-dioxins ("PCDDs") and furans ("PCDFs"). The TEFs are not intended to provide a scientific basis for drawing the conclusion the OCDD or OCDF has been shown in scientific studies to toxic, carcinogenic, mutagenic, or tetratogenic. The difficulty in using TEFs for an Appendix VIII listing decision is highlighted by the conclusion drawn in the preamble to the effect that OCDD and OCDF have oral cancer slope factors that are 10 times higher than that of arsenic. 64 Fed. Reg. At 46,517. That result is simply an artifact of multiplying a hypothetically-constructed TEF value against the real animal data on 2,3,7,8-tetrachorodibenzo-p-dioxin ("TCDD"). The artificiality of the result is obvious when one considers that OCDD produced no effects when evaluated by the National Toxicity Program ("NTP") in a two-year feeding study. Indeed, the long-term assay had to be discontinued because it was impossible to dose the animals at the high level contemplated by the test protocol. In sharp contrast, arsenic is a known human carcinogen based on extensive epidemiological data.

In any event, there is still considerable uncertainty about the propriety of a non-zero TEF for OCDD/OCDF. It was not that long ago that the TEF for the compounds was zero. The 1988 in vivo assay by Couture, Elwell, and Birnbaum did lead to a raising of the TEF to 0.00 1 by the North Atlantic Treaty Organization Committee on the Challenges of Modern Society ("NATO/CCMS"), but a reevaluation of that data has resulted in a downgrading of the TEF to 0.000 1 by the World Health Organization ("WHO"). As explained below, the 1988 study does not in fact support a non-zero TEF for OCDD/OCDF. In point of fact, the few statistically significant physiological effects that have been observed in the study are transitory in nature and are of uncertain toxicological significance. 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 of OCDD.

There also is an important structural difference between OCDD and OCDF and the other 2,3,7,8-PCDDs and PCDFs that have been shown to exhibit dioxin-like toxicity; OCDD and OCDF are the only 2,3,7,8-TCDD congeners that contain chlorine atoms at each non-lateral position of the dibenzo-p-dioxin and furan ring structure.[1] As will be shown, chlorination at each non-lateral position of the dibenzo-p-dioxin and furan ring structure results in a number of significant structural changes that adversely impact the ability of OCDD and OCDF to efficiently bind to TCDD-specific enzyme binding sites.

And finally, although OCDD has been reported to induce certain enzyme activity in the liver at high liver concentrations, the effect is significantly less than that observed with TCDD at one-tenth of one percent

[1] The term "congener" refers to any one particular member of the same chemical family of chlorinated dibenzodioxins or furans. There are 75 cogeners of chlorinated dibenzo-p-dioxins. A specific congener is denoted by unique chemical notation. For example, 2,3,7,8-tetrachlorodibenzo-p-dioxin is referred to as 2,3,7,8-TCDD. See EPA, "Interim Procedures for Estimating Risks Associated with Exposures of Mixtures of Chlorinated Dibenzo-p-dioxins and Dibenzofurans (CDD5 and CDF5) and 1989 Update," part I, appendix A at A-I, (EPA1625/3-89/016) (March 1989) (hereinafter "EPA Interim Procedures').

the concentration. Moreover, the influence of OCDD on liver enzyme activity shows an inverse dose relationship with time; the enzymatic activity diminishes over time even though the OCDD concentration in the liver continues to increase. In short, the enzyme studies show that the liver adapts to any OCDD accumulation in the liver. This is shown by the enzyme activity reaching a plateau and then dissipating before enzyme levels have become high enough to produce significant physiological changes in the liver.

Agency Response:

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.

8.3 Pentachlorophenol Task Force Comment:

COMMENTS

A. Criteria for Listing in Appendix VIII

Section 26 1.11(a) of the regulations sets forth criteria for listing substances on the Appendix VIII hazardous constituent list:

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

40 C.F.R. § 261.11(a) (1992). The regulations thus require an affirmative demonstration that the chemical is a toxicant, carcinogen, mutagen, or teratogen before the chemical may be listed on the Appendix VIII list.

In connection with past rulemakings, EPA has carefully assessed the available toxicological data on chemicals that were proposed for inclusion on the Appendix VIII list. Where the data was insufficient to support the conclusion that the chemical was toxic, the Agency has declined to list the chemical, or on occasion has even deleted a previously listed chemical. See, e.g., 49 Fed. Reg. 49,562, 49,563 (Dec. 20, 1984) (decision not to list ethylene bisisothiocyanate because the available toxicity data was insufficient to support listing); 45 Fed. Reg. 47,832, 47,833 (July 16, 1980) (final rule removing the generic category of "quinones" from the Appendix VIII list because "insufficient data is currently available regarding the acute and chronic effects of the higher molecular weight quinones and their derivatives to support designating them as toxic constituents of a waste"); Id.(deleting generic category

of "chemical tars" from the Appendix VIII list because "insufficient data was available to consider chemical tars as suspect carcinogens or otherwise toxic"); id. at 74,889 (deleting methanol and methylisobutyl ketone from Appendix VIII list because of insufficient data). In the case of OCDD, an extensive body of data exists and those data do not support the conclusion that OCDD is a toxicant, carcinogen, mutagen, or teratogen. For OCDF, essentially no toxicological data has been published in the literature, and, therefore, there is insufficient evidence to support the listing of that compound.

B. Neither OCDD Nor OCDF Has Been Shown To Have Toxic, Carcinogenic, Mutagenic, or Teratogenic Effects On Humans Or Other Life Forms

A characteristic broad spectrum of biological responses are elicited by those polychlorinated dibenzo-p-dioxins and furans that have been shown to produce toxic effects in animal studies. 2,3,7,8-TCDD is the most toxic compound in the series and has been shown to be acnegenic, teratogenic, mutagenic, fetocidal, immuno-suppressive, and tumor promoting.[2] McConnell, et al, studied the clinical and pathological symptomology displayed by mice and guinea pigs given a single large dose of various PCDD compounds.[3] The results of the study (which did not include OCDD and OCDF) show that those PCDD compounds that display toxicity produce a significant dose-related effect on body weight in both guinea pigs and mice, a dramatic reduction in size in both animal species, and significant macroscopic and histopathologic hepatic changes in the mouse. Other characteristic "dioxin-like" responses include necrosis in the liver, thymic involution, teratogenicity, and a wasting syndrome. In sharp contrast to the 2,3,7,8-PCDDs and PCDFs that have been shown to produce toxic effects in animals, the extensive scientific literature on OCDD has not shown that this 2,3,7,8-dioxin congener produces the same toxicological profile.

Acute studies on OCDD have not demonstrated lethality at dose levels as high as one gram of OCDD per kilogram body weight in the rat, have not shown acnegenic activity, or the production of chick edema, or teratogenicity in animals.[4] Similarly, OCDD has not displayed positive mutagenic activity in

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[2] See, e.g., E.L. Delvaux, et al., "Les polychloro dibenzo-p-dioxins," 3 Toxicology 187-206 (1975) (review of 2,3,7,8-TCDD toxicology); R.J. Kociba, et al., "2,3,7,8-Tetrachlorodibenzo-p-dioxin results of a 13-week oral toxicity study in rats," *35* Toxicol. Appl. PharmacoJ. *553-73* (1976).

[3] E.E. McConnell, et al., "The Comparative Toxicity of Chlorinated Dibenzo-p-dioxins in Mice and Guinea Pigs," 44 Toxicol. Appl. Pharmacol. *335-56* (1978). (Appendix 1)

[4] See B.A. Schwetz, et al., "Toxicology of Chlorinated Dibenzo-p-dioxins," *5* Environ. HeaJth Perspect. 87-99 (1973) (hereinafter 'Schwetz (1973)") (Appendix 2). In the teratology study reported by Schwetz (1973), signs of maternal toxicity were not observed in rats given 100 or 500 mg/kg/day OCDD administered as a corn oil: acetone (9:1) solution. Examination of the fetuses did not reveal changes in fetal body measurements, incidence of fetal resorptions, or incidence of any fetal anomaly among litters or the fetal population. Schwertz (1973) at 92. At 500 mg/kg/day, the incidence of subcutaneous edema was significantly increased among the fetal population (23/100 compared with 8/156 in the controls), ~ ~ among liners (9/18 compared with 6/28 in the controls). Id.

vitro assays.[5] Nor has OCDD been found to influence preimplanation embryo development in mouse embryos.[6]

In acute and subchronic animal feeding studies, OCDD was found to produce transitory effects only. For example, in a study on male Sprague-Dawley rats, OCDD administered at a dose of 100 micrograms (µg) OCDD in 1 milliliter (ml) corn oil for 21 days (approximately 12.4 mg/kg administered over 21 days) produced little morbidity in the rats.[7] No significant change in body weight was observed; the treated animals weighed 243 ± 9 g while the control group weighed 235 ± 10 g, or roughly the same amount. The relative liver weight was 3.80 ± 0.20 g/100 g body weight (vs. 2.85 ± 0.05 g for the controls). The animals' behavior was unaffected during the course of the study. The animals continued to eat well throughout the experiment and they were normal in appearance and activity. Ultrastructural changes were confined to a moderate increase of hepatic smooth endoplasmic reticulum. The quantity and the morphologic appearance of lipid droplets, mitochondria, and lysosomes were unaltered. The light microscopic appearance of the liver was indistinguishable from the controls.

In another study, OCDD was dissolved in corn oil and administered intragastrically to female Sprague-Dawley rats at dose levels of 40 µg/kg/day and 400 µg/kg/day for 3 days.[8] The animals were sacrificed 6 days after treatment. No significant changes in body weight, thymus weight, or kidney weight were observed in any of the OCDD-treated animals relative to the control group.

Birnbaum, Couture, and Elwell have reported that repeated exposure to OCDD results in "dioxin-like effects." See L.A. Couture, M. R. Elwell, and L.S. Birnbaum, "Dioxin-like Effects Observed in Male Rats following Exposure to Octachlorodibenzo-p-dioxin (OCDD) during a 13 week study," 93 Toxicology and Applied Pharmacology 31-46 (1988) (hereinafter "Couture (1988)") (Appendix 6).[9] In their experiment, male Fischer rats were treated by gavage with 50 p.g/kg body weight OCDD in 1 ml

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[5] See J.P. Seiler, "A survey on the mutagenicity of various pesticides," 29 Experientia 622-23 (1973).

[6] See U. Gahring, et al., "Embryotoxic effects of various dibenzo-p-dioxins on the development of mouse preimplanation embryos," 25 Chemosphere 1171-74(1992) (mouse embryos cultured for 72 hours from two-cell to the blastocyst stage in culture media containing 7.8 ng/ml OCDD showed no deleterious effects on preimplanatation development) (Appendix 3).

[7] See D.H. Norback, et al., "Tissue Distribution and Excretion of Octachlorodibenzo-p-Dioxin in the Rat," 32 Toxicol. Appl. Pharmacol. 330-3 8 (1975) (Appendix 4).

[8] See M.A. Shara and S.J. Shohs, "Biochemical and Toxicological Effects of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) Congeners in Female Rats," 16 Arch. Environ. Contam. Toxicol. 599-*605* (1987) (Appendix 5).

[9] See also L.S. Birnbaum, L.A. Couture, and M.R. Elwell, "Subchronic Effects of Exposure to Octachlorodibenzodioxin (OCDD)," 18 Chemosphere 389-90 (1989) (Appendix 7) (hereinafter "Birnbaum (1989)") (reprint of conference paper presented on data reported in the 1988 Couture paper cited above).

corn oil five times per week for 13 weeks. Interim sacrifices were conducted after 2, 4, and 8 weeks. The authors of the study report that:

After 13 weeks of dosing with OCDD, hematological changes included a decrease in MCH, MCV, hemoglobin and hematocrit. Such changes are indicative of a mild, non-regenerative anemia resulting from a chronic non-infectious process. These changes are probably secondary to the liver changes detected by 8 weeks of treatment which progressed in both incidence and severity after 13 weeks. This lesion consisted of cytoplasmic vacuolization throughout the liver, with a centrilobular to midzonal distribution.

Bimbaum (1989) at p. 389. This observation (coupled with certain observed effects at the enzymatic level discussed below) appear to form the basis for the NATO/CCMS Subgroup assignment of a non-zero TEF value to OCDD and OCDF. See, NATO/CCMS, "Scientific Basis for the Development of the International Toxicity Equivalency Factor (1-TEF) Method of Risk Assessment for Complex Mixtures of Dioxins and Related Compounds," 37 (Report No. 176) (1988).

A close review of the data reported in the study, however, shows that repeated exposure to OCDD results only in slight and transient effects on blood chemistry and hematologic parameters. Couture (1988), Table 2 at 41. For each parameter reported in the study -- bile acids levels, hemoglobin count (HGB), white blood cell count (WBC), mean cell volume (MCV), mean cell hemoglobin count (MCH), and hematocrit counts (HCT) -- the initial elevation observed in some of the parameters over the controls disappeared by the end of the study. Whole organ effects were minimal and there was no observed change in the thymus/body weight ratios of any of the test animals. Id. at 35.

The sole treatment-related effect detected during histopathological examination of the liver, thymus, and spleen was the occurrence of a mild cytoplasmic fatty vacuolization in the liver in animals receiving at least 40 doses of OCDD which increased in both incidence and severity following 65 doses of OCDD.[10] Id. Although the occurrence of cytoplasmic vacuoles may suggest an initial stage of liver damage, it may also represent a physiological response to nutritional, metabolic, or hormonal imbalances.[11] The phenomena is commonly observed in the livers of animals treated with a large number and variety of environmental chemicals and drugs.[12] Moreover, fatty vacuolization is a

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[10] Couture (1988) also reported a statistically significant ($p < 0.05$) increase in the liver and spleen/body weight ratios m rats exposed to at least 40 doses of OCDD but the data to support that observation is not reported in the paper. Other investigators (Herme linger (1990)) have reported that the mean body weights of female rats maintained on diets containing 800 ppb OCDD for 9 months do not display any statistically significant depression of weight development at the end of the study period.

[11] Greaves and Faccini, "Digestive System" in Rat Histopathology 86-125 (Elseviere, Amsterdam (1984)).

[12] H.M. Zimmerman, "Expression of Hepatoxicity" in Hepatoxicity: The Adverse Effects of Drugs And Other Chemicals In the Liver 44-90 (Appleton Century Crofts, New York (1986)); G.L. Plaa "Toxic Responses of the Liver" in Casarett and Doull's Toxicology 286 (D. Klaassen, M.O. Amdur, J. Doull (1986)).

reversible process and not necessarily adverse or toxic to the organism. The significance of the effect observed by Couture, et. al., may be discounted by considering that no concomitant treatment-related effect on liver function was observed in the study. The function of important liver enzymes -- sorbitol dehydrogenase (SDH), creatine kinase (CK), and alanine aminotransferase (ALT) --were not affected. See Couture (1988) at 33, 41.

Other investigators have not characterized the Couture study as demonstrating dioxin-like effects. In a report by Wermelinger, Poiger, and Schiatter, the authors noted that "[e]xcept for some lipid droplets in the liver, [Couture et.al.] observed no other toxic effects as usually seen with the toxic PCDD/F." See M. Wermelinger, H. Poiger, and C.H. Schlatter, "Results of a 9-Month Feeding Study with OCDD and OCDF in Rats," 1990), reprinted in 1 Organohalogen Compounds 221, 221 (0. Hutzinger and H. Fiedler (1991)) (emphasis added) (hereinafter "Wermelinger (1990)') (Appendix 8).

These investigators conducted a study of significantly longer duration (39 weeks) than that conducted by Couture. (13 weeks). The study shows that long-term treatment with high concentrations of OCDD does not result in liver damage. In the study, female rats (Iva: SIV 50 (SD)) were fed diets containing 0, 80 and 800 ppb of OCDD, or 80 and 800 ppb of OCDF, or 1 ppb of 2,3,7,8-TCDD for 13, 26, and 39 weeks of treatment. Concentrations of OCDD in the liver reached levels as high as 8.1 µg/g in the high dose (800 ppb) group after 39 weeks.[13] Weight development was slightly depressed in the high dose group only. Wermelinger (1990) at 222. A decrease in mean body weight was statistically significant ($p < 0.05$) in only some of the groups and only then at interim sacrifice (at 13 and 26 weeks). Id., Figure 1 at 223. Thymus weights were initially lower in all treated animals relative to the controls after 13 and 26 weeks, but the decrease remained significant only in the high dose (800 ppb) OCDD group at the conclusion of the study. Id., Figure 2 at 223. Other organ weights were much less affected. Most importantly, histopathological examination of the organs showed no treatment related liver lesions other than the detection of cytoplasmic fatty vacuolization that was observed in the Couture study. Telephone interview with H. Poiger (June 22, 1993). Neubert, et al., in their review of the Wermelinger study have observed that "[a] slight and transient effect of OCDD on thymus weight might … be recognizable from the data of [W]ermelinger et al. (1990)."[14]

In sum, the Wermelinger study demonstrates that even after nine months of OCDD treatment at high dose levels, no significant treatment related liver damage could be observed in the test animals. Because OCDD is known to accumulate primarily in the liver (Couture 1988) at 40), the absence of liver

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[13] See Ph.D Dissertation by M. Wermelinger, "Toxizit~t Und Toxische Interaktionen Einiger Chlorierter Dibenzodioxine Und Dibenzofurane Bei Der Ratte" (1990) (data tables) (Appendix 9).

[14] D. Neubert, et al, "Comparison of the Effects of PCDDs and PCDFs on Different Species Taking Kinetic Variables into Account," in Biological Basis for Risk Assessments of Dioxins and Related Compounds 35 (Banbury Report) (M.A. Gallo, R.J. Schenplein, and K.A. Van der Heigden (1991)).

damage in the Wermelinger study raises significant questions as to the toxicological significance of any OCDD accumulation in the body.

C. The Enzyme Studies Do Not Support the Conclusion That OCDD Exhibits Dioxin like Effects

OCDD has been shown to elevate ethoxyresorutin 0-deethylase (EROD) activities over controls in liver microsomal cells of both male and female rats. See Couture (1988), supra, and Wermelinger (1990), supra. See also G. Golor, et al. "Concentration-Effect Analyses With TCDD, H7CDD and OCDD in Female Wistar Rats," 25 Chemosphere 923-30 (1992) (hereinafter "Golor (1992)") (Appendix 10). However, pronounced EROD induction is observed only at extremely high OCDD concentrations in the liver. Compare G. Golor, et al. "Biological Activity and Tissue Concentrations of TCDD and OCDD in Rats After S.C. Application Alone and in Combination," 20 Chemosphere 1183-88 (1990) (hereinafter "Golor (1990)") (Appendix 11) (OCDD liver concentrations of between 400 and 900 ng OCDD per g of liver produced no detectable induction of EROD activity) with Wermelinger (1990) (no induction of EROD activity at 650 ng OCDD per g of liver with maximum EROD activity observed only at OCDD levels of roughly 7800 ng OCDD per g of liver).

Because of the extremely high liver concentrations of OCDD required to elicit EROD activity, the relevance of the observed enzyme induction by OCDD to the evaluation of OCDD and OCDF toxicity in humans is uncertain. The enzyme studies were performed at the upper end of the biologically active dose-range for PCDD congeners. See Golor (1990) at 1185. Evidence of enzyme effects at low exposures are more relevant predictors of potential human toxicity. Moreover, given the extremely high doses of OCDD used in the studies the contribution of contamination by more toxic dioxin and furan congeners cannot be ruled out. j~ In addition, the tissue concentrations of OCDD achieved in the animal studies are orders of magnitude higher than the concentrations that typically are found in human tissue. According to the data reported by Thoma, et al.,[15] average hepatic concentrations of OCDD are roughly 360 picograms ("pg") OCDD per g liver wet weight, a level that is one twenty-thousandth of that required to elicit the maximum EROD response in test animals. See Wermelinger (1990), Fig. 3 at 223. In short, the relevance of the studies to humans is uncertain because of the high doses used in the animal experiments.

The Wermelinger (1990) study also shows that OCDD induced EROD activity does not reach a level as high as that observed in TCDD-treated test animals. See Wermelinger (1990), Fig. 3 at 223. Moreover, the results indicate an inverse dose relationship with time for OCDD induction of the EROD enzyme. The maximum EROD response in the high dose (800 ppb OCDD) group was observed during the interim phase (24 weeks) of the test. And the degree of enzyme induction decreased by the end of

[15] H. Thoma, et al., "Concentrations of PCDD and PCDF in human fat and liver samples," 18 Chemosphere 491-98 (1989).

the study (39 weeks). In sum, the study shows that the effects of OCDD on liver enzyme activity reaches a plateau and begins to diminish before enzyme levels of physiological significance are obtained.

D. Structure Activity Considerations Run Counter to the Conclusion that OCDD and OCDF Exhibit Dioxin-Like Toxicity

The proposal to include OCDD and OCDF on the Appendix VIII list stems from a relationship between PCDD and PCDF congeners that are laterally substituted (2,3,7 and 8 substitution on the dibenzo-p-dioxin and dibenzofuran molecule) and the enhanced biological activity of certain of these 2,3,7,8-substituted congeners relative to the non-2,3,7,8-substituted congeners. 58 Fed. keg. at 25,719. Although both OCDD and OCDF are 2,3,7,8-substituted PCDD and PCDF congeners, other unique structural features of the OCDD and OCDF molecules suggest that these congeners will not display typical dioxin activity.

A comprehensive study of the quantitative structure-activity relationships of a large number of PCDDs was reported in 1986 by Mason, et al.[16] In that study, a marked effect of structure on the ability of PCDD congeners to act as competitive ligands for the 2,3,7,8-TCDD cytosolic receptor protein in rat hepatoma (H-4-IIE) cells in culture was observed. As expected, the most active compound in the receptor binding assay was 2,3,7,8-TCDD. The relative receptor binding affinity for a series of TCDD isomers also showed the expected increase in binding affinity with increasing number of lateral chlorine substituents. See Mason (1986), Table I at 26.

But, the data also illustrates another important substitution effect which strongly influences receptor binding affinity. The degree of chlorination of non-lateral sites was found to be an important structural determinant for interaction with the receptor protein. The 2,3, 7,8-tetra, 1,2,3, 7,8-penta, 1,2,3, 4,7,8-hexa, and octachloro- dibenzodioxins all contain 4 lateral chlorine substituents; however, there was a marked decrease in their receptor binding affinity with increasing chlorine substitution at each of the non-lateral 1,4,6, and 9 positions. Id., Table I. And, OCDD -- the only dioxin congener that has a chlorine substituent at all four non-lateral positions -- did not bind to the receptor. Id.

The observed trend in binding affinity is easily explained in terms of the difference in structure between the different congeners. The stepwise addition of chlorine groups at the 1, 4, 6, and 9 positions of the dibenzo-p-dioxin ring results in several structural changes in the molecule, including increased molecular size and volume, increased lipophilicity, decreased aromatic ring electron density due to the electron

[16] See G. Mason, et al., "Polychiorinated Dibenzo-p-Dioxins: Quantitative In Vitro and In-Vivo 13 Structure-Activity Relationships," 41 Toxicology 21-31 (1986) (hereinafter 'Mason (1986)") (Appendix 12).

withdrawing chlorine groups, and a decrease in PCDD coplanarity associated with steric crowding.[17] The structural changes become more pronounced with increased chlorination and reach a maximum in the case of OCDD. In sum, the uniqueness of the OCDD and OCDF structures suggests that these PCDD and PCDF congeners would not exhibit the same biological characteristics as are expressed by the more planar and lower chlorinated PCDDs.

Poland and Glover published a study on the structure activity relationships for a series of PCDDs, including OCDD, that examined the capacity of various PCDD congeners to induce aryl hydrocarbon hydroxylase ("AHH") and delta-aminolevulinic acid synthetase ("ALA") activity in chick embryo liver.[18] The authors found that congeners which induced AHH and ALA activity in chick-embryo liver had at least one ring position that was not substituted by a chlorine group. The fully chlorinated PCDD -- octachlorodibenzo-p-dioxm -- lacks an unsubstituted ring position and, as expected, that congener did not induce either enzyme in the study.

In another enzyme study, Shara and Stohs administered both 2,3,7,8-TCDD and OCDD at doses of 40 µg/kg/day (for TCDD) and 40 or 400 µg/kg/day (for OCDD) to female Sprague-Dawley rats for 3 days.[19] Six days after treatment the animals were sacrificed to determine lipid peroxidation and glutathione peroxidase (GSH-PX) activity in the liver and kidney. Although TCDD administration resulted in a four fold increase in hepatic lipid peroxidation (based on malondialdehyde content), no significant increase in lipid peroxidation relative to controls was observed for OCDD at all dose levels. Similarly, although TCDD administration (40 µg/kg/day x 3 days) results in a high level of inhibition of GSH-PX, OCDD had no effect at a 10-fold increased dose level (400 µg/kg/day x 3 days) relative to TCDD.

The results of the enzyme studies show that the molecular structure of OCDD is such that it serves as a poor substrate for enzymes when compared with the 2,3,7,8-PCDDs that have been shown to display dioxin-like toxicity.

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[17] The x-ray structure of OCDD has recently been published and, as expected, the molecule shows a marked departure from planarity. See C.J. Koester, J.C. Huffman, and R.A. Hites, 'The Crystal Structure of Octachlorodibenzodioxin: Experimental and Calculated," 17 Chemosphere 2419-22 (1988).

[18] See A. Poland and E. Glover, "Chlorinated dibenzo-p-dioxins: potent inducers of d-aminolevulinic acid synthetase and aryihydrocarbon hydroxylase-Il -- A study of the structure-activity relationship," 9 Molecular Pharmacol. 736-47 (1973) (Appendix 13). See also A. Poland and E. Glover, "2,3,7,8-Tetrachlorodibenzo-p-dioxin: a potent inducer of d-aminolevulinic acid synthetase," 179 Science 476-77 (1973) (Appendix 14).

[19] M.A. Shara and S.J. Stohs, supra, at 7 n. 8.

Agency Response:

EPA disagrees with the commenter's arguments for several reasons. First, as the Agency noted above and 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. 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 which are also associated with increasing tissue accumulation of OCDD. OCDD induces hepatic CYP1A1 activity and 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 incidence and severity was reported 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 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 that 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 that 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 that 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 possess dioxin-like activity.

SECTION 9
Synthetic Organic Chemical Manufacturers Association (SOCMA)
CALP-00005

The Synthetic Organic Chemical Manufacturers Association ("SOCMA") is the leading trade association representing the batch and custom chemical industry. SOCMA's 300+ member companies make the products and refine the raw materials that make our standard of living possible. From pharmaceuticals to cosmetics, soaps to plastics, and all manner of industrial and construction products, SOCMA members make materials that save lives, make our food supply safe and abundant, and enable the manufacture of literally thousands of other products.

In connection with their regular manufacturing operations, a number of SOCMA members routinely generate and manage materials that are regulated as hazardous waste. Frequently, the manufacturing operations of SOCMA members are "batch" manufacturing operations, distinct from the continuous operations used in commodity chemical operations. In many instances, SOCMA members structure their operations to limit their management of hazardous waste to waste generation and temporary on-site storage under the 90-day on-site storage exemption and other exemptions from the interim status and permit requirements established under the Resource Conservation and Recovery Act ("RCRA").

SOCMA appreciates the opportunity to comment on the proposed rule regarding hazardous waste listings for certain chlorinated aliphatics production wastes (the "Proposed Rule"). 64 Fed. Reg. 46475 (Aug. 25, 1999). SOCMA has not evaluated and is not commenting upon the proposed decision to list as hazardous the particular waste streams identified in the Proposed Rule. However, SOCMA is interested in several aspects of the Proposed Rule that might be considered precedents for other rulemaking activity by the Agency. As is discussed below, SOCMA is particularly interested in efforts to better tailor hazardous waste identification to reflect risk and in maintaining the various permit exemptions by which many SOCMA members have structured their operations.

9.1 SOCMA Comment:

SOCMA Supports Efforts To Tailor Hazardous Waste Identification and
Listings To Better Reflect Risk and Actual Waste Management Practices

In the Proposed Rule, as in a number of other recent rulemaking initiatives, EPA is considering various approaches to better tailor the scope of hazardous waste identification and listing regulations to reflect both risk and actual waste management practices. In general, SOCMA supports the Agency's efforts as a means to address one of the fundamental problems of the RCRA program - the overinclusive effect of the hazardous waste listings program. As EPA acknowledged in its 1995 Reinventing Environmental Regulation Initiative, one important goal for the hazardous waste program is refocusing the program on the regulation of high-risk wastes and better aligning the regulations to the degree of risk

actually posed by particular wastes. In order to serve this purpose, however, SOCMA notes that it is critical for these approaches to be based upon a scientifically sound assessment of the risks presented by the wastes, based upon realistic assumptions about both waste management practices and exposure scenarios.[1]

Proposed Use of Contingent Management Options. SOCMA is pleased that the Agency is continuing to explore means by which the use of contingent management can be used to tailor the scope of the hazardous waste listings and provide positive incentives to use protective waste management practices.

For two of the three proposed listings, EPA generally is proposing to exempt from the listings those sludges: (1) that are disposed of in a Subtitle C or D landfill; (2) that are not otherwise placed on the land prior to final land disposal; and (3) for which the generator maintains adequate documentation of the commitment to disposal in a qualifying landfill and of the actual disposal in such a landfill. There are several innovative aspects to this approach that SOCMA applauds. First of all, EPA has structured the scope and implementation of the contingent management option in a way that exempts the waste from the hazardous waste listing at the point of generation. This is a significant, positive incentive since it both reduces the volume of hazardous waste generated by a facility and also has the effect of removing the waste from the application of the land disposal restrictions regulations.

SOCMA also commends EPA for a second aspect of this contingent management option i.e., the level and type of documentation required to qualify wastes as exempt under this provision. A key element of the contingent management exemption is documenting the intent to dispose and then the actual disposal of the waste in either a Subtitle C or Subtitle D landfill (depending upon the listing). In the proposed listing descriptions, EPA references "contracts between the generator and the landfill owner/operator" and "invoices documenting delivery of waste to landfill" as examples of "appropriate documentation." Proposed 40 C.F.R. § 261.32. EPA refrained from specifying a particular type of document since it acknowledged that "documentation of previous landfilling of the waste and a demonstration of a commitment to dispose of currently generated waste in a landfill may be made by several means." 64 Fed. Reg. at 46509.

In this context, EPA has sought to allow companies to rely upon standard contracts, records and other commercial documents that would be created and maintained in the ordinary course as the "adequate documentation" required by the contingent management option. This reliance on and recognition of the value of routine, commercial records as a compliance tool is an important development. To date, the RCRA program has relied too heavily upon the creation of specific separate forms that serve no purpose outside the context of the RCRA program. In fact, by conscious design, the RCRA regulations

[1] As noted above, SOCMA has not evaluated and offers no comment upon the proposed decision to regulate as hazardous the particular waste streams identified in the Proposed Rule and similarly has not evaluated in any detail the underlying risk assessment performed by the Agency in conjunction with the Proposed Rule.

initially were predicated upon establishing a separate paper trail that could be used primarily for enforcement purposes.

Agency Response:

The Agency acknowledges SOCMA's support of a contingent management listing approach for EDC/VCM wastewater treatment sludges, including the flexible approach for demonstration that the waste has been disposed (or will be disposed) in conformance with the conditions of the listing.

EPA notes that it is not finalizing the alternative conditional listing approach for VCM-A wastewater treatment sludges. 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.

9.2 SOCMA Comment:

Proposed Exclusion from Mixture and Derived-From Rules. SOCMA believes that proposed exclusion of "wastewater treatment sludges derived from wastewaters" listed as K173 from the so-called "mixture" and "derived-from" rules is another illustration of the potential merits of tailoring waste listings to reflect the specific wastes and waste management practices of concern. See Proposed 40 C.F.R. § 261.3(c)(2)(ii)(F). The overinclusive impact of the mixture and derived-from rules has been one of the most unfortunate and most contentious aspects of the RCRA hazardous waste program.

Assuming that the risk assessment analysis justifies the proposed exclusion of these sludges from the otherwise automatic effect of the mixture and derived-from rules, SOCMA supports this further approach to tailoring the scope of the listing rules. To date, much of the focus on "fixing" this aspect of the RCRA program has been on the various efforts to establish numerical concentration-based exit levels which would require frequent testing and analysis of process waste streams. Given that many SOCMA members use batch operations to manufacture multiple products, the previously-proposed testing and analytical requirements associated with concentration-based levels have been a significant concern for SOCMA members from both a cost and feasibility perspective. Consequently, SOCMA supports efforts, such as this proposal, to identify circumstances in which the automatic application of the mixture and derived-from rules is not justified. Carefully crafted listing descriptions better fulfill the mandate that the RCRA program should focus on high-risk wastes.

Agency Response:

Because we are not finalizing the listing for chlorinated aliphatic wastewaters as proposed, the proposed amendment that would "break" the derived from rule for sludges derived from K173 wastewaters is moot.

EPA points out the it did not propose (nor is it finalizing) an amendment to the hazardous waste mixture rule.

9.3 SOCMA Comment:

Further Consideration of Concentration-Based Approaches. In the Proposed Rule, EPA also solicited comment upon whether it would have been preferable for the Proposed Rule to implement an approach more akin the concentration-based listings recently proposed for the dye and pigments industries. 64 Fed. Reg. 40192 (July 23, 1999). As SOCMA indicated in its comments on the proposed dyes and pigment listings, concentration-based approaches to listing have particular potential to tailor hazardous waste listings to the variability often inherent in batch manufacturing operations.[2] The scientific merits of any particular concentration-based listing will depend upon the scope and accuracy of the underlying risk assessment. In addition, from the perspective of SOCMA members, the utility of any particular concentration-based listing will depend upon whether EPA takes adequate consideration of the cost and feasibility of testing and analytical requirements for batch manufacturing operations.

Agency Response:

The Agency acknowledges the commenter's support of a concentration-based listing approach, as well as the commenter's concerns about the cost and feasibility of implementing such an approach. However, 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.

9.4 SOCMA Comment:

1. Proposed Imposition of Subpart CC Controls on All Wastewater Treatment Units Should Be Reconsidered

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[2] See Comments of the Synthetic Organic Chemical Manufacturers Association, dated Oct. 20, 1999, on the proposed listings for the dye and pigments industries (Docket No. F-1999-DPIP-FFFFF).

In the Proposed Rule, EPA would require that all wastewater treatment tanks managing a K173 wastestream with an influent concentration greater than or equal to 1 ng/L TCDD TEQ comply with the Subpart CC standards (Air Emission Standards for Tanks, Surface Impoundments and Containers) in 40 C.F.R. §§ 264.1080(h) and 265.1080(h). EPA stated in the preamble that it considered simply requiring that tanks be "covered" but concluded that the Subpart CC standards for covering tanks and controlling air emissions were appropriate for these wastewaters as well. 64 Fed. Reg. at 46053.

SOCMA is extremely concerned about the Agency's approach to this issue. The wastewater treatment unit exemption has been an element of the RCRA regulatory program for almost twenty years. Many SOCMA member facilities have been designed and operated in reliance on this provision.

As part of its rationale for the proposed approach, EPA explained that its decision "to propose technical standards to address air emissions from treatment tanks managing these wastewaters is directly related to the fact that current regulatory programs do not appear to adequately address the type of air releases from these units that showed risk in our analysis." 64 Fed. Reg. at 46501. While SOCMA has not conducted an in-depth review of the underlying risk assessment, SOCMA understands that the Chemical Manufacturers Association and the Chlorine Chemistry Council have done so and have identified a number of significant flaws in the assessment. SOCMA urges EPA to review and re-evaluate this aspect of the Proposed Rule. Unless the Agency has correctly determined that it has accurately identified serious risks posed by emissions from all wastewater treatment units that cannot be diminished in any other way, the Agency should not proceed with this aspect of the Proposed Rule.

SOCMA notes that EPA's modeling assumed that all wastewater treatment units managing these wastestreams would be uncovered aggressive biological treatment units. EPA needs to recognize that the definition of wastewater treatment unit covers a wide range of tanks in a wastewater treatment train, many of which are not used for aggressive biological treatment and many of which have a design that minimizes emissions (albeit short of Subpart CC controls). The fact that these designs are not mandated by regulation is not relevant. The Agency has an obligation to consider and model plausible waste management practices and the risks associated with those practices. The assumptions used by EPA in this risk assessment fall far short of this mark. It is not plausible to project that in the future all exempt wastewater treatment units managing this waste stream will be shifted to uncovered aggressive biological treatment.

Agency Response:

In response to the comment regarding the flaws in the risk assessment as identified by comments from CCC and CMA, the commenter is referred to the Agency's responses in Sections 10 and 19, respectively, of this Response to Comment Document. While the Agency also agrees that it must consider plausible waste management practices in making listing determinations, as pointed out in the proposed rule preamble, EPA determined that wastewater treatment in uncovered, aerated

biological treatment tanks was in fact prevalent and deemed by EPA to be plausible for the management of chlorinated aliphatic wastewaters. This does not mean that EPA predicts, as the commenter suggests, that "in the future all exempt wastewater treatment units managing this waste stream will be shifted to uncovered aggressive biological treatment."

However, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

SECTION 10
Chlorine Chemistry Council
CALP-00007

Introduction:

The **Chlorine Chemistry Council®** (CCC) is pleased to submit these comments on the U.S. Environmental Protection Agency's (EPA's) proposal to list three wastes from the chlorinated aliphatics industry as hazardous wastes under the Resource Conservation and Recovery Act (RCRA). CCC, a business council of the Chemical Manufacturers Association, is dedicated to addressing public policy issues related to the products of chlorine chemistry.

These comments focus primarily on EPA's risk assessment and policy decisions related to the presence of dioxin in the chlorinated aliphatics waste streams. On other issues, CCC fully supports comments filed separately by CMA and by the Vinyl Institute.

CCC believes that EPA has greatly overestimated the risks associated with dioxin. When corrected for the significant errors identified in these comments, EPA's risk assessment will demonstrate that K173 wastewaters with dioxin concentrations of 1 ng/L do not pose a substantial hazard. Therefore, EPA should not list them as hazardous waste.

Please direct any questions or comments you may have regarding this submission to David Fischer, Associate General Counsel, at (703) 741-5179.

Sincerely,

C.T. "Kip" Howlett, Jr.
Executive Director
CMA Vice President

The Chlorine Chemistry Council® (CCC), a business council of the Chemical Manufacturers Association (CMA), is pleased to submit these comments on the U.S. Environmental Protection Agency's (EPA's) proposal to list three wastes from the chlorinated aliphatics industry as hazardous wastes under the Resource Conservation and Recovery Act (RCRA). CCC is dedicated to addressing public policy issues related to the products of chlorine chemistry.

These comments focus primarily on EPA's risk assessment and policy decisions related to the presence of dioxin in the chlorinated aliphatics waste streams. On other issues, CCC fully supports comments filed separately by CMA and by the Vinyl Institute.

10.1 Chlorine Chemistry Council Comment:

CCC supports a conditional approach for listing waste streams, based on contaminant trigger concentrations. However, EPA has greatly overestimated the risks associated with dioxin. When corrected for the significant errors identified here, EPA's risk assessment will demonstrate that K173 wastewaters with dioxin concentrations of 1 ng/L do not pose a substantial hazard. Therefore, EPA should not list them as hazardous waste.

Agency Response:

EPA acknowledges the commenter's support for a conditional listing approach for listing wastes, and notes that this approach was finalized for the EDC/VCM wastewater treatment sludges (K174). Regarding chlorinated aliphatic wastewaters, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

10.2 Chlorine Chemistry Council Comment:

<u>K173 Wastewaters with Dioxin Concentrations of 1 ng/L Do Not Pose a Substantial Hazard to Human Health or the Environment</u>.

Under RCRA, a waste may be listed as hazardous only if EPA finds the waste poses a "substantial present or potential hazard to human health or the environment." Using a high-end deterministic risk assessment for K173 wastes, EPA has estimated the individual risk for a farmer to be $2x10^{5}$. However, as discussed more fully in these comments,

- Most dioxins in wastewater never reach aeration tanks;
- EPA's exposure assessment relies on unrealistic assumptions which over-estimate risks;
- EPA's toxicity assessment adds additional conservatism to the risk estimates;
- EPA's conservative, high end assessment yields risk estimates only marginally above the $1x10^{5}$ level. Corrections to the risk assessment would reduce these estimates to below levels of concern.

EPA must ensure that its listing decisions are based on appropriate risk estimates and not theoretical estimates without real-world significance.

Agency Response:

Detailed responses to the specific issues raised by the commenter above are provided in previous sections of this Response to Comment Document, as noted below:

- Most dioxins in wastewater never reach aeration tanks: Section 4.5 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004);

- EPA's exposure assessment relies on unrealistic assumptions which over-estimate risks: Sections 4.29 through 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004);
- EPA's toxicity assessment adds additional conservatism to the risk estimates: Sections 4.41 and 4.42 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004);
- EPA's conservative, high end assessment yields risk estimates only marginally above the $1x10^{5}$ level. Corrections to the risk assessment would reduce these estimates to below levels of concern: Section 4.47 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.3 Chlorine Chemistry Council Comment

EPA has Failed to Consider that Most Dioxins in Wastewater Never Reach Aeration Tanks
For purposes of this proposal, EPA's model used the influent to the water treatment plants to estimate dioxins volatilized in the treatment tanks. CCC believes the model does not appropriately consider that the dioxin in the wastewater results from contaminated solids are not readily transported. Further, the solids that may be contaminated with dioxins would most likely be removed in primary clarifiers prior to aeration.

EPA states that the estimated emissions from biological treatment units are based on the assumption that the dioxin concentration in the aqueous phase is equal to the solubility limit when the measured dioxin concentration is greater than the solubility. If the measured concentration does not exceed the solubility limit, the concentration measured in the high end sample is used.

EPA has overlooked the degree to which dioxins partition to solids in the aqueous environment and has erroneously assumed CHEMDAT8 accounts for sorption correctly. Dioxins will be adsorbed onto solids even when the measured concentration is less than the solubility limit. As such, it cannot be assumed that all measured dioxin is truly soluble and available for stripping just because that measured dioxin concentration is less than the solubility limit.

Data supplied from various CCC, CMA, and Vinyl Institute member companies demonstrates that most dioxin in wastewater (likely over 90%) will be adsorbed to particles and not be in the liquid phase. Therefore, it will not be available to volatilize in the aeration tanks. As a result, EPA has overestimated the concentration of dioxins available for stripping in the biological treatment unit by at least one order of magnitude. If emissions estimates in the risk assessment are reduced accordingly, the exposure and risk estimates will decrease proportionally.

Agency Response:

The Agency's response to this comment is provided in Section 4.5 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.4 Chlorine Chemistry Council Comment:

EPA 's Risk Assessment Greatly Over-Estimates Risks

The principle constituent of concern in K173 waste streams is dioxin, expressed as 2,3,7,8-TCDD toxicity equivalent (TEQ). As discussed below, EPA's risk assessment for this rulemaking is seriously flawed, and does not adequately support a decision to list these wastes as hazardous.

CCC retained the services of ChemRisk, a service of McLaren-Hart Inc., to provide a critical review of EPA's risk assessment used to support the listing of K173 waste.[1] A copy of ChemRisk's report is included as Appendix A, and should be considered part of CCC's comments. This report concludes that EPA has overestimated dioxin risks for the farmer, beyond what can be considered an appropriate high-end estimate.

Agency Response:

The Agency's responses to the McLaren Hart/Chemrisk comments are provided in Sections 4.29 through 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.5 Chlorine Chemistry Council Comment:

Exposure Assessment

There are a number of areas in which the exposure assessment relies on conservative assumptions, many of which result in the generation of unrealistic risk estimates.

• Normally, the beef cow is fed on grain during the last third of its life. Since grain and silage are often purchased elsewhere, the assumption that all cattle feed is contaminated appears to be unrealistic. Therefore, a net loss of the relevant congeners would occur prior to slaughter.

Agency Response:

The Agency's response to this comment is provided in Section 4.29 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

[1] Many of ChemRisk's comments are applicable to the risk assessment for K174 wastes.

10.5 Chlorine Chemistry Council Comment:

• The risk assessment does not appear to account for loss of chemicals due to food preparation, cooking and consumption practices. The Exposure Factors Handbook (USEPA, 1997) recommends that these important factors 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, because of the propensity that dioxin-like compounds have for fat, the cancer risk estimates associated with the beef ingestion pathway should be adjusted by a factor of 0.55 (0.73x0.76). Loss of residues from grilling or broiling of fish has been shown to reduce contaminant load by 50% or more and this "cooking reduction" value has been employed in deriving fish consumption advisories for PCBs.

Agency Response:

The Agency's response to this comment is provided in Section 4.40 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.6 Chlorine Chemistry Council Comment:

• EPA's estimate of adult dairy consumption is unreasonably high, over-estimating risk from this pathway by as much as 50%.

Agency Response:

The Agency's response to this comment is provided in Section 4.37 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.7 Chlorine Chemistry Council Comment:

Toxicity Assessment

Most of the risk associated with the K173 wastewaters is driven by two dioxin-like chlorinated furans (2,3,4,7,8-PeCDF and I ,2,3,4,7,8-HxCDF). The toxicity assessment for these compounds adds additional conservatism to the risk assessment.

• The TEFs for 2,3,4,7,8-PeCDF and l,2,3,4,7,8-HxCD do not reflect central values, but are instead upper bound values. The reliance on these upper-bound TEF values combined with an upper-bound cancer slope factor for TCDD results in cancer risk estimates that are overly conservative by a factor of approximately 2.5.

• EPA's cancer slope factor (CSF) for TCDD [156,000 (mg/kg-day)-l] is based on human equivalent doses calculated by scaling doses to body weight raised to the 2/3 power. This practice is obsolete,

and does not reflect changes in EPA policy for scaling doses to body weight raised to the 3/4 power (EPA, 1992). Making this correction would reduce risk estimates by 35%.

Agency Response:

The Agency's response to this comment is provided in Sections 4.41 and 4.42 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.8 Chlorine Chemistry Council Comment

ChemRisk attempted to quantify the impacts on the final risk calculations for as many of these factors as possible. Together these factors lead to approximately a 10-fold over-estimation of the high-end deterministic risk assessment for farmers. ChemRisk estimates risks from this waste stream to be 2x10-6, well below the lx 10-5 level EPA typically relies on to support hazardous waste listings. Similar reductions in risk estimates are expected for the other exposure scenarios.

As the comments above demonstrate, EPA has over estimated the high-end risks from K173 wastes. Given that even the inflated risk estimates are only marginally above the $1x10^5$ level, and only for the most highly exposed individuals (farmers), EPA should reconsider its determination that this waste stream poses a substantial hazard to human health or the environment.

Agency Response:

The Agency's response to this comment is provided in Section 4.47 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.9 Chlorine Chemistry Council Comment

EPA Should Consider Data Which Indicate that Low Level Dioxin Exposures Do Not Pose a Cancer Risk to Humans

Threshold Model

The CSF in the risk assessment does not take into account mechanistic information that would suggest there is a threshold for TCDD carcinogenesis. Considering the very low exposure levels associated with chlorinated aliphatics waste streams[2], it is entirely possible that a threshold model would show zero dioxin risk from these wastes.

[2] As noted in the ChemRisk report, a number of recent studies have examined dioxin concentrations in meat and dairy products sampled from grocery stores. These findings have similar levels to those predicted by EPA's risk assessment to occur in the food of farmers living near chlorinated aliphatics manufacturing facilities. This provides further evidence that the waste streams are not elevating dioxin risks of these farmers.

In reviewing the draft Dioxin Reassessment, EPA's Science Advisory Board strongly urged EPA to consider a non-linear model. As noted in *An SAB Report: A Second Look at Dioxin (1995):*

Thus the [Reassessment] document cannot ignore a possible threshold dose-response relationship and claim to be comprehensive in its presentation (SAB 78).

Although EPA's preferred dose-response model is linear, it seems clear that a threshold model would provide an equivalent or nearly equivalent description of the data. This is the most important issue in the dose-response modeling and should be thoroughly explored in EPA's analysis (SAB 76).

Epidemiology Studies
Several key epidemiological studies suggest that low to moderate TCDD exposure may not be carcinogenic to humans.

· The Ranch Hand studies, which include extensive clinical evaluations in 1982, 1985, 1987, and 1992 on a cohort of almost 1000, comprise the most comprehensive analysis ever conducted on a cohort of dioxin-exposed individuals. In their 1995 study of the "Ranch Hand" cohort, Wolfe et al. concluded:

At the end of a decade of surveillance and more than 20 years after the last exposure to Agent Orange in Vietnam, Ranch Hands and Comparisons appear to be at equal risk for the development of all forms of neoplastic disease and there is no evidence to suggest a positive dose-response relationship between body burden of dioxin and neoplastic disease.[3]

· In a study of cancer deaths among 5132 chemical workers at 12 U.S. plants[4], excess cancers were seen only in those workers whose dioxin exposure was 100 to 1,000 times higher than the background exposure of the general public. Dr. Robert Hoover of the National Cancer Institute stated that the study is "a critical piece of evidence" that shows dioxin, at its present levels in the environment, appears to present no significant threat to public health.

The exposure levels at issue for the proposed rule are much closer to the cohorts in these studies than to the high-exposure studies relied on by EPA. The SAB appears to agree that consideration should be given to results of studies in less exposed cohorts, stating

The conclusion that dioxin and related compounds are likely to present a cancer hazard to humans at exposure levels within one or two orders of magnitude above background is not well-supported by the existing human epidemiological database (SAB 92).

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[3] Wolfe et at., Paternal serum dioxin and reproductive outcomes among veterans of Operation Ranch Fland, *Epid. 6:*17-22 (1995).

[4] Steenland et al., Cancer, Heart Disease and Diabetes in Workers Exposed to 2,3,7,8-Tetrachlorodibenzo-p-dioxin. *J. Nat. Cancer Inst.* 91:779-86 (1999).

Agency Response:

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[5], and is comparable to the TCDD slope factor published in the Health Effects Assessment Summary Tables (HEAST; USEPA, 1997), 150,000 $(mg/kg\text{-}day)^{-1}$ [6]. We understand that the 1996 *Proposed Guidelines for Carcinogen Risk Assessment* 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, which will include a review of relevant epidemiological studies, the Agency has decided to use the 1985 cancer slope factor for TCDD (USEPA, 1985) for this rulemaking.

10.10 Chlorine Chemistry Council Comment:

Other Issues

Chloroform Exposure from Chlorinated Aliphatic Wastewaters Does Not Pose a Cancer Risk
EPA incorrectly asserts that the chloroform cancer risk of 3 x 10-6 for the farmer, based on the LMS approach is "additive to the risks that EPA estimated for dioxins because they would occur within the same timeframe." (64 FR at 46488). Apparently, EPA's Office of Solid Waste is unaware of the Office of Water's reanalysis of chloroform carcinogenicity. As articulated in the December 16, 1998 rulemaking on disinfection byproducts, EPA firmly rejected the LMS approach to assessing cancer risks from chloroform exposure. Specifically, EPA concluded that "the **nonlinear** cancer extrapolation approach is the most appropriate means" to assess cancer risks from chloroform (63 FR 69390, 69400, emphasis added). Under this nonlinear approach, exposures to chloroform of 300 ppb are

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

[6]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.

considered to pose no cancer risk. Therefore, the 201 ppb central tendency concentration for chloroform in chlorinated aliphatic wastewater poses no cancer risk.

Furthermore, even if the LMS approach for assessing chloroform carcinogenicity was scientifically valid, chloroform and dioxin act by different modes of action. Consequently, any risks from dioxin and chloroform exposure would not be additive.

Agency Response:

The Agency's response to this comment is provided in Section 3.16 of this Response to Comment document (responses to Dow Chemical, CALP-00012).

10.11 Chlorine Chemistry Council Comment:

The Risk Assessment Lacks Transparency

As discussed more thoroughly in the ChemRisk report, important information is left out of EPA's risk assessment. The sources and derivations of a number of assumptions are unknown or unclear. In addition, different values are used in the same model for different scenarios, without sufficient explanation.

Furthermore, a number of calculations could not be reproduced with the information provided. Of particular concern, EPA's deterministic risk estimate for the adult farmer could not be replicated. Using EPA's cancer risk formula and high-end parameters from the tables, ChemRisk calculated a cancer risk from 2,3,4,7,8-PeCDF and 1,2,3,4,7,8-HxCD that is significantly less than reported in the risk assessment. A reason for the discrepancy is not obvious, but suggests that the risk estimates should be carefully re-evaluated.

Agency Response:

The Agency's response to this comment is provided in Section 4.48 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.12 Chlorine Chemistry Council Comment:

EPA 's Peer Review of the Risk Assessment Is Inadequate

The peer review for the Risk Assessment Technical Background Document suffers from a number of weaknesses. EPA's charge to the three peer reviewers was vague, and did not provide sufficient guidance for addressing some critical aspects of the assessment. In addition, all three reviewers are well-known risk assessors and modelers, but none are dioxin experts or toxicologists. A broader range of expertise would have provided a more balanced review.

Despite these limitations, the peer reviewers have provided useful comments to EPA. It is likely that responding to these comments would reduce the risk estimates in the assessment. EPA should have revised the assessment in response to these comments prior to releasing the proposed rule.

Agency Response:

The Agency's response to this comment is provided in Section 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

10.13 Chlorine Chemistry Council Comment

EPA Should Give Weight to Population Risks

EPA is correct to base listing decisions primarily on risks to those individuals who are significantly exposed. Obviously a hazard can be significant, even if relatively few individuals are exposed. However, to fully evaluate risks in meaningful terms, EPA should also give weight to the population risks. Clearly the number of persons affected is a relevant factor for determining whether a substantial hazard exists.

In the current rulemaking, EPA estimates the population risks to be quite small, 0.0002 excess cancer cases annually from a population of 1,410 individuals. The average individual risk for this population is $2x10^{7}$. Given that the population risks are well below a level of concern, the individual risk estimates warrant particular scrutiny. EPA must ensure that listing decisions are based on substantial risks, and not theoretical high-end estimates without real-world significance.

Agency Response:

See EPA response to population risk issues in Section 7.4 (response to comment from American Petroleum Institute, CALP-00002).

10.14 Chlorine Chemistry Council Comment:

EPA's Estimates Show High Costs for Minimal Risk Reductions

EPA estimates the proposed rule will cost $3 million and prevent at 0.0002 cancer cases annually. Thus, the rule will cost an astounding $15 billion per cancer prevented. CCC believes that the true cost of the proposed regulations is more than double EPA's estimate (see comments by CMA and the Vinyl Institute) and, as noted above, the cancer risk is significantly lower than estimated. Therefore, the actual cost for each predicted cancer avoidance will be significantly larger, perhaps by orders of magnitude. Based on the low risk and high cost, EPA should exercise its discretion to not list these wastes.

Agency Response:

In contrast to some other Federal agencies, and to some authorizing statutes for other USEPA programs (e.g. the economic achievability criterion for effluent guidelines of Section 301(b)(2)(A) of the 1977 Clean Water Act), Congress' 1976 RCRA hazardous waste authorizing statute (with 1984 amendments) does not direct the USEPA to apply economic analysis criteria, such as measures of cost-effectiveness, in either (a) promulgating RCRA Subtitle C hazardous waste regulations in general, or in (b) developing and promulgating criteria for identifying and listing hazardous wastes, in particular (see RCRA Subtitle C Sections 3001(a) & (b)(1)). For additional information about this specific aspect of RCRA, see USEPA's 1980 review of the legal history of RCRA (Federal Register, Vol.45, No.98, 19 May 1980, p.33089), which arrived at the following determination:

> "*Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most cost effective regulation among various alternatives... There is no explicit requirement in the Act directing EPA to consider costs in the development of its initial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from other major pollution control statutes... The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration... Congress was aware that the hazardous waste regulation would impose substantial costs on the regulated community. Despite this recognition, Congress deliberately rejected provisions that would require consideration of cost burden on industry or to moderate the Act's environmental objectives. For these reasons, the Agency concludes that the Act prohibits it from considering such costs in the development of Subtitle C regulations as a basis for lessening the standards it considers necessary to ensure protection of human health or the environment.*"

As of 1999, two other Congressional statutes direct Federal regulatory agencies to conduct benefit-cost analyses in special circumstances where (a) unfunded Federal mandates may exceed $100 million in direct cost in any single year (1995 UMRA), or if (b) small entities are disproportionately affected (1980 RFA & 1996 SBREFA). Furthermore, the Executive Branch (Executive Order 12866 of 30 Sept 1993) only directs Federal regulatory agencies such as the USEPA to conduct benefit-cost analyses in cases of economically "significant" rulemakings, which are defined as having adverse effects greater than $100 million on the national economy. Based on USEPA's cost/impact estimates, both the proposed and final listing rules were not expected to exceed any one of these various benefit-cost analysis criteria. Consequently, the USEPA did not develop a cost-effectiveness measure for either the proposed or final listing rule.

10.15 Chlorine Chemistry Council Comment

EPA Inappropriately Relied on the Draft Dioxin Reassessment
EPA issued a draft Health Assessment for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) in 1992. These documents have been reviewed by the EPA Science Advisory Board (SAB). The SAB made substantial comments on this document that are directly relevant to the Risk Assessment for the Chlorinated Aliphatics Listing Determination. Since 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.

On the front cover of the draft chapters of the dioxin reassessment (see for example, Chapter 8. Dose-Response Relationships, EPAI600/AP-92/00 1 h) it states:

Review Draft (Do not Cite or Quote)
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, Section 5.0 Risk Characterization in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, July 30, 1999, EPA Contract Number 68-W6-0053, RTI Project Number 92U-7298-027, page 5-33 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, conclusions made concerning dioxin in the risk assessment for chlorinated aliphatics wastes are based on a preliminary and possibly incorrect document.

Agency Response:

EPA acknowledges the commenter's concerns regarding the use of a draft document to support our toxicity assessment for dioxin-like compounds. 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, and is comparable to the TCDD slope factor published in the Health Effects Assessment Summary Tables (HEAST; USEPA, 1997), 150,000 $(mg/kg\text{-}day)^{-1}$*. In the preamble to the proposed rule, and in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination (USEPA, 1999), 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) 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.

* 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 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).

References:

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

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

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

USEPA. 1999. Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. Office of Solid Waste. July.

10.16 Chlorine Chemistry Council Comment:

CCC Supports a Conditional Approach for Listing Waste Streams as Hazardous

In this rulemaking, EPA proposes a concentration level for wastewaters that would trigger RCRA Subpart CC controls for wastewater treatment tanks if the listed wastewater exceeds a level of contamination (i.e., 1 ng/L dioxin TEQ). In principal, CCC supports the use of a concentration-based implementation approach rather than an across-the-board mandate where all listed wastes must comply with the Subpart CC requirements.

CCC believes that EPA should extend this conditional approach one step further, and regulate wastewater streams as hazardous only if a contamination trigger level is exceeded. A concentration-based listing approach is preferable to an across the board listing, which subjects all waste of a certain description to Subtitle C regulations, no matter how small the constituent concentrations, and how little

risk is actually posed. For K173 wastes, the trigger level should be based on a revised risk assessment that corrects for the issues raised in these comments.

Agency Response:

The Agency acknowledges CCC's support of a concentration-based listing. 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.

For the reasons described in the preamble to the final rule, EPA is finalizing the conditional listing approach for EDC/VCM wastewater treatment sludges, as proposed. EPA is not finalizing the proposed alternative conditional listing approach for VCM-A wastewater treatment sludges.

SECTION 11
Formosa Plastics Corporation, U.S.A.
CALP-00009

I. INTRODUCTION AND SUMMARY

Formosa Plastics Corporation, U.S.A. (FPC USA) is a petrochemicals and chemical manufacturing company which produces vinyl chloride monomer (VCM) and 1, 2 ethylene dichloride (EDC), along with other chemicals. As such, as the proposal stands, it appears that we generate two of the three waste streams listed in EPA's proposed rule of August 25, 1999 (64 FR 46476) to list three new waste streams as hazardous under the Resource Conservation and Recovery Act (RCRA). FPC USA believes that it would be significantly impacted by this proposed rule and is not satisfied that the risks associated with these waste streams have been accurately characterized with regard to their risk to human health and the environment. Hence, FPC USA is contributing comments as requested by EPA throughout the proposal.

Specifically, as the proposal currently stands, FPC USA believes that it generates the following two proposed waste streams:

K173 — Wastewaters from the production of chlorinated aliphatic hydrocarbons, except for wastewaters generated from the production of vinyl chloride monomer using the mercuric chloride catalyst in an acetylene-based process; and,

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

Two of FPC USA's three operating facilities would be affected by this proposal as written. One facility, Formosa Plastics Corporation, Texas (FPC TX) is located in Point Comfort, Texas and the other facility, Formosa Plastics Corporation, Louisiana (FPC LA) is located in Baton Rouge, Louisiana. Wastewater treatment systems at both FPC TX and FPC LA operate as open-top tank systems. Since FPC TX and FPC LA are integrated facilities, each facility manages wastes generated across different production processes within the same waste management system (i.e., commingled system vs a dedicated system). FPC USA's comments on the proposal can be summarized as follows:

The Risk Assessment dramatically overstates the risk to human health and the environment.

FPC USA is in agreement with the Peer Reviewers that site-specific assessments should be considered. The assumptions for the partitioning of dioxin in wastewater and its volatilization are overly conservative and not representative of a typical facility, in our opinion. Additionally, the assumption that dioxin emissions do not sorb to particulate overstates the risk and the food consumption patterns necessary for

nearby receptors is unlikely, if not impossible in the area where we operate our facilities. Consequently, the proposed rulemaking is based upon the worst, of the worst, of the worst case scenarios and as such, is not adequately balancing the needs for environmental protection with reasonable risk estimations.

EPA has based the entire proposal on only one positive sample result.

The costs for implementing air emission controls are underestimated by a factor of 10-100.

Compliance with RCRA Part 265 Subpart CC is unachievable as currently written and as proposed.

In conclusion, EPA should consider withdrawing the rule based on the following:
The wastes are being managed using methods that do not pose substantial present or potential hazard to human health or the environment; and,

The subject waste do not meet the listing criteria of 40 CFR 261.11.

Detailed comments are provided below.

11.1 Formosa Comment:

II. REGARDING RISK ASSESSMENT

Regarding EPA's approach to conducting the human health risk assessment, FPC USA appreciates the considerable effort that went into carefully evaluating the health risk that exposure to K173 and K174 waste may have on humans and the environment. However, FPC USA has several critical comments with regard to this subject.

A. *EPA's Risk Assessment is Overly Conservative*

FPC USA does not have in-house technical experts to comment upon EPA's Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination. However, FPC USA agrees with its industry representative's (the Vinyl Institute) opinion that the Risk Assessment is overly conservative and believes that these waste streams should not be determine hazardous.

FPC USA believes, based on the above, that the wastewater risk assessment overestimated the risks such that a decision to list the residual is not warranted and that this proposed waste listing be dropped.

Agency Response:

The Vinyl Institute's comments, and the Agency's responses to those comments, are provided in Section 4 of this Response to Comments Document (responses to The Vinyl Institute, CALP-00004).

11.2 Formosa Comment:

B. *EPA Did Not Use Site Specific Analysis to Determine the True Risk of K173 Wastewaters Streams*

1. Site Specific Analysis

If EPA does not drop the listing, FPC USA believes that a risk based, site specific risk assessment be allowed by EPA, as it has done for other emission categories, so that an accurate risk representation is presented to the public.

It is FPC USA's understanding that the human risk analyses are based on dioxin emissions from K173 wastewater treatment systems affecting farmers and farmers' children living within 300 m (0.18 miles) of a EDC/VCM plant in the same location for 48.3 years or more. EPA assumed that the farmer raises fruits, exposed vegetables, root vegetables, beef cattle, and daily cattle within this 0.18 mile range and that the farmer consumes approximately 42 percent of the exposed vegetables, 17 percent of the root vegetables, 33 percent of the fruits, 49 percent of the beef, and 25 percent of the dairy products (64 FR 46485). EPA explains that the farmer meeting this criteria is a human at a health risk for an excess lifetime cancer risk due to exposure to a cancer causing contaminant, namely dioxin (i.e., "affected receptor").

With some degree of uncertainty, EPA assumed that vapor emissions of dioxins from chlorinated aliphatics wastewaters and wastewater sludges remain as vapors during their transport from the waste management system to the receptor.

Hence, EPA proposed that if the concentration of dioxin in a K173 wastewater treatment system's headwaters exceeds 1 ng/L, then the facility is required to control the dioxin emissions from any open-topped wastewater treatment tanks under 40 CFR Part 265 Subpart CC (i.e., enclosed the tank and vent emissions to a control device) and comply with specific testing, monitoring, recordkeeping and reporting requirements.

Since FPC USA does not have any farmers living within 0.18 miles of its facility that meet all the criteria detailed above, FPC USA is unclear as to why its operations would be regulated under this proposal. FPC USA recommends that EPA use site specific information when assessing the risk of dioxin emissions from chlorinated aliphatics production wastes.

Agency Response:

The Agency's response to the comments pertaining to the use of site-specific risk assessments is provided in Sections 3.25 (Shell comment) and 4.6 (Vinyl Institute comment) of this Response to Comment document.

11.3 Formosa Comment:

If scientific information demonstrates that dioxin is present in wastewater in concentrations that warrant air emissions controls, it would make sense to regulate only those situations where the risks are justified (i.e. when the risk threshold is exceeded and when an affected receptor is present). Given that the proposed rule is addressing such a limited number of facilities (23 sites), why not allow each facility to run the same modeling program EPA used with site specific data, distance to nearest receptor, wastewater concentrations, etc. Facilities that remain below the critical dioxin emission level would be allowed to "opt-out" of the requirements and their wastewaters and wastewater sludges would not be considered hazardous waste.

This is the same rational allowed under this proposed rule for the management of K174 hazardous waste. In particular the "contingent management" option. Under the contingent management approach, EPA is proposing to list particular wastes as hazardous only if the wastes are managed in a way other than the manner in which EPA has determined is protective of human health and the environment (64 FR 46480). If a facility's current operations can be reasonably estimated to be protective of human health and the environment, why enforce costly emission controls?

Agency Response:

The Agency's response to this comment is provided in Section 3.25 of this Response to Comment document (responses to Dow Chemical Company, CALP-00012).

11.4 Formosa Comment:

Within the preamble to the rule, EPA itself expressed concern with its lack of site specific information. For example:

The risk analyses were based on a limited set of waste sample data. It is possible that these data do not represent the true distribution of contaminant concentrations in the waste categories evaluated, resulting in either an overestimation or under estimation of the actual risk to receptors.

EPA obtained little site-specific information regarding waste management units for the chlorinated aliphatics industry, necessitating that we make a number of assumptions regarding waste management in off-site landfills, the land treatment unit, and wastewater tanks...

We typically used regional databases to obtain the parameter values necessary to model containment fate and transport. Because the data that we used are not specific to the facilities at which the actual wastes are managed, the data represent our best estimates of actual site conditions. Use of these databases in lieu of site-specific data may result in either overestimations or underestimations of risk.

Agency Response:

The Agency's response to this comment is provided in Sections 4.6 and 12.39 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004 and responses to Louisiana Chemical Association, CALP-00010).

11.5 Formosa Comment:

Sources of uncertainty in toxicological benchmarks includes one or more of the following: extrapolation from laboratory animal data to humans.... Toxicological benchmarks are designed to be conservative

(that is, overestimate risk) because of the uncertainties and challenges associated with condensing toxicity data into a single quantitative expression. Therefore, use of the current toxicological benchmarks most likely overestimated risk for the pathways evaluated. (64 FR 46498)

Agency Response:

The risk assessments performed for the hazardous waste listing determinations typically have relied on Agency health benchmarks developed through Agency consensus and presented on the IRIS (Integrated Risk Information System) database or on other reliable databases. These health benchmarks are combined with an exposure analyses performed for the particular waste(s) in question to arrive at a risk estimate. Agency managers reviewing the risk estimates as part of the listing determination process are aware that the Agency methodology for deriving health benchmarks has some conservative elements to it, and they consider this factor independent of the exposure analysis, which, as described elsewhere, uses two high end exposure parameters in developing a high end risk estimate. The independence of the health benchmark from the exposure assessment is explicitly recognized in the Agency's "Guiding Principles for Monte Carlo Assessment" (EPA/630/R-97/001; March, 1997) which recommends that probabilistic analyses not be applied to dose response evaluations.

Reference:
USEPA. 1997. "Guiding Principles for Monte Carlo Assessment", EPA/630/R-97/001, http://www.epa.gov/ncea/monteabs.htm. March

11.6 Formosa Comment:

In a recent final rulemaking, EPA allowed facility-specific data in determining the true risks. FPC USA recommends that EPA allow the same for the chlorinated aliphatic production wastes (see September 30, 1999 NESHAPS: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors (64 FR 52828)). This NESHAP regulates, among other things, emissions of chlorinated dioxins and furans from hazardous waste incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. EPA also followed this approach for the proposed Standard for the Management of Cement Kiln Dust (CKD) under RCRA.

As a result of the public and peer review comments received on the risk assessment for the Hazardous Waste Combustors NESHAP proposal, EPA modified the 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. After EPA conducted a detailed site-specific analyses, it determined, with respect to cancer risks of dioxins, that there are variables in individual exposures due to site-

specific differences in dioxin emissions, location of exposure, and other factors. As a result of the detailed site-specific analysis, EPA projected that the high end lifetime excess cancer risks will be reduced in the affected population from 2 in 100,000 for one type of subject waste to below one in 1,000,000 (64 FR 53000 & 64 FR 53004). EPA found that "the risks associated with non-cancer effects from hazardous waste combustors are an order of magnitude or more lower than any (unknown and unquantifiable) risks that may be attributable to background exposures." (64 FR 53004)

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

11.7 Formosa Comment:

Upon review of the Peer Review Document *(Charge to Peer Reviewers - June 29, 1999 - Risk Assessment Technical Background Document Chlorinated Aliphatics Listing Determination),* one of the Peer Reviewers agrees with the observation that site specific data should be used. Specifically, EPA charges the Peer Reviewers with the question: Do the assumptions EPA employed in calculating vapor emissions from wastewater tanks (e.g., the tank operating parameters) appear technically valid and reasonable? The Peer Reviewer responded:

EPA modeled vapor emissions from aerated biological treatment tanks using the CHEMDAT8 model. The model has undergone extensive review by both EPA and industry and is considered to provide reasonable accurate emission estimates. Thus, the choice for this model for the current assessment appears reasonable and technically sound. The annual waste quantity (flow rate) and dimensions of the tank are sensitive input parameters. **Specific data on these parameters were not available for the aerated tanks; therefore, the flow rate and dimensions of the tanks were estimates based on reported annual waste quantities. It is not clear why such fundamental data were not available**, but give that they were not, the assumptions make (sic) seem reasonable. (ref. :Review by Curtis Travis)

Hence, FPC USA believes that a risk based, site specific risk assessment be allowed by EPA, as it has done for other emission categories, so that an accurate risk representation is presented to the public.

Agency Response:

The Agency's response to this comment is provided in Sections 3.25 (Dow) and 4.6 (Vinyl Institute) of this Response to Comment document.

11.8 Formosa Comment:

2. General Analysis of Risk Assessment

Again, regarding types of receptors, the preamble states that the types of individuals that could be exposed to contaminants from chlorinated aliphatic wastes are an adult resident, child of a resident, home gardener, a farmer, the child of a farmer, and fisher. Although this could happen in theory, in reality these types of individuals may not be residing, farming, or fishing in proximity of a location managing these wastes. It is FPC USA's opinion 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 in the area. We recommend that the risk assessment account for the probability of proximity of these individuals or use actual population/geographic data.

Agency Response:

EPA conducts its risk assessment on the basis of plausible receptors and exposure scenarios. The Agency believes that is it plausible for residents, farmers, fishers, and gardeners to live within close proximity to chlorinated aliphatic manufacturing facilities (see the 2000 Addendum to the Risk Assessment Background Document and the Agency's response provided in Section 4.6 of this Response to Comment document [responses to The Vinyl Institute, CALP-00004].). In addition, EPA based the listing determinations on the results of an assessment of risk to individuals and not upon population risks (see Agency response in section 7.4, response to comment from American Petroleum Institute, CALP-00002). Therefore, the Agency disagrees with the commenter's recommendation that the risk assessment account for the probability of proximity of individuals to specific facilities or the use of population data.

11.9 Formosa Comment:

Additionally in the preamble, EPA's estimates of consumption patterns by various receptors seems unreasonable in general and extremely unlikely for our facilities in particular. It is difficult to believe that a farmer living 0.18 miles from a chlorinated aliphatic production facility would grow fruit trees **and** vegetables, along with raising beef **and** dairy cattle all on the same plot of land. In fact, in the South Texas area where one of our facilities is located, dairy cattle production is non-existent due to the climate. More importantly perhaps is the proposed connection between milk consumption and exposure to dioxin for children of farmers given their relatively high consumption of milk and the tendency of chlorinated dioxins and furans to bioaccumulate in milk fat (64 FR 53004). Given its disproportionate significance in the exposure calculation, site-specific data on dairy/milk production should be used to improve the accuracy of the risk assessment for this particular exposure route.

Upon review of the Peer Review Document *(Charge to Peer Reviewers - June 29, 1999 - Risk Assessment Technical Background Document Chlorinated Aliphatics Listing Determination),* one of the Peer Reviews agrees with this observation. While generally stating that EPA's overall risk assessment methodology was reasonable and technically defensible, the Peer Review wrote the following with regard to the Risk Assessment Document and receptors:

Page 2-31, paragraph 4. Where do the percentages of food eaten by the home gardener that are home grown come from? It is hard to believe that a home gardener gets 11.6% of his exposed fruit (apples, peaches, pears, and berries) from a home garden. That would mean that 11.6% of home gardeners are growing apple, peach or pear trees in their home garden; a figure that is hard to believe given that most home gardens are small and mainly used to grow vegetables.

Page 2-34, Paragraph 1. It is hard to believe that a recreational angler obtained 32 percent of the fish in his/her diet from a stream located near a waste management unit or near his home. This figure represents that fraction of the total fish is his diet that is caught. However, of the total fish that an angler catches, what fraction is caught within one mile of his residence? I would expect this fraction to be small. But even if assumed to be 58%, it would reduce the total intake from the fish pathway by 50%.

Page 2-34, Paragraph 2 Where do the percentages of food eaten by the farmer that are home grown come from?" (ref: Review by Curtis Travis).

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

11.10 Formosa Comment:

C. *EPA is Uncertain of the True Vapor Emissions of Dioxin from K173 Wastewater Streams*
As per the preamble, one of the sources of uncertainty is EPA's assumption that vapor emissions of dioxins from chlorinated aliphatics wastewaters and EDC/VCM wastewater treatment sludges do not appreciably sorb to particulate matter in ambient air for approximately 1.2 minutes (64 FR 46499). Because of this assumption, EPA's calculated dioxin concentration in plants, and in animals consuming plants (particularly grasses), are higher than they would be if EPA assumed that some fraction of the vapor phase dioxin irreversibly partitions onto particles in the ambient air. EPA believes that its assumption that dioxins remains as vapors during their transport from the waste management unit to the receptor location is appropriate. Because EPA understands that its assumption results in increased risk estimates, it requested comments on the issue.

Calculated dioxin vapor emissions from aeration units appear high. Studies have shown that dioxin partition to solids, so FPC USA is uncertain as to how a high concentration of dioxin can be found in its

aeration basin, after the solids have been removed in the clarifier. In addition, calculated air emissions are high estimates because the air emissions model did not use commingle sample results, but relied on samples from dedicated wastewater treatment systems. (Commingled wastewaters is the predominant wastewater treatment practice.)

FPC USA does not have in-house experts to addresses this important topic and will rely on its industry representative, the Vinyl Institute, to discuss this concern in detail.

Agency Response:

The commenter appears to have confused the issue of partitioning of dioxins between the vapor and particulate phase after release from the wastewater treatment tank (the issue EPA on which specifically requested comment) with an issue concerning how EPA estimated emissions from a wastewater treatment tank. The issue that the commenter raises is the latter. The Agency's response to this comment is provided in Section 4.5 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

11.11 Formosa Comment:

D. *EPA has Limited Test Data Results Which Skews the Rule's Impact*

EPA is basing the entire rule making process and the threshold of concern ($\geq$ 1 ng/L dioxin TEQ) on only one test result of 6 samples tested. The risk assessment used only the sampling results from dedicated (i.e., wastewater from EDC/VCM production facilities only vs commingled) chlorinated aliphatics wastewater samples and the dedicated EDC/VCM sludge samples (6 out of 41 wastewater samples and 4 out of 7 sludge samples). Although EPA acknowledged that most facilities commingle their EDC/VCM wastewater, it chose to exclude the samples from the commingled wastewaters. As a result, the conclusion based on the dedicated samples may exaggerate the risks associated with chlorinated aliphatics wastewater and EDC/VCM wastewater sludge from commingled facilities. We recommend that sample results from the commingled wastewaters and sludges be used in the risk assessment.

Does EPA truly believe that this small sample size is representative for the industry and justifies the proposed rulemaking? In order to evaluate the wastewater streams of concern and the potential applicability of the rule, we estimate that, at one facility, between 25 to 30 wastewater samples may require testing in order to defensibly evaluate the impact of the proposed rule. In contrast, EPA appears to be willing to accept scant evidence for the rule making that it would not typically accept as adequate evidence to support a facility's determination for non-applicability.

Agency Response:

See the Agency's response to the comment in Section 4.9 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

11.12 Formosa Comment:

E. *EPA Did Not Use Site-Specific Analysis to Determine True Risk of K174 Waste streams*
As discussed in Section II B. of this document, FPC USA believes that, using site specific information, if the risk assessment does not support the estimation of adverse risks to human health or the environment, the waste should not be considered hazardous.

Agency Response:

The Agency's response to this comment is provided in Section 12.39 of this Response to Comment document (responses to The Louisiana Chemical Association, CALP-00010).

11.13 Formosa Comment:

III REGARDING PROCESS ASPECTS - K173

A. *Option 2 for K173 Wastewater Streams is a Better Option*
EPA has proposed three options for addressing the K173 waste determination (64 FR 46504)

Option 1 - $\geq$ 1 ng/L TCDD TEQ = Hazardous Waste & RCRA Subpart CC
< 1 ng/L TCDD TEQ = Hazardous Waste

Option 2 - $\geq$ 1 ng/L TCDD TEQ = Hazardous Waste & RCRA Subpart CC
< 1 ng/L TCDD TEQ = Non- Hazardous Waste

Option 3 - $\geq$ 1 ng/L TCDD TEQ = Hazardous Waste & RCRA Subpart CC
< 1 ng/L TCDD TEQ = Non- Hazardous Waste if determination requirements are followed and the determination is certified to EPA. Method used in the Dyes & Pigments RCRA Listing (July 23, 1999 64 FR 40210 & 40227).

Based on EPA's recent rulemaking activity, FPC USA recommends that EPA chose Option 2 with regard to the classification of chlorinated aliphatic wastewaters that do not meet the 1 ng/l trigger, if a listing determination is justified. Recently EPA proposed to allow properly managed cement kiln dust (CKD) to remain non-hazardous providing the management standards are met. See proposed rule of

August 20, 1999 (64 FR 45633). Option 2 follows EPA's creative, affordable, and common sense approach for management of wastes just as EPA applied to the CKD proposal.

E.g.: "H. Today's Approach - Exclude Properly managed CKD From Hazardous Waste Listing

1. *Develop Management Standards and Exempt Properly Managed CKD From Classification as a Hazardous Waste (Management-based Listing)*

Today's proposed rule would regulate CKD under RCRA to address the concerns identified in the RTC[1] while avoiding unnecessary requirements. The approach taken is to establish management standards for CKD and make it clear that all CKD managed in accordance with those standards is not classified as a hazardous waste. CKD not managed in accordance with the standards, on the other hand, is proposed to be listed as a hazardous waste under 40 CFR 261.11

Accordingly, EPA is proposing to (1) establish standards that define proper management of CKD waste; (2) exempt from classification as hazardous waste all CKD managed in accordance with specific standards proposed today....' (64 FR 45641)

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. The Agency appreciates the commenter's input with regard to the concentration-based listing approach.

11.14 Formosa Comment:

IV REGARDING PROCESS ASPECTS OF LISTING K174

A. *EPA has Neglected to Consider "Contingent Management" Overburden*

If truly exempt, why enforce that "accurate records" are kept to facilitate enforcement? This proposal is as restrictive as if the waste were regulated. (64 FR 46508). The current RCRA regulations under 40 CFR 261.2(f) already provide guidance for "Documentation of claims that materials are not solid wastes or are conditionally exempt from regulation". In our opinion, there does not appear to be any need to establish a new or more specific set of rules or guidelines to demonstrate compliance with the "Contingent Management Option". Facilities are familiar with the current requirement to provide

[1] Report to Congress on Cement Kiln Dust

appropriate documentation (such as legally binding contracts) to demonstrate that a material is not a waste or is exempt from regulation. Any new set of standards or rules would only create confusion.

Agency Response:

EPA disagrees that the proposed approach to implementing the conditional listing for K174, that the Agency is finalizing, is "as restrictive as if the waste were regulated." The Agency is not imposing any new or additional recordkeeping requirements as part of the contingent management 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 recordkeeping requirements. 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.

Please see also EPA's response to comment in Section 4.25 of this Response to Comment Document.

11.15 Formosa Comment:

FPC USA suggests that the conditional K174 listing be changed to apply to the waste stream when it is managed, intended for disposal, or disposed of using the method that poses the risk that warrants listing it as a hazardous waste. The proposed conditional listing would impose unnecessary compliance burdens on companies that are managing the waste stream using methods that do not pose risk that warrant listing. The proposed listing description creates ambiguities in the interpretation and implementation of the listing, and those regulatory requirements that it affects. Also, the conditional listing accepts landfilling as the only acceptable method of disposal. This approach would prohibit any new management and disposal methods although they may prove to be as acceptable or more environmentally beneficial than the landfilling.

FPC USA recommends that the listing be revised, in keeping with EPA's proposed listing language found within the Dye & Pigment Proposed Hazardous Waste Listing Rule (July 23, 1999). FPC USA recommends the following language at Section 261.32 and 268.40 - Treatment Standards for Hazardous Waste:

K174 .....Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater), unless the sludges meet the following conditions: they are disposed of in a subtitle C or D landfill licensed or permitted by the state or federal government; and they are not otherwise placed on the land prior to final disposal.

Agency Response:

EPA disagrees with the commenter's assertion that "the proposed listing description creates ambiguities in the interpretation and implementation of the listing." In fact, the conditional listing approach for EDC/VCM wastewater treatment sludges eliminates any ambiguity in that it clearly states that EDC/VCM wastewater treatment sludges are hazardous waste, unless they are managed in one specific manner (*i.e.*, disposed in a landfill) and without being placed on the land prior to being managed in this specific manner. The Agency left open no ambiguity with regard to its conclusion of how this waste can be managed safely.

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*., 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 that the Agency found 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.

However, the Agency disagrees with the commenter's suggestion that based upon the fact that one management scenario has been deemed to be safe and another management scenario is deemed to be unsafe, that EPA should restrict the listing to only those wastes managed in the unsafe manner. The Agency has no information on which to base a decision that EDC/VCM wastewater treatment sludges are safe when managed in any other manner other than disposal in a landfill.

Information available to the Agency during development of the proposed rule indicated that there were no facilities managing EDC/VCM wastewater treatment sludges in a manner other than landfill disposal or disposal in a land treatment unit. Therefore, EPA did not evaluate potential risks from other management practices. 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 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. Therefore, we do not have a basis to exclude sludges managed in any other manner from the listing description. Should the Agency receive information in the future indicating that other management practices are occurring, the Agency may re-visit the decision to preclude other non-hazardous waste management practices 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.

11.16 Formosa Comment:

B. *EPA has Incorrectly Determined that There is Sufficient Capacity*

Under the proposal at 64 FR 46523, the capacity analysis states that "sufficient capacity exists to manage proposed K173 should the need for treatment of proposed K173 waste arise." How can the EPA substantiate the claim that treatment capacity exists for a waste that is not yet listed? Treatment facilities would be required to add the new listing description to their permits prior to accepting the waste. Consequently, no one currently can accept K173 and given the perceived "stigma" of treating dioxin, there is no reason to assume that all waste treatment operations will make the necessary changes to accept the material.

Agency Response:

As discussed above, EPA is finalizing a decision to not list K173 as hazardous. Therefore, the commenter will not need to seek alternative treatment capacity.

11.17 Formosa Comment:

V. REGARDING EPA's ECONOMIC ANALYSIS FOR K173 WASTE

A. *Compliance Costs for Waste Management Units are Underestimated*

EPA is encouraging the public to provide comments and suggestions about the design, accuracy, representativeness and completeness of the *Economic Background Document* for the proposal to list wastewater's and wastewater sludges from the chlorinated aliphatic industry (64 FR 46517). FPC USA appreciates EPA request for comments on this document and has provided what we believe to be constructive input into determining the cost to comply with the K173 proposed listing.

FPC USA believes that EPA's Table IV - 1 - Summary of Estimated Industry Compliance Costs (64 FR 46518) appears to be low and underestimates the cost to comply. Specific details are provided below.

Within EPA's *Economic Background Document* (dated 30 July 1999) regarding the subject, EPA requested public comments and information relative to the baseline waste management characterization (Item 6 of page ii). Specifically, EPA requested comments on the waste management units, stating in particular, that there is uncertainty in the Section 3007 survey data regarding the applicable number and sizes of wastewater management tanks used by CAHC manufacturing facilities (64 FR 46498). EPA also requested comments on Unit Costs (Item 8 of page ii). FPC USA is providing comments as requested by EPA.

Upon review of the *Economic Background Document* and the example RCRA 3007 Survey found in *the Listing Background Document for the Chlorinated Aliphatic Listing Determination* (dated July 30, 1999), FPC USA's believes that EPA did not use the true range of tanks that may be affected by the control requirements of RCRA Subpart CC.

Page 40 and Exhibit D-1 of the *Economics Background Document* explain EPA's approach to characterizing tank systems and consequently developing implementation and compliance costs. In summary, EPA based its scope on information provided by 15 of the 23 surveyed facilities and then proportionally expanded the "universe" to estimate a total number of potentially affected tanks for all 23 facilities.

By summarizing the total capacity of the 58 wastewater tanks reported in the survey by the 15 facilities, EPA came up with an average tank size of 380,000 gallons. The total capacity of the 58 wastewater

tanks was estimated at 22.045 million gallons, with each facility averaging six tanks. EPA then developed "proxy" tank sizes ranging from 45,000 to 775,000 to create a tank size distribution across a facility.

In order to estimate how many of the 58 wastewater tanks would require air emission controls under RCRA Subpart CC, EPA relied on the test results of six wastewater samples applied to the Risk Analysis (64 FR 46483 & 46503). Of the six samples tested for dioxin, all taken from a "dedicated" wastewater management systems, one exceeded the 1 ng/L dioxin concentration threshold. Hence, EPA applied the assumption that one in six wastewater streams (17%) would require air emission controls. Since survey results indicated that several facilities already operate with emission controls, EPA multiplied the affected streams by a percentage ranging from 0 to 100% to account for the likelihood that some tanks were already covered.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

11.18 Formosa Comment:

B. *Critical Survey Data is Missing*

FPC USA has several concerns regarding EPA's approach to characterizing tank systems. By leaving eight sites out of its evaluation, EPA made assumptions with regard to the unsurveyed sites that may not be accurate. EPA does not explain why eight sites were not included in the cost analysis. For example, EPA assumes that the largest tank potentially affected by air emission controls would be 775,000. This is not true for FPC USA, as detailed below.

In addition, *Section 8.1 Storage or Treatment in Tanks* of the RCRA Section 3007 Survey did not request **exact** design capacity, but used the following codes:
A = < 10,000 gallons
B = 10,000 gallons to 100,000 gallons
C = 100,000 to 1,000,000 gallons
D = > 1,000,000 gallons

By inserting a letter code, EPA does not have an accurate amount of wastewater handled by the industry, nor a true idea of the tank sizes involved, particularly tanks > 1,000,000 gallons.

C. *EPA Ignored Potentially Affected Tanks*

In assigning "proxy" tank sizes in the range of 45,000 to 775,000, EPA ignored tanks that may be in a much higher size range. For example, FPC USA has three wastewater tanks potentially affected that

are approximately 1,500,000 gallons, two that are greater than 2,000,000 and two that are greater than 3,000,000 gallons. Currently, all seven tanks are not required to have covers.

As per note (d) of Exhibit D-4 in the *Economic Background Document,* EPA estimated that the roof area of a 20,000-gallon tank is 293 sq. ft and the cost to enclose it is $11,400 (1986 price). Proportionally, therefore the cost to cover a 775,000-gallon tank with a roof area of 3,728 would be $145,048 (not including sales tax, and field installation). FPC USA believes that the cost to cover large existing tanks (i.e. greater than 1,000,000 gallons), is significantly more than a simple proportion evaluation using the cost to cover a 20,000 gallon tank.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements. However, EPA acknowledges the information provided by the commenter on the proposed rule cost estimates.

11.19 Formosa Comment:

D. *EPA 's Compliance Cost Estimation Methodology Underestimates the Cost Impact*

FPC USA reviewed EPA's method of determining the initial capital costs and the recurring annual Operating and Maintenance (O&M) costs. These costs and the methodology used are found in Table VI - 1 (64 FR 46518) of the preamble to the proposed rule and the Executive Summary for Estimated Industry Compliance Costs (page (i)) and Exhibits D-4 and D-5 of the Economics Background Document). With regard to K173 compliance costs, EPA estimated the following:

Table 1
EXECUTIVE SUMMARY OF ESTIMATE INDUSTRY COMPLIANCE COSTS[2]

Item	Type of CAHC Facility Potentially Affected by the Proposed Rule	Nr. Of affected CAHC mfg. Processes	Initial capital costs ($ lump-sum)	Recurring annual O&M costs ($/year)
B	**K173: WASTEWATER LISTING ESTIMATED COSTS:**			
BI	Tank fixed roof + valve	9 tanks	$1,084,600	$81,600
B2	Tank roof vent + carbon control device	9 tanks	$150,900	$581,600
B3	Tank "Subpart CC" ancillary costs	9 tanks	$0	$23,700
B4	Initial waste testing for dioxins	51 tanks	$84,500	$0
B5	Annual waste retesting for dioxins	43 tanks	$0	$70,400
	Subtotal wastewater costs =		**$1,320,000**	**$766,900**

Using EPA's methodology of calculating compliance costs, but inserting FPC USA specific information, FPC USA has calculated initial capital costs and recurring annual O&M costs that may be incurred at its facilities. Since FPC USA has not been required to test its wastewaters for dioxin at the headworks to its wastewater treatment plants, FPC USA has assumed that its wastewater streams may meet or exceed the 1 ng/L trigger for air emission controls. Again in order to develop a potential cost impact to FPC USA, we have assumed that 10 tanks have the potential to be controlled.

Assuming that 10 tanks are affected, FPC USA calculated, using the same methodology as EPA, that its total initial capital cost would be $6,872,414 and its annual O&M costs would be $3,770,070. A spreadsheet detailing FPC USA's calculation can be found in Appendix 1. FPC USA's estimate contains several costs that were overlooked by EPA. **FPC USA's total initial cost for K173 compliance only may be > $8,000,000 with an estimated annual cost of > $4,000,000.** This is substantially more than the cost estimate which EPA developed ($1,320,00 initial and $766,900 annual as per Table VI).

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements. However, EPA acknowledges the information provided by the commenter on the proposed rule cost estimates.

[2] Taken from page (i) of the Economics Background Document

11.20 Formosa Comment:

E. *EPA's Cost Methodology Underestimates the Number of Tanks Potentially Affected by RCRA Subpart CC*

FPC USA believes that EPA's continual use of one sample in six will exceed the air emission control trigger is inaccurate and underestimates the number of facilities that may exceed the trigger. Using this assumption yields only nine tanks of a potential 58 requiring control. FPC USA believes that this number may increase if facilities are required to test wastewater streams for dioxin. In addition, many facilities may choose to cover tanks if test results indicate that EDC/VCM wastewater streams are close to the 1 ng/L trigger.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements. However, EPA acknowledges the information provided by the commenter on the proposed rule cost estimates.

11.21 Formosa Comment:

F. *EPA's Unit Costs are Too Low*

As detailed above, EPA has estimated that the unit cost to cover an average tank is $120,511 (Total capital cost to cover nine tanks divided by nine). In order to determine whether EPA's estimation methodology detailed above was reasonable and to determine the potential cost for FPC USA to cover its typical tanks, FPC USA contacted several vendors to request a "ball park" estimate to cover a typical open-top tank that FPC USA believes may be affected. The vendors contacted were references used by EPA to develop its cost analysis for controlling volatile organic compounds (see page 6-33 of EPA's Control of Volatile Organic Compounds from Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks - July 1992 A-90-21 IV-A-3).

FPC USA requested an estimate to cover the following typical existing tank:

Capacity:	3,200,000 gallons
Height:	38 ft
Diameter:	120 ft
Materials of Construction:	Carbon Steel

One vendor provided input. A rough cost to cover this typical tank was estimated by the vendor to be between $350,000 and $370,000. However, this cost did not take into account several factors such as the cost to:

1. Alter the walls, bottom or accessories mounted on the bottom portion of the tank (nozzles, hatches, manways, etc.) in order to support a roof;
2. Depending on the location and loading on the site, provide additional support to account for earthquakes or high winds;
3. Ship the roof (taxes were not include either); and,
4. Control emissions from the tank.

Considering the vendor's ball-park estimate along with the cost to complete Items 1 through 4 above, and **assuming** that 10 FPC USA tanks would be affected, the cost estimate summarized in Attachment 1 seems reasonable.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements. However, EPA appreciates this commenter's level-of-effort in providing the spreadsheet "Attachment 1" tank data and tank cover/control cost computations.

11.22 Formosa Comment:

EPA Neglected to Consider the Air Permit Effort That May Be Required

Within EPA's economic cost and burden analysis, FPC USA did not find any consideration of the time and effort necessary to obtain and operate these potentially newly regulated emission sources (i.e., the closed vent system and control device would be considered new emission points) under an air permit. This effort can be substantial under the Clean Air Act's Federal Title V Air Permit Program. It has been FPC USA's experience that receiving a State Air Operating Permit can take between 8 and 18 months. Amending a Title V Air Operating Permit may take even longer.

In addition, it was not apparent whether EPA considered the cost to conduct performance testing on control devices for tanks potentially affected by this proposal. Again, in FPC USA experience, this effort can cost between $150,000 to more than $300, 000 per control device. This cost is the expense of having a third party conduct the test and develop results, it does not account for the cost of:

1. Operating the process at the required operating rate to indicate performance at a maximum production rate;
2. Environmental personnel to coordinate testing, escort third party testing personnel, review testing protocols and test results, etc.; and
3. Purchasing and contracting personnel efforts.

Taking this additional effort into account adds to the cost to demonstrate that the control device is operating as required by the RCRA Subpart CC standard.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements. However, EPA acknowledges the information provided by the commenter on the proposed rule cost estimates.

11.23 Formosa Comment:

H. *Dioxin Testing Costs are Underestimated*

Table IV-1 and Page i and Exhibit D-1 of the *Economics Background Document* were reviewed by FPC USA to determine EPA's cost methodology with regard to waste testing for dioxins for K173 wastewaters streams (see Table 1 on page 11 of this document for EPA's cost summary). FPC USA agrees with the cost to test a single wastewater sample for dioxin, but believes that the total cost to demonstrate compliance with regard to dioxin testing is higher than EPA estimates.

Specifically, regarding the cost to test K173 wastewaters for dioxin, EPA estimated that the cost per test is $1,657 (Total initial cost of $84,500 divided by 51 tanks). EPA estimated that each facility would have to conduct an average on 2.2 tests (51 tanks divided by 23 facilities). Hence, EPA estimated that each facility would average $3,674 to demonstrate initial compliance. FPC USA disagrees with this estimate for the reasons detailed below.

1. Cost per Sample

FPC USA's experience with testing wastewater streams for dioxin indicates that the total (direct and indirect) cost to test one wastewater sample for dioxins is ~$1,500. The direct cost to have a Third Party conduct the analysis is $900 per sample. Taking into account the cost to maintain a "Chain of Custody" and conduct purchasing and contracting activities, based on the information on hand, FPC USA believes that EPA's cost of $1,657 per sample appears reasonable. However, due to time constraints, FPC USA was unable to fully determine whether its current testing practices (estimated to cost $1,500 per sample) would satisfy EPA's sampling and analysis requirements detailed within the August 25, 1999 proposal. For example, FPC USA's Third Party Analytical Laboratory ensures a accuracy level of between 81 to 96%. FPC USA is uncertain of the cost to ensure a "95% upper confidence level". Hence, the cost per sample may be underestimated.

2. Number of Samples per Facility

FPC USA does not agree with EPA's estimate found within the *Economics Background Document* that 51 tanks would require testing initially, and 43 tanks annually thereafter. FPC USA believes that the number of affected tanks and the number of samples required to be conducted is too low.

As per the *Economics Background Document,* using some of the same flawed assumptions detailed in Sections V B., C. And D of this document regarding compliance cost to install emission control, EPA determined that 51 tanks would be opened topped, and thus must be tested to determine whether the wastewater streams met or exceeded the 1 ng/L threshold. Based on EPA's estimation that 23 facilities are affected by the proposal, this means that each facility would average 2.2 tests. This average seems to contradict EPA's description in the permeable in that EPA expects the following:

In designing the sampling program, the facility **must consider any unexpected fluctuations** in concentration over time. The sample design should be described in the waste analysis plan, which must be retained in the facility's files. The sample design must be adequate to determine that the level of TCDD TEQ in the wastewater is above or below the 1 ng/L at a 95 percent upper confidence limit around the mean.... Under this approach, **EPA is not specifying a specific number of samples, because the number of samples required to demonstrate that the wastewater dioxin concentration is below 1 ng/L at the 95 percent upper confidence limit depends on how close the actual concentration is to the regulatory limit and on the variability of the waste.** EPA is proposing that the samples used to demonstrate compliance be grab samples collected within a time period that **will accurately account for potential variability in the wastestream**, including potential variabilities associated with batch and continuous processes... (64 FR 46504)

Since EPA is requiring such a high level of confidence (i.e., 95 percent upper confidence), and emphasizing that fluctuations in the process must be accounted for, FPC USA believes that more than 2.2 tests per facility would be required. As FPC USA understands the bullet items detailed below (64 FR 46504), FPC USA envisions a sampling plan which requires at least five samples with the potential for many more to certify compliance.

It is FPC USA's understanding that EPA expects the following:

Each wastewater treatment tank managing K173 that is not compliant with 40 CFR sections 264.1084/265.1085 of subpart CC must be assessed to determine whether dioxin levels in the influent to the tank exceed the trigger level.

For the purposes of this listing, the headworks of the wastewater treatment system is assumed to be at a location directly after steam stripping. If a facility does not utilize steam stripping, the wastewater treatment system headworks is assumed to be the first tank in which wastewaters are combined, accumulated or treated after leaving the chlorinated aliphatics production process.

Tanks that are fully compliant with sections 264.1084/265.1085 of 40 CFR subpart CC would not be subject to waste analysis, record keeping and notification requirements proposed in today's rule to be added to 40 CFR 265.1080(f) (1) - (5), described below.

Once the facility has established that TCDD TEQ levels do not exceed the trigger level for a specific tank, the facility can assume that the TCDD TEQ levels for all downstream tanks also are below the trigger level.

Using FPC USA's Texas facility as an example (FPC TX), based on these bullets and the proposed language for RCRA Subpart CC, FPC USA could expect to conduct a sampling and analysis plan at FPC TX as follows:

Since FPC TX has wastewater strippers prior to the wastewater treatment system, it would be required to sample each EDC/VCM wastewater stream directly after stream stripping. This would be a total of 3 streams; **hence at least 3 tests.**

There are more than 50 open-topped tanks between where a wastewater stream exits the stream stripper and enters the discharge outfall. Since EPA proposed to exempt tanks that are less than < 1 ng/L from control requirements and those that are downstream from an exempt tank, FPC TX would have to attempt to estimate which one of the 50 open-topped tanks was below the 1 ng/L threshold. Hence, FPC TX would conduct **another test** at a tank were it could be assumed that the trigger was not exceeded.

If Step 2's test results indicate that the wastewater dioxin concentration was at, well above, or well below the trigger concentration, FPC TX would have to perform another test either upstream or downstream of the selected tank chosen in Step 2.

Step 3 would be repeated until FPC TX determined at which point in it waste treatment system the 1 ng/L concentration limitation was not triggered. Hence, **additional testing** would be likely.

Therefore, at a minimum, FPC TX would have to conduct 5 tests at a total EPA estimated cost of $8,285. This is higher than EPA's estimate of 2.2 tests at a cost of $3,645 per facility. However, FPC TX's initial cost would most likely exceed $8,285. Since EPA expects that the facility must consider **any expected fluctuations** in the concentration over time (64 FR 46504) and proposed 40 CFR 265.1080(h)(2)(vii) requires retesting after a process change that could change the TCDD TEQ level more testing would be required. Since it is not required at this time, FPC USA is currently unaware of how its commingled wastewater streams' dioxin concentration would be affected by fluctuations, hence FPC USA would most likely take significantly more than 5 test samples.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements. However, EPA acknowledges the information provided by the commenter on the proposed rule cost estimates.

11.24 Formosa Comment:

VI. REGARDING RCRA SUBPART CC

If a facility is required to comply with RCRA subpart CC due to the 1 ng/L trigger, Section 265.1080(h) (64 FR 46533) directs the owner/operator (O/O) to comply with 265.0185 (RCRA CC). However, as these sections are currently written there are many inconsistencies within RCRA CC particularly since the rule was directed at controlling emissions of volatile organic compounds(VOC) and not dioxins. There are numerous issues with the requirements as they are currently written. FPC USA has attempted to highlight some of the inconsistencies below.

A. *EPA Provisions to Apply RCRA Subpart CC are Inconsistent and Unachievable - Proposed Language of August 25, 1999*

1. Compliance Time Frame

a. Regarding the One Year Compliance Date

RCRA CC requires immediate compliance for O/Os that become newly subject to the requirements (40 CFR 265.1083(c)). Regarding the time frame for compliance with this proposal, in the preamble EPA states:

The initial assessment must be conducted by the effective date of the rule. If the trigger level is exceeded, compliance with the applicable sections of 40 CFR 264/265 subpart CC must be accomplished **within one year** of the effective date. Alternatively, the facility may implement process changes to reduce the TCDD TEQ level below the trigger level, and repeat the initial assessment to demonstrate that levels are now below the trigger level, within the same **one year time frame.** (64 FR 46503).

FPC USA believes that a one year time frame is too restrictive when considering the type of construction that may be required. For example, if FPC USA were required to cover an existing wastewater tank, as previously discussed, the tank walls and bottom would have to be strengthen prior to installing a fixed roof. If it is determined that it is more cost effective for a commingled wastewater treatment system to become a dedicated wastewater treatment facility due to this proposal, this certainly would take more than one year to construct. EPA's Maximum Achievable Control

Technology Standards (MACT) of the Clean Air Act provides affected facilities that may be required to, for example enclose existing open topped tanks and install control devices, **three years** to complete the activity (see 40 CFR 63.6(c) - General Provisions for the National Emission Standards for Hazardous Air Pollutants for Source Categories and 40 CFR 63. l00(k)(2)(i) - Hazardous Organic NESHAP (HON) promulgated 4/22/94). FPC USA recommends that facilities, which may be required to comply with RCRA Subpart CC, be allowed three years for compliance.

Also, as it is currently written Section 265.1082(c), which details when a new source must be in compliance would have to be revised. Specifically, the current language states:

(c) Owners and operators of facilities and units that become newly subject to the requirements of this subpart after December 8, 1997 due to an action other than those described in paragraph (b) of the section must comply with all applicable requirements **immediately** (i.e., must have control devices installed and operated on the date the facility or units because subject to this subpart; the 30— month implementation schedule does not apply.)

FPC USA recommends that this paragraph be revised as follows:
(c) Owners and operators of facilities and units that become newly subject to the requirements of this subpart after December 8, 1997 due to an action other than those described in paragraph (b) of the section must comply with all applicable requirements **within three years** (i.e., must have control devices installed and operated on the date the facility or units because subject to this subpart; the 30— month implementation schedule does not apply.)

b. Regarding the 60 day Notification and Certification requirement
This requirement, found in Section 265.1080(h)(5) is too restrictive. FPC USA recommends that at least 120 days be allowed, rather than 60. This approach is used in the HON standard (40 CFR 63.151(b)(2)(i)). It would take considerable time for facilities to sample and analyze process wastewaters to the extent that EPA is requiring. In addition, there is some concern as to whether laboratories are available to provide reliable methods. For example, if FPC USA has 40 samples to test and other affected manufactures have 40 samples, that means that more than 1,000 tests would have to be conducted at only a handful of qualified laboratories within 60 days.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements, which also includes waste sampling and analysis requirements. However, EPA acknowledges the information provided by the commenter.

11.25 Formosa Comment:

2. Process Knowledge

There appears to be a contradiction between the preamble language and the proposed requirements of Section 265.1082(h)(2) as to whether process knowledge can be use to exempt a tank from control downstream of a tank which does not exceed the 1 ng/L trigger. Specifically, the preamble states:

Generators may not use process knowledge to determine whether or not the 1 ng/L TCDD TEQ trigger level has been exceeded for the first tanks in the system where constituent concentrations are likely to be highest. However, once the facility has established that the trigger level is not exceeded in the influent to a given tank, the facility may use process knowledge to determine that dioxin levels in wastewater's managed in subsequent downstream tanks also will not exceed the trigger level. (64 FR 46505)

Section 265.1080(h)(2)(i)(B) provides the language to exempt a tank using process knowledge:

(2) Sampling and analysis. (i) General. For each wastewater treatment tank for which an exemption is claimed, the generator of K173 must:
(A) Test for all 2,3,7,8—substituted CDDs/CDFs; or
(B) Use process knowledge for tanks downstream of a tank that is exempt as a result of testing specified in paragraph (h) (2) (i) (A) of this section.

However, further along in this specific section, the proposed regulation contradicts itself and requires a sample be taken in order to claim exemption (Section 265.1080(h)(2)(iv)):

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

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

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

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements, which also includes waste sampling and analysis requirements.. However, EPA acknowledges the information provided by the commenter.

11.26 Formosa Comment:

3. Flawed Certification Language

The K173 certification language is flawed in that since it does not have a time period associated with it, a wastewater that is certified to be < 1 ng/L can not spike over the limit **EVER!** The K173 certification language should be revised, at a minimum, so that the limitation is an annual average concentration, not an instantaneous limitation.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. Therefore, the Agency is not finalizing the proposed subpart CC air emissions and tank cover requirements, which also includes waste sampling and analysis requirements.. However, EPA acknowledges the information provided by the commenter.

11.27 Formosa Comment:

4. Miscellaneous Clarifications and Typographical Errors

a. Section 265.1080(h)(2)(vi) is redundant. The owner/operator is already required to follow a written plan in Section 265.1080(h)(1).

Specifically Section 265.1080(h)(1) states:

(1) Waste sampling and analysis plans. (i) General. The generator of K173 shall develop and **follow** a written waste sampling and analysis plan

Further down in the same section is a specific requirement repeating the requirement above:

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

b. Section 265.1080(h)(2)(vii) requires that the influent to exempt tanks must be retested, at a minimum, annually. Section 265.1080(h)(3)(vi)(G) requires laboratory analytical results for each exempt tank. Do these requirements apply to tanks that utilize the process knowledge option found at Section 265.1080(h)(2)(i)(B)?

c. Typographical error at Section 265.1080(h)(3)(H). If no other language follows, the section should read:

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

Agency Response:

EPA thanks the commenter for the detailed comments. However, 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.

11.28 Formosa Comment:

B. *EPA Provisions to Apply RCRA Subpart CC are Inconsistent and Unachievable- Current RCRA CC Requirements*

1. Existing language of 40 CFR 265.1085(b) -
This section requires:
The owner or operator shall control air pollutant emissions from each tank subject to this section in accordance with the following requirements, as applicable:
(1) For a tank that manages hazardous waste that meets all of the conditions specified in paragraphs (b) (1) (i) through (b) (1) (iii) of this section, the owner or operator shall control air pollutant emissions from the tank in accordance with the Tank Level 1 controls specified in paragraph (c) of this section or the Tank Level 2 controls specified in paragraph (d) of this section.
(i) The hazardous waste in the tank has a **maximum organic vapor pressure** which is less than the **maximum organic vapor pressure** limit for the tank's design capacity category as follows:....

The language to determine the level of control is based on vapor pressure and does not seem to be an appropriate method to determine the level of control for dioxin emissions. Since dioxins, not VOCs, are the chemicals of concern the method for selecting the level of control is completely inappropriate for dioxin. This same issue can also be found at Section 265.1085(c) and 265.1084. The language would have to be reconfigured to account for dioxin emissions.

2. Existing Language of 40 CFR 265.1085(c)(2)(iii) and (g)(2(ii) -
If the regulation is reconfigured and it is determined that an affected tank must vent though a closed vent system to a control device, the standard allows no control exemption for when the tank is empty.
The regulation only allows by-passing the control device:
(2) During periods of routine inspection, maintenance, or other activities needed for **normal** operations and for the removal of accumulated sludge or other residues from the bottom of the tank.

FPC USA suggests that if the regulation is reconfigured and an affected tank must vent through a closed vent system to a control device, than EPA develop language similar to that used in the Hazardous Organic NESHAP ("HON").

For example to allow for compliance during non-operational periods (i.e., the tank is empty), the following language could be used:

The provisions set forth in this subpart of the part shall apply at all times except during periods of start—up or shutdown, malfunction, or **non-operation** of the chemical manufacturing process unit (or specific portion thereof) resulting in cessation of the emissions.

Agency Response:

The Agency thanks the commenter for the detailed comments. However, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

11.29 Formosa Comment:

VII REGARDING CERCLA REPORTING ISSUES

Would CERCLA RQ Reporting be required for spills of sludge that would be excluded from K174?

Agency Response:

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, spills of EDC/VCM sludges would *not* be excluded from the K174 listing. A spill of EDC/VCM wastewater treatment sludge 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.

11.30 Formosa Comment:

VIII MISCELLANEOUS

EPA stated that it received comments from the peer review of the risk assessment but did not review or address these comments for the proposed rule. How do the peer review comments affect the validity of the risk assessment? How do the peer review comments change the conclusions presented in the risk assessment? (64 FR 46499)?

Agency Response:

Although peer review comments were not addressed prior to proposal, the 1999 Risk Assessment Technical Background Document did go through peer review prior to proposal, and the peer review comments were provided in the docket for the proposed rule with the understanding that those comments would be addressed before the rule was finalized. EPA reviewed and responded to all comments received from peer reviewers. EPA made some modifications to the risk assessment and risk assessment technical background document developed for the proposed rule in response to comments and information provided by both peer reviewers and public commenters. Responses to peer review comments are provided in the docket for the final rule.

SECTION 12
Louisiana Chemical Association (LCA)
CALP-00010

12.1 LCA Comment

I. INTRODUCTION

The Louisiana Chemical Association ("LCA") appreciates the opportunity to comment on EPA's proposal to list certain wastewaters and wastewater treatment sludges generated by the chlorinated aliphatics production industry as hazardous wastes. The LCA is a nonprofit Louisiana corporation, composed of 75 members located at over 100 plant sites in Louisiana. A large number of LCA members will be substantially affected by the proposed Chlorinated Aliphatics Rule. The members who are directly affected by the proposed rule include: Borden Chemicals & Plastics Operating Limited Partnership; Dow Chemical Company; Dupont-Dow Elastomers, L.L.C.; Formosa Plastics Corp.; Georgia Gulf Corporation;[1] Occidental Chemical Corporation; PPG Industries, Inc.; Shell Oil Company; and Vulcan Chemicals, A Division of Vulcan Materials Company. In addition, a number of other member companies supply raw materials or purchase products from the directly affected members. Thus, any adverse financial impact on these directly affected companies may also affect their suppliers and customers.

Agency Response:

Although the scope of the types of wastestreams potentially affected, and impact of the final listing rule are both less than those predicted in the background documents to the 25 August 1999 proposed listing rule (*i.e.* the K173 wastewater proposal has been dropped), EPA agrees in a general sense, that the financial impact of new regulation on directly affected companies, may also potentially affect suppliers and customers. For example, such "collateral" impacts (often referred in assorted literature as "indirect", "secondary", "second-order", "induced", "interactive", "spill-over", "pass-through" or "incidental" impacts), may either take the form of: (a) short- or long-term pass-through of regulatory compliance costs by "directly affected" companies, in the form of higher product/service prices charged to customers, or (b) consequent changes requested by the directly-affected companies, in purchase of process equipment/technology or in other manufacturing inputs provided by suppliers.

[1] Georgia Gulf Corporation recently acquired the EDC/VCM plant in Westlake, LA from CONDEA Vista Company as well as CONDEA Vista's interest in the PHH Monomers, Inc. joint venture with PPG Industries, Inc. which joint venture is operated by PPG to make VCM.

The net-effect of cost pass-through mitigates the overall impact on the directly-affected entities. However, changes in purchase orders to suppliers may conceivably be either "adverse" or "beneficial" to one or more suppliers, depending upon the type of supply change. In theory, the magnitude and extent of such impacts may depend upon a number of inter-related factors (such as market price "elasticity of demand", and market concentration), which are often difficult to predict and measure, without access to detailed, confidential company business information, and without conducting rather extensive (and often expensive) market analysis. Because EPA's expected direct cost magnitude for both the 25 Aug 1999 proposed rule and for the year 2000 final listing rule are less than the Federal economic analysis thresholds (e.g. 1993 Executive Order 12866, 1995 UMRA, 1996 SBREFA) for triggering full economic benefit-cost impact studies, EPA did not estimate such potential market impacts in the economic analysis for this particular rule.

12.2 LCA Comment:

EPA may classify a waste as hazardous only if it poses a "substantial" hazard to human health or the environment. 42 U.S.C. §9603(5) as implemented through 40 CFR §261.11(a). In Dithiocarbamate Task Force v. Environmental Protection Agency, 98 F.3d 1394, 321 U.S.App. D.C. 231) (1996), the United States Court of Appeals for the District of Columbia Circuit indicated that this hazard must be real, not illusory. The court stressed that two of the more important factors under 40 CFR 261.11(a)(3) are whether the waste poses a hazard under "plausible" mismanagement scenarios, and the degree to which existing regulatory programs make such mismanagement implausible or otherwise address the hazard. The court's discussion concerning the importance of these two factors is relevant to today's rulemaking and is worth repeating:

Foremost in our review, however, is EPA's consideration of mismanagement, the defects of which, as we shall see, interact with, and aggravate, the meagerness of the discussion of non-RCRA regulatory controls. Mismanagement is not only specifically listed among the numbered factors, "plausible types of improper management to which the waste could be subjected", factor (vii), but is also an aspect of two others: "[t]he potential of the constituent or any toxic degradation product ... to migrate ... into the environment" under improper management, factor (iii), and the "nature and severity of the human health and environmental damage ... as a result of the improper management of wastes ...," factor (ix). **More important, the very question that the ten factors of §261.11(a)(3) are supposed to help answer--the hazard posed by the substance--is explicitly phrased in terms of improper management.** That language in turn echoes the statutory definition, which (in one of its aspects) looks to whether the substance will "pose a ... substantial present or potential hazard to human health or the environment **when improperly treated, stored, transported, or disposed of, or otherwise managed.**" 42 U.S.C. S 6903(5)(B) (emphasis added).

EPA, in turn, said in promulgating § 261.11(a)(3) that **it would not consider a substance to pose a "substantial" hazard unless the possibility of mismanagement were plausible**. See Identification of Hazardous Waste, 45 Fed.Reg. at 33,113/2. And we have insisted that the agency "provide at least some factual support" for a conclusion that a particular mismanagement scenario is plausible. Edison Electric Inst. v. U.S. Environmental Protection Agency, 2 F.3d 438, 446 (D.C.Cir.1993). Again, one should bear in mind that the ultimate question under § 261.11(a)(3), once listing under Appendix VIII has occurred, is whether the waste poses a "substantial" hazard **in light of the various possibilities of improper management.** Most of what the EPA had to say on the subject of mismanagement regarding the U *1401 **238 wastes seemed to amount to an assertion of the obvious: accidents will happen. Of course--but if that constituted "plausible mismanagement", see § 261.11(a)(3)(vii), it would be ubiquitous and therefore unnecessary to be considered in a listing, contrary to the express language of § 261.11(a)(3). For specifics, EPA relied heavily on a train wreck in California that spilled a dithiocarbamate (metam-sodium) into a river and so caused environmental destruction. See Proposed Rule, 59 Fed.Reg. at 9821/3-22/1. DTF argues that listing would have no direct effect on the likelihood of such spills, because the train's handling would in any event have been governed by Department of Transportation regulations. EPA resists that claim, arguing that under § 261.11(a)(3), "[T]he proper inquiry is not whether Subtitle C or other regulatory controls would prevent environmental harm, but whether the substances are capable of posing a hazard if improperly treated, stored, transported, disposed of or otherwise managed." Respondent's Brief at 40. But even if that be the correct reading of the express reference to mismanagement in § 261.11(a)(3)(vii), DTF's argument would necessarily come back in through factor (x), **which looks to the relationship between RCRA regulation and the existing regulatory matrix, presumably with the intention of assuring that products will be listed only where doing so will yield some incremental benefit.**

* * *

[4] To summarize: EPA's discussion of the quantities of waste is slight and oblique, but we need not consider whether such an inadequacy would require us to vacate the rule. **Where EPA falls down completely is on the interlocked topics of other regulatory controls (factor (x)) and mismanagement (factor (vii)).** It is tempting to say that the toxicity of these chemicals alone marks them as hazardous, and, of course, in one of the purely colloquial senses of the word, they are. But 40 CFR S 261.11(a)(2) gives explicit toxicity benchmarks that are not satisfied here. That relationship underscores what would be true anyway--that a failure on EPA's part to give serious consideration to the "softer" variables of §261.11(a)(3) tends to turn its application of that section into an exercise in totally standardless discretion. Accordingly, we vacate the challenged U listings as arbitrary and capricious. 98 F.3d 1394, at 1400-1401 (emphasis added).

The LCA respectfully requests that EPA make a determination that wastewaters from the production of chlorinated aliphatics (proposed “K173” wastewaters) should not be listed as hazardous wastes because they do not meet the listing criteria of 40 CFR 261.11(a)(3). As noted in the Preamble, EPA must consider the eleven factors addressed by 40 CFR 261.11(a)(3) to determine whether a waste should be listed. EPA’s own risk assessments for wastewaters proposed to be classified by EPA as

"K173" wastes indicated that there was no significant risk posed by such wastewaters to the general population.

In its proposal to list K173 wastewaters, EPA failed to consider plausible mismanagement scenarios or the impact of regulation of such waste under other regulatory programs. EPA acknowledged that it had not observed any actual damage incidents with respect to these wastes. EPA seemed to imply that use of aggressive biological treatment systems that are open to the air is a "mismanagement" of such wastewaters. This is not "mismanagement" but rather a well recognized, and in some cases - required, form of wastewater treatment that is regulated under both the Clean Water Act 33 U.S.C. § 1301 et seq. and the Clean Air Act, 42 U.S.C. § 7401 et seq. Moreover, EPA's "high end" deterministic risk assessment for K173 wastewaters showed only a slightly excess risk to an adult farmer who lives 75 meters (high end) or 300 meters (central tendency) from the waste management units and eats high percentages of fruits, vegetables, beef and dairy cattle from fields located very near the waste management unit. These conditions do not exist at any of the sites of the Louisiana companies identified above and are not likely to exist at any of the other manufacturing sites potentially subject to this rule.

Agency Response:

In proposing to list chlorinated aliphatic wastewaters (K173) EPA did consider the listing criteria set out in 40 CFR 261.11(a)(3), including the two factors specifically referred to by the commenter. As was stated in the proposed rule, *plausible mismanagement* and *other regulatory actions* (261.11(a)(3)(vii) and 261.11(a)(3)(x) respectively) were considered in establishing the waste management scenario(s) modeled in the risk assessment (64 *FR* at 46482). Likewise, these factors were considered in EPA's decision to not list the chlorinated aliphatics wastestream in the final rule.

Regarding EPA's identification of aerated biological treatment of chlorinated aliphatic wastewaters in tanks as "plausible mismanagement," this is not meant to imply that this (or any) waste management practice cannot in fact be a well-recognized or even (currently) required form of waste management. For the purposes of our listing determination, EPA sought to identify whether or not currently non-hazardous chlorinated aliphatic wastewaters (many or all of which, are managed legally under CWA and other regulatory programs), when managed in ways that are plausible, are capable of posing a substantial present or potential hazard that the RCRA program is required address.[2] That is, first, EPA determines that particular practices are plausible,

[2]In fact, the point made by the court in Dithiocarbamate Task Force v. Environmental Protection Agency, is that EPA may not base its listing determination upon an assessment of risks associated with management practices that are not currently employed by handlers of the waste and/or not reasonably expected to be employed (and therefore are not *plausible*) in the foreseeable future. The Agency must restrict its analysis to management practices that can reasonably be expected to be employed, based either on information regarding current waste management practices

which in this case they clearly are. Next, the Agency analyzes whether the plausible management scenarios may be capable of posing substantial present or potential risks to human health or the environment. If the Agency determines that such risks may occur, the scenarios are considered plausible mismanagement. The commenter is clearly incorrect in presuming that any currently acceptable practices can never be considered mismanagement. If substantial risks may occur, it would be irresponsible of the Agency not to consider these practices to be mismanagement. Regarding the commenter's specific criticisms of EPA's high-end deterministic risk assessment for chlorinated aliphatic wastewaters (*e.g.,* diet of adult farmer, location of beef and dairy cattle, etc.) please see the Agency's response to the comment in Section 4.6 of this Response to Comment document.

12.3 LCA Comment

The Preamble states in a conclusory fashion, with no analysis, that "current regulatory programs do not appear to adequately address the type of air releases from these units that showed risk in our analysis." 64 Fed. Reg. at 46501. Wastewaters were sampled at these facilities prior to the compliance date from the SOCMI HON wastewater rule. See 40 CFR §§63.130-63.140. EPA made no analysis as to the impact of that rule. In any case, the Clean Air Act regulatory program is the appropriate and logical program for addressing air releases from process wastewaters. Section 112(d) of the Clean Air Act provides the legal basis for regulation of air emission from industrial wastewater from SOCMI processes by requiring that EPA establish Maximum Achievable Control Technology ("MACT") limits on the SOCMI category. The industrial wastewater rules cited above constitute these MACT standards. Further, Section 112(f) of the Clean Air Act provides for establishing further emission limits on such sources if it is believed that there is a residual excess risk after application of MACT. Congress established specific schedules and criteria under the Clean Air Act for review and development of these limits. There is simply no need to create redundant air regulatory programs under RCRA when Congress has explicitly provided these criteria and deadlines.

Agency Response:

The Agency does not agree with the commenter that RCRA controls of air releases of dioxins from aerated biological treatment tanks used to treat chlorinated aliphatic wastewaters would be redundant. EPA had in fact looked at the requirements of the SOCMI HON for wastewaters, and found that the chief constituent driving the proposed listing for K173 (dioxin) is not on the list of Hazardous Air Pollutants for which the SOCMI HON wastewater requirements apply (40 CFR, Subpart G, Table 9).

However, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

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or available information indicating that such waste management practices may be plausible in the future. It is the plausibility of any particular management practice that is of importance, not necessarily the practice's acceptability or unacceptability.

12.4 LCA Comment

LCA requests that if EPA does list K173 wastewaters, it should select the option of using the 1 mg/L TCDD TEQ as a listing criterion, not simply as a trigger for 40 CFR Part 264 Subpart CC applicability. EPA's risk assessment indicates that this level will not pose any significant excess risk to the general population and may pose a slightly excess risk only in a limited scenario which is not likely to occur in real life. Eliminating the wastewaters below this criterion is consistent with teh conservative risk assessment.

Furthermore, LCA requests that EPA adopt the 1 ng/L TCDD TEQ trigger level such that, if at any point in the waste management process from the point of generation to the point of discharge, the concentration of dioxins and furans in the wastewaters falls below 1 ng/L TCDD TEQ (except by impermissible dilution), then the wastewater would not be a K173 listed hazardous waste from that point forward.

In the alternative, LCA requests that EPA adopt a contingent management option for K173 wastewaters such that wastes managed in a closed tank systems would not be listed hazardous wastes. Management in open, aerated tanks was the only scenario which was predicted by EPA's risk assessment to have any excess risk and then only to a limited scenario which is not likely to ever exist. Thus, management in closed tanks would not pose even such projected high end risk. LCA supports the concept of using contingent management options as these to narrow the scope of the waste listing to only those management scenarios that may pose a risk. This is particularly appropriate in this case in which the only "risky" management scenario is not a significant risk to the general population and only a limited type of waste management need be addressed, if such wastewaters need to be addressed at all.

Agency Response:

The Agency appreciates the commenter's support for the concentration-based listing approach. EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

12.5 LCA Comment

LCA believes that EPA failed to accurately determine the economic impact of the K173 listing, as proposed. Information supplied by several affected LCA members, which is summarized below, indicates that there were significant costs associated with the proposed rule that EPA failed to consider. LCA also believes that EPA failed to consider other safety and non-economic factors in proposing to list such wastewaters. LCA requests that EPA evaluate this information.

Agency Response:

The Agency thanks the commenter for the submitted information. However, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

12.6 LCA Comment

LCA supports EPA's proposal to preclude the application of the "derived from" rule to K173 wastewaters for the reasons articulated by EPA in the Preamble.

Agency Response:

The Agency acknowledges the commenter's support of the exclusion to the derived-from rule. However, EPA is issuing a final decision not to list chlorinated aliphatic wastewaters as hazardous, for reasons described in the preamble to the final rule and relevant background documents. Therefore, because wastewater treatment sludges derived from such wastewaters will not become hazardous (as a result from being derived-from K173) we are not finalizing the proposed exemption at 40 CFR 261.3(c)(2)(ii)(F).

12.7 LCA Comment

LCA supports EPA's proposal to use a contingent management scenario to exempt K174 sludges from listing if managed in a landfill and documentation of such management is provided. Louisiana has a well developed solid waste regulatory program that establishes the documentation and record keeping necessary to confirm that such wastes are properly disposed. This regulatory system is described in more detail in the comments below.

Agency Response:

The Agency acknowledges LCA's support of a contingent management listing approach, as well as the proposed requirement that generators be able to demonstrate compliance with the conditions of the listing. EPA is finalizing the conditional listing approach for EDC/VCM wastewater treatment sludges, as proposed.

12.8 LCA Comment

The LCA also requests that EPA extend the contingent management option for K174 wastes to burning of such sludges in an incinerator or BIF. Such management scenario would pose even less risk than a landfill management option, which has been determined not to pose an excess risk. Although it is not likely that large quantities of such sludges would be incinerated, the mixture and derived from rules may cause small quantities of such wastes to be generated which would be suitable for incineration. The same rationale that supports use of the contingent management option for land filling also supports the use of a similar contingent management option for incineration in a RCRA or solid waste permitted incinerator or BIF.

Agency Response:

The Agency notes that LCA provided no information indicating that incineration of presently non-hazardous EDC/VCM sludges is occurring. 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. Therefore, EPA did not evaluate potential risks from on-site or off-site incineration of EDC/VCM wastewater treatment sludges in non-hazardous waste incinerators. 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 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).

12.9 LCA Comment

With respect to wastewaters to be listed as K175, it is LCA's understanding that the basis for the listing is a conservative risk assessment showing an excess risk due to the presence of mercury. The toxicity characteristic already provides that if mercury exists at certain levels in leachate, a waste is characteristically hazardous. LCA believes that it is inappropriate to list a waste as hazardous when there is already a characteristic that provides a basis to classify it as hazardous. In addition, when there is only one generator of such waste, EPA should perform a site specific risk assessment rather than making conservative assumptions in the risk assessment.

Agency Response:

EPA assumes the commenter is referring to wastewater treatment sludges that were proposed to be listed as K175 (*i.e.,* VCM-A sludges). Please see the discussion of EPA's decision to list as hazardous wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM-A) provided in Section VI.C.1. of the preamble to the final rule, and in Section 5 of this Response to Comment Document.

Because there was only one generator of this wastestream at the time EPA evaluated this industry for this listing determination (and as far as EPA knows this is still the case), and because EPA took into account certain information relat to the hazardous waste landfill where this waste is currently managed, EPA notes that there are elements of the VCM-A wastewater treatment sludge listing determination that could be characterized as "waste-specific" and/or "site-specific". However, EPA believes that the conditions described for the hazardous waste landfill (*e.g*., high alkalinity) could reasonably be assumed to apply at other hazardous waste landfills as well.

12.10 LCA Comment

The LCA supports EPA's decision not to list 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. None of these wastes pose any significant risk to human health or the environment.

Agency Response:

The Agency acknowledges LCA's support for these no list determinations.

12.11 LCA Comment

II. GENERAL COMMENTS

A. Comments on Proposed Listing of Wastewaters as K173 Listed Wastes

1. EPA Should Place Significant Weight On the Central Tendency Deterministic Risk Assessment That Demonstrated These Wastes Pose No Excess Risk to the Population and Should Determine Not To List Such Wastewaters

a. Rationale for EPA Proposal

EPA has proposed to list wastewaters generated from the production of chlorinated aliphatic compounds (except wastewater generated from the production of vinyl chloride monomer by the acetylene process) as a listed hazardous waste bearing waste code K173. (Wastewater from the production of vinyl chloride monomer by the acetylene process is proposed to be classified as listed hazardous waste K175, and will be discussed separately below.) EPA concluded that such wastewaters, even when managed in open topped aerated biological treatment tanks, do not pose an excess risk to the average receptor and thus do not pose excess risk to the general population. Nonetheless, EPA determined that such wastewaters should be listed as hazardous waste and subject to control requirements because under EPA's deterministic risk assessment, the concentration of certain dioxin cogeners in such wastewaters can pose an excess risk to one segment of the population, certain farmers living very near such plants, when: such wastewaters are managed in open topped aerated biological treatment tanks, the dioxin vaporizes from the tanks rather than sorbing onto particulate which is removed from the wastewater; the dioxin travels in vapor form to the farm about .18 miles away; the farmer grows not only his own fruits and vegetables, but also beef cattle and dairy cattle and feed for such cattle; all of the cattle's feed is contaminated (i.e., none is purchased from outside sources); the farmer eats a high percentage of home grown contaminated fruits, vegetables, beef and dairy; and none of the dioxin concentrations in the beef, dairy, fruits or vegetables is lost through cooking.

Agency Response:

See EPA's response to comments in Sections 4.1, 4.5, 4.6, 4.29, and 4.40 (comments from Vinyl Institute) and (with regard to population risk) Section 7.4 (comments from API).

12.12 LCA Comment

LCA believes that EPA cannot legally base its decision to list these wastewaters as hazardous on the risk assessment that it conducted due to the many unfounded assumptions contained in such risk assessment that make it grossly over conservative. That said, even the grossly over conservative risk assessment showed no excess risk to the general population. The only projected excess risk was based on a series of unfounded assumptions. Perhaps one of the most significant of these assumptions

is that EPA continues to use a cancer slope factor for dioxin which assumes a linear, no safe threshold below which carcinogenisis will not occur. This rulemaking has been rushed to avoid consideration of recent data which indicates that the cancer slope factor for dioxin may be nonlinear, with a threshold below which no tumor formation will occur. (See "Critical Review of USEPA's Risk Assessment Supporting the Proposed Rule for Listing Chlorinated Aliphatic Waste K173", of ChemRisk, a service of McLaren-Hart, Inc., hereinafter ChemRisk Review.) The slope factor used by EPA in this risk assessment has not been approved for use in the IRIS database and is currently undergoing review, a process which EPA has indicated should be complete in the near future. In any case, the existing cancer slope factor used by EPA is based on obsolete practices which even EPA has repudiated (concerning scaling of doses to body weight). Use of current EPA methods for establishing the slope factor overestimates the risk by about 35%, even if EPA continues to use a linear, nonthreshold approach. EPA should have either waited on verification of the cancer slope factor on the IRIS database prior to proposing (and certainly before finalizing) this rule. At a minimum, EPA must adjust its cancer risk estimates downward by a factor of 0.65 to maintain consistency with its own policies for establishing slope factors. Id.

Agency Response:

The Agency's response to this comment is provided in Section 4.42 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.13 LCA Comment

EPA's risk assessment is not based on good science and cannot support its proposal to list K173 wastewaters. EPA is required to consider the eleven factors in 40 CFR 261.11(a)(3) when determining whether to list a waste as hazardous. This rule provides as follows:

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

* * *

(3) It contains any of the toxic constituents listed in appendix VIII and, after considering the following factors, the Administrator concludes that the waste is **capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed**:

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

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

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

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

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

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

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

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

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

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

(xi) Such other factors as may be appropriate.

Substances will be listed on appendix VIII only if they have been shown in scientific studies to have toxic, carcinogenic, mutagenic or teratogenic effects on humans or other life forms. (Wastes listed in accordance with these criteria will be designated Toxic wastes.)

(Emphasis added.)

EPA indicated that the risk assessments that it performed took into account factors 261.11(a)(3)(i)-(viii) and (xi).[3] LCA's comments on this characterization of the risk assessments appear below. However, it should be noted that with respect to the factor in 40 CFR 261.11(a)(3)(ix), (nature and severity of damage incidents that have occurred), **EPA indicated that it was not aware of any damage incidents occurring with respect to these wastewaters**. It is difficult to determine whether EPA identified any plausible mismanagement scenarios with respect to such wastewaters under 40 CFR 261.11(a)(3)(vii), as required. EPA used the scenario of open topped aerated tanks as though this were a "mismanagement" scenario, despite the fact that industrial wastewater from these facilities is well regulated under both the Clean Water Act and Clean Air Act. With respect to 40 CFR 261.11(a)(3)(x) (whether other governmental or regulatory programs address the hazards) EPA concluded, with almost no discussion, that other regulatory programs do not appear to address the risks identified in the risk assessments. LCA disputes this conclusion and will address this issue below as well.

[3]EPA actually indicated that the risk assessments encompass 9 of the 11 factors but did not specify which 9 they referenced. However, because EPA separately discussed factors (ix) and (x), it is assumed that EPA intended the risk assessments to cover factors (i)-(viii) and (xi).

Agency Response:

EPA disagrees with the commenter's assertion in their footnote that EPA did not identify which of the listing criteria from 40 CFR 261.11(a)(3) are directly incorporated into the risk assessment. The factors that were considered to be incorporated into the risk assessment (40 CFR 261.11(a)(3)(i)-(viii) and (x)) were discussed in the proposed rule. 64 *FR* at 46482.

Regarding the comment that stated EPA did not identify damage incidents involving chlorinated aliphatic wastewaters, but then questioned whether EPA had identified plausible mismanagement scenarios, EPA emphasizes that the Agency's assessment of whether or not there have been any damage incidents involving the waste under review (factor at 40 CFR 261.11(a)(3)(ix)) is separate and distinct from the determination of plausible (mis)management scenarios that are selected for the risk assessment. As described in EPA's response to comment in Section 12.2 above, first EPA determines that particular practices are plausible, which in this case they clearly are. Next, the Agency analyzes whether the plausible management scenarios may be capable of posing substantial present or potential risks to human health or the environment. If the Agency determines that such risks may occur, the scenarios are considered plausible mismanagement.

The Agency response to the comment regarding coverage by other regulatory programs is in Section 12.3 above.

As already mentioned, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

12.14 LCA Comment

b. EPA's Risk Assessment Is Flawed

EPA's risk assessment is central to its decision that the wastewaters at issue meet the criteria of 40 CFR 261.11(a)(3); thus, the risk assessment deserves critical review. In spite of this, EPA went to rulemaking before peer review of such risk assessment was complete. Further, EPA chose peer reviewers with a somewhat narrow background to conduct the review, rather than subjecting the review to different reviewers with different areas of expertise. See ChemRisk Review.

Agency Response:

The Agency's response to this comment is provided in Sections 3.39 (responses to Dow Chemical, CALP-00012) and 4.49 (responses to The Vinyl Institute, CALP-00004) of this Response to Comments document.

12.15 LCA Comment

EPA used three different methods to estimate the potential risks - the high end deterministic risk analysis, the central tendency deterministic risk analysis and the probabilistic risk analysis. The high end and central tendency deterministic risk analysis use single values for each parameter in the risk assessment program and produce a point estimate of the risk or hazard for each receptor/pathway combination. The high end deterministic risk analysis identifies the most sensitive variables and sets these parameters at their high end (generally 90th percentile) values and is used to estimate risks to individuals exposed at the upper range of the distribution of exposures. The central tendency deterministic risk analysis sets parameters at their mean (average) or 50th percentile (median) values and is used to estimate risks to the average receptor in the population. The probabilistic risk analysis allows some of the parameters to have a range of values thus producing a distribution of risk or hazard for each receptor/pathway combination. 64 FR 46482-46483]

In LCA's opinion, EPA used excessively conservative assumptions in conducting the risk assessment. These assumptions are discussed by EPA in the Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination - July 30, 1999. (the "Risk Assessment Document") However, even though these assumptions were excessively conservative, the risk assessments concluded that: 1) none of the wastewater contaminants had a non-cancer hazardous quotient (1-HQ) greater than 1 nor did the sum of the contaminant hazardous quotients exceed 1; 2) the central tendency deterministic risk assessment showed that there was no excess cancer risk to the average receptor; and 3) the high end deterministic risk assessment revealed that there was only one receptor/pathway combination for which the risk exceeded the significant level of 1 x 10-5 for proposed K173 wastewaters. This receptor/pathway combination was an adult farmer ingesting dioxins that were released through air emissions from open topped aerated biological treatment tanks. There was no excess risk for the child of such farmer. Further, the extremely conservative high end deterministic risk estimate for the farmer ingesting dioxins was only 2 x 10-5, which is only slightly above the significance level. LCA believes that this level is well within the potential error of the risk estimate, particularly when considering the lack of site specific data and the uncertainty factors discussed by EPA in the Preamble.

Agency Response:

The Agency's response to this comment is provided in Section 4.1 (responses to The Vinyl Institute, CALP-00004) of this Response to Comments document. Also, as already mentioned, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

12.16 LCA Comment

A review of the Risk Assessment Document shows that EPA's human risk analysis are based on dioxin emissions from K173 wastewater treatment systems that use open, aerated treatment tanks. Air emissions of dioxin from such tanks were modeled to predict the effect on farmers living within 300 meters (only 0.18 miles) of a EDC/VCM wastewater treatment unit that live in the same location for 48.3 years or more. EPA assumed that the farmer who lives this close to the plant raises not only fruits,

vegetables, and beef cattle, but also dairy cattle. Further, the risk assessment assumes that the percentages of the farmer's diet from home grown products is approximately 42 percent for exposed (i.e., above ground) vegetables, 17 percent for root vegetables, 33 percent for fruits, 49 percent for beef, and 25 percent for dairy products. [4] EPA explains that the farmer meeting this criteria is a human at a health risk for an excess lifetime cancer risk due to exposures to a cancer causing contaminant, namely dioxin (i.e., "affected receptor"). As noted, the excess risk for this receptor/pathway was 2 x 10-5, just slightly over the excess risk level of 1 x 10-5.

EPA's risk assessment used the assumption that a farmer living near the facility would raise both beef cattle and dairy cattle as well as all of the food for such cattle. There is no source quoted in the Risk Background Document to support such an unrealistic assumption. In fact, in the Combustion MACT rulemaking, EPA stated: information on the number of farms that produce more than one food commodity (e.g., beef and milk) is not available from the U.S. Census of Agriculture." 64 Fed.Reg. 52828, at 53005-53006.

In the Combustion MACT rulemaking, EPA indicated that only 40% of farmers who raise beef eat their own beef, according to USDA information. 64 Fed. Reg. At 52998. Further, EPA indicated 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 only 13% as a national average. Id. For this reason, 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." Id.

LCA has surveyed the directly affected members identified on the first page of these comments. None of these facilities have any farmers living within 0.18 miles of a EDC/VCM open top, aerated wastewater unit that grow fruits, vegetables, dairy cattle and beef cattle. Only two facilities had farmland within 300 meters of their complex boundaries (not necessarily within 300 meters of their wastewater tanks). One farm raises sugar cane and beef cattle. The other raises beef cattle. To the best of LCA's knowledge, it is extremely unlikely that any factual situation of the type assumed by EPA will exist in reality near any EDC/VCM plant identified in EPA's database.[5]

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

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[4] 64 Fed. Reg. at 46,485.

[5] As noted in the comments of the Vinyl Institute, "it is difficult to believe that a farmer living 0.18 miles from chlorinated aliphatic production facility would grow fruit trees and vegetables, along with raising beef and dairy cattle all on the same plot of land. In fact, in the South Texas area where several EDC/VCM manufacturing facilities are located, dairy cattle production is non-existent due to the climate." (Emphasis added.)

12.17 LCA Comment

In its review of EPA's risk assessment, ChemRisk noted that the "drivers" of the excess risk in EPA's high end deterministic assessment were the assumptions concerning beef consumption and dairy consumption. ChemRisk noted the following problems with this risk assessment:

- EPA assumed all feed to beef cattle is contaminated. Studies show that beef cattle typically are fed grain only during their last 4 months prior to slaughter, not pasture or silage. "The assumption that all feed is contaminated appears to be unrealistic. This would imply that this farm not only has both dairy and beef cattle operations, but raises sufficient grain (and silage) and still maintains enough pasture to graze the animals as well (in addition to crops for human consumption." It is recommended by ChemRisk that EPA select a value less than 100% to estimate the portion of food likely to be purchased off-site.

- EPA should reduce the risk estimated from beef ingestion by 505 because the beef cattle are fed grain their last few months (likely to be uncontaminated) and given the half life of dioxins, the concentrations in beef tissue would be much lower than assumed by EPA at the time of slaughter.

C EPA multiplied the biotransfer factor for milk by 5.4 which overstates the dose. EPA should have used a more appropriate factor of 5.0 which is based on recent studies.

Agency Response:

The Agency's responses to these comments are provided in Section 4 of this response to comments document (responses to The Vinyl Institute, CALP-00004). The specific sections where the responses may be found are as follows:

first bulleted issue: Section 4.29
second bulleted issue: Section 4.30
third bulleted issue: Section 4.30

12.18 LCA Comment

C EPA assumed an adult farmer would ingest up to 2.1 kg/day of dairy products for its high end deterministic assessment. EPA's Exposure Factors Handbook indicates that the ingestion level for 20-39 year olds is 1.08 kg/day, only half that assumed by EPA. This is much of the adult life of the farmer, and national consumption data tends to indicate that dairy consumption goes down with age. Thus, EPA should have used no higher than 1.08kg/day and should readjust the risk estimates downward by a factor of 0.51 to account for this.

Agency Response:

The Agency's response to this comment is provided in Section 4.37 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.19 LCA Comment

- EPA's factor of 48.5% to estimate the percentage of contaminated beef that would form a part of the farmer's diet is overly conservative by a factor of 12.7 for the general population and is likely to be overly conservative for the high end assessment as well.

- EPA's factor of 25.4% to estimate the percentage of contaminated dairy products that would form a part of the farmer's diet is overly conservative by a factor o 21.2% for the general population and is likely to be overly conservative for the high end assessment as well.

Agency Response:

The Agency's response to this comment is provided in Section 4.39 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.20 LCA Comment

- EPA failed to account for any loss of dioxin from cooking or post-cooking activities (i.e., cutting the fat off). Studies have estimated a mean 27% reduction from cooking activities and a mean 24% reduction from post-cooking actions. Failure to account for these losses overestimates dose, so the risk estimates should be revised to account for this.

Agency Response:

The Agency's response to this comment is provided in Section 4.40 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004)

12.21 LCA Comment

- The TEF values used by EPA for the two dioxin cogeners that "drove" the risk represent are upper bound values, not central tendency values, thus producing a risk estimate that is overly conservative by a factor of 2.5.

- EPA used the cancer slope factor for TCDD 156,000 (mg/kg-day)-1 in the risk assessment. As noted above, this cancer slope factor has not yet been verified in the EPA's IRIS database. EPA should have used the cancer slope factor for hexachlorodibenzo-p-dioxin mixtures for any of the hexachlorinated dioxin/furans. This latter cancer slope factor is 6,200(mg/kg-day)-1 and is verified on the EPA IRIS database. It is appropriate to use the hexachlorodibenzo-p-dioxin mixture factor where exposure is to a mixture of congeners as in this case. For this reason, EPA should reduce all cancer risk estimates calculated for hexachlorinated dioxins/furans by a factor of 0.40.

Other comments concerning the risk assessment are contained in ChemRisk's "Critical Review of USEPA's Risk Assessment Supporting the Proposed Rule for Listing Chlorinated Aliphatic Waste K173.

Agency Response:

The Agency's responses to these comments are provided in Section 4 of this response to comments document (responses to The Vinyl Institute, CALP-00004). The specific sections where the responses may be found are as follows:

first bulleted issue: Section 4.41
second bulleted issue: Section 4.42

The Agency's responses to the McLaren Hart/Chemrisk comments are provided in Sections 4.29 through 4.49 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.22 LCA Comment

LCA is also aware that one of the persons conducting a peer review of EPA's risk assessment has raised the following additional concerns with EPA's assumptions:

Page 2-31, paragraph 4. Where do the percentages of food eaten by the home gardener that are home grown come from? It is hard to believe that a home gardener gets 11.6% of his exposed fruit (apples, peaches, pears and berries) from a home garden. That would mean that 11.6% of home gardeners are growing apple, peach or pear trees in their home garden; a figure that is hard to believe given that most home gardens are small and mainly used to grow vegetables.

Page 2-34, paragraph 1. It is hard to believe that a recreational angler obtained 32 percent of the fish in his/her diet from a stream located near a waste management unit or near his home. This figure represents that fraction of the total fish is his diet that is caught. However, of the total fish that an angler catches, what fraction is caught within one mile of his residence? I would expect this fraction to be small. But even if assumed to be 58%, it would reduce the total intake from the fish pathway by 50%.

Page 2-34, paragraph 2. Where do the percentages of food eaten by the farmer that are home grown come from?

Review of Risk Assessment Technical Background Document; Chlorinated Aliphatics Listing Determination, by Curtis Travis, at 10.

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.23 LCA Comment

In addition to these concerns about the assumptions used to estimate risk to a farmer, LCA also has concern with other EPA assumptions concerning the projected level of emissions of dioxins from open top aerated tanks. Many facilities use covered tanks and/or do not agitate the wastewaters in the tanks. 64 FR 46501 EPA's data in Appendix D of the Listing Background Document for K173 does not identify which facilities use uncovered, aerated, biological treatment tanks and which use covered tanks, so an assessment of volumes managed by each method could not be determined.

In developing the proposal, EPA used the CHEMDAT8 model to estimate the emissions of dioxins from aerated tanks. This model is based on several assumptions, including Henry's Law for the partitioning of volatile organics from an aqueous media. LCA believes, based on data developed by the Vinyl Institute, that such assumptions concerning partitioning of volatile organics between the wastewater fraction and suspended solids removed by the system may not be accurate. The information developed by the Vinyl Institute indicates that dioxin emissions from the water fraction in the CHEMDAT8 model are over predicted. (See also the comments of Occidental Chemical Corporation.)

Under its Dioxin Characterization Program, the Vinyl Institute has investigated emissions of dioxins from EDC/VCM manufacturing plants. A report summarizing this program was submitted to EPA.[6] The report concludes that dioxins in treated wastewater (effluent) varied by up to a factor of 10 between facilities of equivalent production capacity. The report also indicated that testing of Waste Water Treatment Plant Solids (WWTPS) revealed great variability in dioxin levels. The report offered a possibility of carryover of contaminated catalyst from oxychlorination as a potential reason. This could be observed in the copper and TSS levels in the wastewater stream.

For purposes of the proposed rule, EPA's model used the influent to the water treatment plants to estimate dioxins volatilized in the treatment tanks. LCA believes the model does not consider the data from the Vinyl Institute report that suggests the dioxin in the wastewater is associated with entrained solids that are not readily emitted. Further, the model does not account for the fact that the solids that may be contaminated with dioxins would most likely be removed in primary clarifiers or other filtration systems prior to aeration.

The Vinyl Institute report samples show part per quadrillion (ppq) dioxin levels in the effluent, as compared to ppt levels observed by EPA in the influent, (at some facilities). This level corresponds to a 10-fold lower annual quantity of dioxins in the effluent water than the "central" quantity and a 100-fold lower quantity than the "high" quantity in the influent. Two of the four Vinyl Institute effluent samples came from stand-alone sites. If these samples are representative, and volatilization and solids removal are the only difference between the influent and effluent streams, this suggests that the majority of the dioxins in the influent water samples are actually in the solids. Thus, these solids which are removed in the wastewater treatment and are not available for volatilization. The comments of Dow

[6] "The Vinyl Institute Dioxin Characterization Program; Phase I Report," Vinyl Institute (August 10, 1998).

Chemical Company also describe testing that they have conducted which indicates the vast majority of dioxin is sorbed onto the wastewater solids.

Agency Response:

To confirm whether or not biological wastewater treatment in open, aerated tanks was a plausible management scenario, EPA did not necessarily have to identify how many tanks utilized this practice versus how many did not (although estimates were made in order to develop cost estimates for the proposed rule in the Economics Background Document supporting the proposal). However, as described in the same section of preamble cited by the commenter, not only are open tanks typically used in biological treatment (a fact confirmed by a number of comments received in opposition to EPA's proposal to conditionally require covers for these tanks,) but this practice was confirmed during site visits and follow-up phone calls to some facilities. 64 *FR* at 46501.

The Agency's response to the commenter's concerns regarding how we calculated emissions from tanks is provided in Section 4.5 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.24 LCA Comment

EPA should not list these wastewaters as hazardous wastes in the face of such uncertainty, when the estimated risk is questionable on other grounds. EPA acknowledged concern with regard to its lack of site-specific information in developing this proposal.[7] EPA stated:

The risk analysis were based on a limited set of waste sample data. It is possible that these data do not represent the true distribution of contaminant concentrations in the waste categories evaluated, resulting in either an overestimation or underestimation of the actual risk to receptors . . . EPA obtained little site-specific information regarding waste management units for the chlorinated aliphatics industry, necessitating that we make a number of assumptions regarding waste management in off-site landfills, the land treatment unit, and wastewater tanks . . . We typically used regional databases to obtain the parameter values necessary to model contaminant fate and transport. Because the data that we used are not specific to the facilities at which the actual wastes are managed, the data represent our best estimates of actual site conditions. Use of these databases in lieu of site-specific data may result in either overestimates or underestimates of risk.

64 Fed. Reg. at 46,498.

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[7] In Review of Risk Assessment Technical Background Document; Chlorinated Aliphatics Listing Determination, at 10, Curtis Travis stated: The annual waste quantity (flow rate) and dimensions of the tank are sensitive input parameters. Specific data on these parameters were not available for the aerated tanks; therefore, the flow rate and dimensions of the tanks were estimates based on reported annual waste quantities. It is not clear why such fundamental data were not available, but given that they were not, the assumptions make [sic] seem reasonable.

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

12.25 LCA Comment

EPA also acknowledged that it's "decision to list wastewater has been based primarily on the concern over risks to those individual's [sic] who are significantly exposed, even if there are relatively few such individuals." However, EPA did specifically request comment on whether it should give weight to population risk in deciding whether to list chlorinated aliphatic wastewater. EPA indicated that population risk may be a factor that EPA should consider under 40 CFR 261.11(a)(3)(xi). See 64 Fed. Reg. 46496. Placing more weight on the lack of population risk would lead to the conclusion that the wastewaters should not be listed.

LCA believes that EPA should place much more weight on the central tendency deterministic risk assessment, which clearly shows no significant population risk is present, even when using the extremely conservative parameters used in the risk assessment. Moreover, LCA believes that EPA should place little weight on the high end deterministic risk analysis because the parameters used in the farmer receptor scenario are completely unrealistic.

Agency Response:

Please see EPA's response to comment in Section 7.4 of this Response to Comment Document (comment from API).

12.26 LCA Comment

In addition to overstating the risk, EPA failed to adequately consider the suitability of other regulatory programs to address the perceived risk. EPA has stated many times that it is desirable to avoid overlap between the hazardous waste regulatory program and other regulatory programs within the EPA. This principle is reflected in the criteria specified in 40 CFR 261.11(a)(3)(x), which EPA must consider in determining whether to list a waste as hazardous. An example of the coordination between regulatory programs is 40 CFR 264.1(g)(6) and 40 CFR 265.1(c)(10) which exempt from the hazardous waste regulations "wastewater treatment units" subject to either Section 402 (the NPDES Program) or Section 307(b) (the POTW Program) of the Clean Water Act. A more recent example is illustrated by the "Combustion MACT" rule which establishes air emission standards for hazardous waste combustion units pursuant to the Clean Air Act. See 40 CFR Part 63, Subpart EE. This coordination by EPA avoids regulation of the same stream or activity under duplicative or conflicting environmental regulations.

LCA fully supports the principle of avoiding such duplication. Where a facility is already controlling specific emissions under a regulatory program such as the Clean Air Act, then the RCRA program should defer to the initial regulatory program and not impose similar requirements. If the EPA

determines that controls are needed on some currently exempt wastewater units, then the hazardous waste program should defer to the existing air and/or water emissions from industrial wastewater as regulated under existing law. In fact, industrial wastewater is regulated under the SOCMI HON, a federal CAA MACT standard developed pursuant to 42 U.S.C. § 7412 (d). See 40 CFR 63.130-63.140. All of the facilities producing chlorinated aliphatics are subject to the SOCMI HON, although some may have Class 2 wastewaters which are subject to a lesser degree of control compared to Class 1 wastewaters. In any case, the level of control required for both Class 2 and Class 1 is MACT.

Section 112 of the CAA is ideally designed to regulate air emissions from these facilities. It is structured so as to impose technology based limits that reflect MACT. 42 U.S.C. § 7412(d)). Then, if it is determined that there is excess residual risk, further controls are to be developed. 42 U.S.C. § 7412.(f). Congress explicitly set forth the criteria and deadlines for consideration of residual risk standards. In proposing to list K173 wastewaters, EPA is completely ignoring the standards developed by Congress under the Clean Air Act.

In summary, when considering the factors under 40 CFR 261/11(a)(3), it is clear that EPA should not list such wastewaters as hazardous wastes. There have been no damage incidents EPA is aware of associated with such wastes, industrial wastewaters from the SOCMI industry are heavily regulated under both the Clean Water Act and Clean Air Act. EPA has not identified any plausible mismanagement scenario with respect to such wastewaters. The only concern expressed with such wastewaters involves ordinary wastewater treatment - not a "mismanagement: scenario. If EPA believes that air emissions from such wastewater are posing excess risk - then the Clean Air Act, Section 112, provides the most logical vehicle to address such perception. However, the data in EPA's grossly over conservative risk assessment shows that there is no excess risk to the population in general. The level of uncertainty that even EPA acknowledges with respect to the potential of an excess risk to farmers living near such a facility preclude listing on that basis, particularly when more realistic, albeit still conservative, assumptions would show no excess risk.

Agency Response:

EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

However, while the Agency acknowledges its previous statements regarding the desire to avoid regulatory overlap, the RCRA statute and implementing regulations direct EPA to identify wastes as hazardous if they are "capable of posing a present or potential hazard to human health and the environment," including wastewaters generated by chlorinated aliphatic manufacturers. EPA notes that when the Agency proposed to list chlorinated aliphatic wastewaters as hazardous waste (as part of a statutory requirement under RCRA), there were no current, competing regulatory requirements to control this estimated release of dioxins under either the Clean Water Act or the Clean Air Act. As stated previously, the SOCMI MACT ("HON") does not include dioxins in the list of hazardous air pollutants regulated under the wastewater portion of the HON, and the assessment of residual risk was still several years away

from scheduled completion. Again, this issue is moot given the Agency's findings regarding chlorinated aliphatic wastewaters are not hazardous wastes under RCRA.

12.27 LCA Comment

2. In the Alternative, EPA Should Use the 1 ng/L TCDD TEQ Concentration As a Basis For Excluding Wastewaters From the Listing

EPA requested comment on the alternative of using a one nanogram/liter (ng/L) TCDD TEQ trigger level as a criterion for listing wastewater streams as hazardous under the K173 Listing. 64 Fed. Reg. 46504. If EPA decides not to delist, LCA members support the use of this option as it minimizes the adverse impacts of the listing decision and precludes said impacts on facilities that EPA's own risk assessment would should as not posing any significant risk.[8] Use of a 1 ng/L TCCD TEQ trigger level as a concentration-based listing criterion follows an approach similar to how the EPA plans to implement a similar concentration-based listing criterion in the Dyes and Pigments Industry Proposed Rulemaking of July 23, 1999. See 64 FR 40192-40230

EPA's basis for determining excess "risk" in the high end risk assessment was the single highest dioxin concentration in wastewater found during its testing. The EPA data shows that the majority of samples had wastewater concentrations of dioxins that were well below that measured value (and below the 1 ng/L trigger as well).

Agency Response:

EPA thanks the commenter for its support of the proposed concentration-based listing alternative. In the final rule, the Agency is promulgating a decision not to list chlorinated aliphatic wastewaters as hazardous waste.

12.28 LCA Comment

In addition, however, the risk assessment used only the sampling results from the dedicated (i.e., wastewater from EDC/VCM production facilities only) chlorinated aliphatics wastewater sludge samples and the dedicated EDC/VCM sludge samples (6 of 41 wastewater samples and 4 of 7 sludge samples). Although EPA acknowledged that most facilities commingle their EDC/VCM wastewater, with other wastewaters, it chose to exclude the samples from the commingled wastewaters from its analysis. As a result, the conclusion based on the dedicated samples exaggerates the risks associated with chlorinated aliphatics wastewater from commingled facilities.

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[8]For example, some of the adverse impacts of listing include hazardous waste taxation and fee requirements. Failure to exclude wastewaters with TCDD TEQ below 1 ng/L criteria could have a tremendous economic impact for generators of such waste with no corresponding environmental benefit, as wastes below this level are not "driving" the risk.

Agency Response:

See EPA's response to comment in Section 4.9 of this Response to Comment Document (comments from Vinyl Institute).

12.29 LCA Comment

For these reasons, LCA urges EPA to develop this concentration-based listing as a self-implementing option based on the waste constituent data developed by the generator of the wastewater stream. LCA supports EPA's proposal to allow sampling the wastewater stream a minimum of four times and using the maximum value from the four (or more) samples as the value to compare against the 1 ng/L TCDD TEQ listing criterion. However, LCA also requests that the EPA also allow generators to demonstrate that the TCDD TEQ level is below the 1 ng/L criteria through use of accepted statistical methods to determine an acceptable upper confidence limit on the mean as the value to compare to the listing criterion. This could be stated as an alternative procedure in the rule.

Agency Response:

The Agency is not finalizing the listing for chlorinated aliphatic wastewaters as proposed. Therefore, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements, which included waste sampling and analysis requirements. Given the Agency's decision not to list chlorinated aliphatic wastewaters as hazardous, EPA did not evaluate the merits of a self-implementing regulatory approach.

12.30 LCA Comment

Because of the time required for laboratories to analyze for dioxins and furans, and the shortage of commercial laboratories qualified to conduct these analysis, LCA requests that the EPA allow 180 days after the effective date of the final rule as the completion deadline for sampling and analysis and the waste determination. LCA members have routinely experienced significant delays in obtaining dioxin/furan sample results due to the number of trial burns, test burns and other recent regulatory and voluntary testing programs.

With respect to periodic resampling, LCA supports testing the non-hazardous wastewater stream annually or when a process change occurs that may increase the dioxin and furan concentration in the wastewater stream. A single, annual confirmatory sample could suffice; however, the EPA should allow the generator the option of additional samples to conduct a statistical determination based on the upper confidence level on the mean.

Agency Response:

See EPA's response in Section 12.29 above. EPA thanks the commenter for their input on the proposed sampling approach.

12.31 LCA Comment

3. EPA Should Adopt a Contingent Management Scenario Which Excludes From the Listing Any K173 Wastewaters That Are Managed In Closed Tanks

As discussed, in its proposal to list K173 wastewaters, the EPA used open, aerated biological treatment tanks as the management option addressed in the risk assessment. The EPA's data indicated that such open treatment tanks are a common method for managing chlorinated aliphatic process wastewaters; however, the EPA acknowledged that not every facility in the database uses these aerated, uncovered tanks. Some use closed tanks and others use open, but not aerated tanks.

The risk assessment indicated no excess risk (central tendency) to the average receptor from managing chlorinated aliphatic production wastewaters in these open tanks was barely above the significant risk level of 1 x 10-5. All other receptors had maximum high end deterministic risk estimates from 10 to 10,000 times less than that of the farmer considering this same pathway. The central tendency deterministic risk estimates for all receptors were an order of magnitude less than the equivalent high end deterministic risk estimates. See 64 FR 46489-46490

It is well established that covered tanks have a relatively low rate of exchange of wastewater contaminants between the water and air compared to uncovered tanks and that non-aerated tanks have a much lower rate of exchange between air and water than do aerated tanks. Clearly then, if modeled risks for covered tanks containing chlorinated aliphatic production wastewaters, one would expect the high end and central tendency deterministic risk estimates to be significantly lower than for uncovered tanks and certainly much less than 1 x 10-5. It is equally clear that covered tanks managing chlorinated aliphatic production wastewaters do not pose a significant risk to human health or the environment.

For this reason, LCA requests that EPA allow use of covered tanks as a contingent management option such that wastewaters managed by this practice would not be considered a hazardous waste at the point of origin. Documentation of use of such tanks could be relatively straightforward, such as annual certification.

Agency Response:

Because EPA is not listing chlorinated aliphatic wastewaters as hazardous waste, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements, which include waste sampling and analysis requirements.

12.32 LCA Comment

In developing this contingent management option, the EPA should clarify that "*de minimis*" losses of wastewaters through minor spills such as those from well maintained pumps and piping (as described in 40 CFR 261.3(a)(2)(iv)(D)) do not result in such minor spills being classified as described in a K173 listed hazardous waste. Such minor spills could fall outside of a system designed to capture and route such wastewater to a closed tank system. Obviously such "*de minimis*" drips and leaks would not pose a significant excess risk. The rationale supporting the *de minimis* wastewater rule itself counsels for extension of such rule to these situations.

Agency Response:

EPA thanks the commenter for their suggestion on this aspect of the proposed wastewater listing. However, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

12.33 LCA Comment

4. LCA Supports EPA's Proposal To Amend the 'Derived-From' Rule to Exempt Wastewater Treatment Sludges 'Derived From' Treating K173 Wastewaters as Hazardous Wastes

The derived from rule has been significantly criticized because application of the rule assumes excess risk absent any specific information on the toxicity of the treatment residue. The EPA has evaluated wastewater treatment sludges from the chlorinated aliphatics industry and has made independent hazardous waste listing determinations for several categories of these sludges. These independent hazardous waste listing determinations supply the necessary, specific data and thus "derived from" status is not warranted for such sludges. For this reason, LCA strongly supports the EPA's determination that wastewater treatment sludges 'derived from' K173 wastewaters do not pose significant risks to human health and the environment.

Agency Response:

See EPA's response to comment in Section 3.30 in this Response to Comment Document (Dow Chemical comment).

12.34 LCA Comment

5. LCA Requests EPA to Reevaluate Its Economic Analysis and to Consider Other Noneconomic Factors

EPA's Economic Analysis indicated that the estimated industry compliance costs associated with the K173 listing would be approximately $1,320,000 in initial capital costs and approximately $766,900 in

recurring annual operation and maintenance costs. EPA included only the following estimates in reaching these totals:

tank fixed roof and valve
tank roof vent and carbon control
Tank Subpart CC ancillary costs
initial waste testing for dioxins

LCA believes that EPA has underestimated the costs for the items it did review to a significant degree as well as failed to include other costs necessarily associated with installing controls to meet the Subpart CC requirements.

EPA assumed that only 9 tanks out of the 58 it reviewed would require controls. This estimate was based on the fact that only 1 sample out of 6 samples that EPA collected were above the 1 ng/L trigger level. As previously noted, EPA failed to test at a number of facilities. (EPA did not consider that some facilities may choose to install tank covers and control systems in order to account for potential process variability and to ensure 100% compliance.) EPA also failed to consider that some facilities may choose to install new tanks rather than cover existing tanks due to structural issues and/or the significant period of downtime that would be necessary to retrofit an existing tank which would mean lost production revenues or the need to shop wastewater off-site.

Information provided by several companies indicates that EPA's estimates for tank retrofit and annual operation and maintenance costs are unrealistically low. Bids given to Formosa Plastics indicated that the cost of retrofitting tanks of the size that they use at the Louisiana plant would cost approximately $300,000 without consideration of reconstruction of support, shipping, taxes, or emission control equipment The costs of retrofitting tanks at their Texas facility are even greater due to larger size. DuPont-Dow Elastomers has estimated that a tank retrofit costs approximately $200,000 - $300,000 depending upon the size of the tank. Borden Chemicals & Plastics has estimated that it will cost them $7,340,000 to reconstruct 11 tanks (averaging about $660,000 per tank) when considering the additional foundations, structural work, instrumentation, fans, duct systems and carbon bed filters required. Occidental Chemical has estimated that it will cost them about $6 million per facility at each of their three facilities in order to comply with the rule.

EPA's estimate for annual operation and maintenance costs appears to have grossly underestimated the cost of operating carbon bed systems. Formosa's Louisiana facility alone estimates the annual operating/maintenance costs to be an order of magnitude higher - in the range of $846,500 for control of three tanks, if testing shows the 1 ng/L to be exceeded.

Agency Response:

In the final rule, EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. Therefore, the Agency did not include an assessment of costs for the proposed listing in the economic analysis. However, EPA thanks the commenter for its input.

12.35 LCA Comment

EPA failed to consider at all the cost to Shell Oil facilities to convert from surface impoundments to tanks - estimated by Shell to be $50 million at their Deer Park facility. Likewise, EPA failed to consider the impact to DuPont-Dow Elastomers' Louisiana facility which currently uses deepwell injection to manage wastewaters subject to this rule. The changed wastewater classification alone will require that DuPont-Dow obtain both state and federal no migration determinations, amend its UIC permits, and include two tanks in a RCRA permit - at a cost anticipated to be $500,000 to $1 million, without consideration of the costs DuPont Dow will have to meet for off-site disposal while these other administrative actions are pending. (DuPont-Dow estimated that 1 truck of wastewater would leave its site every 32 minutes during the time period it cannot use its existing system.)

Agency Response:

Although the USEPA was unaware in the 1999 proposed listing rule that chlorinated aliphatic manufacturing wastewaters were managed in the Shell facility's surface impoundment, the preamble to the final rule presents the USEPA's additional research, risk screening analysis and economic analysis associated with this surface impoundment. The potential economic impact of the final listing on this particular (Oxy Vinyl VCM) industrial wastewater stream, and on the use of this Shell surface impoundment, are discussed in both the preamble and in the Economics Background Document to the final rule.

Please see generally EPA's responses to comments in Sections 6 (Dupont-Dow) and 13 (Shell Chemical) in this Response to Comment Document.

12.36 LCA Comment

EPA did not consider the cost of title V air permit amendments for any of the facilities - although all of the facilities will require these. Neither did EPA consider the delay inherent in the permitting process which could affect the ability of facilities to comply by the deadline. It is possible that amendments to existing state or federal wastewater discharge permits will also be required and the cost of these were not considered.

EPA did not consider the cost of performance testing control devices to demonstrate compliance with the Subpart CC standards. Some facilities have estimated that these costs can be as high as $150,000 to $300,000 per performance test.

Agency Response:

In the final rule, EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. Therefore, the Agency did not include an assessment of costs for the proposed listing in the economic analysis. However, EPA thanks the commenter for its input.

12.37 LCA Comment

EPA did not consider the potential impact on hazardous waste fees that will be due to authorized states as a result of this rule nor did it consider the potential increase in hazardous waste taxes.

Agency Response:

EPA agrees that the economic analysis for the 1999 proposed listing rule did not estimate the potential effects on state-level hazardous waste fees and taxes. However, EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. Therefore, the Agency did not include an assessment of costs for the proposed listing in the economic analysis.

12.38 LCA Comment

Finally, EPA did not consider the fact that it's proposed rule could pose countervailing health and safety risks to maintenance workers who will be required to inspect and perform maintenance in closed tanks rather than open tanks. LCA believes that this is certainly a factor that should be addressed pursuant to 40 CFR 261.11(a)(3)(xi). Likewise, in assuming annual operating and maintenance costs, EPA did not appear to account for the fact that such annual inspections/maintenance activities may require draining of the tanks, with associated downtime for production processes, and issues concerning water management during such periods.

Agency Response:

EPA did not consider in the economic analysis for the 1999 proposed listing rule, the possibility of production process shut downs associated with draining covered tanks for purpose of annual inspections and maintenance. Consequently, the initial 1999 economic analysis did not include an estimate of this potential industry cost. However, EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. Therefore, the Agency did not include an assessment of costs for the proposed listing in the economic analysis. However, EPA thanks the commenter for its input.

12.39 LCA Comment

C. Comments on Listing and Management of K174 Sludges

1. LCA Supports the Contingent Management Option Approach But Urges a Review of the Risk Assessment

EPA has proposed to list sludges generated from treatment of EDC/VCM wastewaters as K174 listed hazardous wastes, except if they are managed in a landfill and certain documentation of such management is provided, such sludges are not considered to be listed hazardous wastes from their point

of generation. The basis for EPA's listing determination is that EPA's risk assessment for such sludges, which was based on the scenario of managing such sludges in an onsite land treatment unit, showed that the high end deterministic risk assessment showed excess risk from dioxin and arsenic to farmers, children of farmers, and fishermen. The central tendency risk assessment revealed no excess population risk. 64 Fed.Reg. Table III.-3 and Table III.4.

LCA believes that much of the same type of over conservatism is present in the risk assessment for these sludges as was present in the risk assessment for K173 wastewaters. For the same reasons articulated above, therefore, LCA believes that EPA should reevaluate and adjust risk assessment parameters as necessary before proposing to list such wastes, even under a land treatment scenario. However, if EPA refuses to do so, then LCA supports the contingent management option which allows wastes that are land filled to be exempt from the listing.

Agency Response:

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.

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 4.40 of this Response to Comment Document [Responses to the Vinyl Institute, CALP-00004]), 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 (See Sections 4.41 and 4.42 of this Response to Comment Document [Responses to the Vinyl Institute, CALP-00004]). 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 4.42 of this Response to Comment Document [Responses to the Vinyl Institute, CALP-00004]), 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. 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 comments on chlorinated aliphatics wastewaters (See Section 4.6 of this Response to Comment Document [Responses to the Vinyl Institute, CALP-00004]), 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 4.6 of this Response to Comment Document (Responses to the Vinyl Institute, CALP-00004), 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, 1999) 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, 2000). 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 these concerns are addressed in Section 4.29 of this Response to Comment Document (Responses to the Vinyl Institute, CALP-00004). 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, 2000). 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 (pasture grass and hay) 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 size (USEPA, 2000). 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, 2000).

See Section VI.B.1. of the preamble to the Final Rule for specific discussion of how the revised risk estimates, along with additional factors, informed the Agency's decision to finalize the listing for EDC/VCM wastewater treatment sludges (using a conditional listing approach) as proposed.

EPA thanks the commenter for their support of the conditional listing approach for EDC/VCM wastewater treatment sludges.

References:

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

USEPA. 2000. *Risk Assessment Technical Background Document for the Chlorinated Aliphatics Listing Determination, Addendum*. Office of Solid Waste. September 30.

12.40 LCA Comment

LCA notes that Louisiana, like many other states, has a well developed solid waste regulatory program. Louisiana's Solid Waste Rules provide the necessary structure for documentation that such sludges are being managed in a landfill. These rules require annual reports, which provide the documentation necessary to satisfy EPA that appropriate disposal in a landfill occurred.[9]

Agency Response:

The Agency thanks the commenter for its input. In response, the Agency notes that we are not imposing any new or additional recordkeeping requirements as part of

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[9] LAC 33:VII.701. Standards Governing Industrial Solid Waste Generators provides:

A. Annual Reports
1. Generators of industrial solid waste shall submit annual reports to the administrative authority listing the types and quantities, in wet-weight tons per year, of industrial solid waste they have disposed of off site.
2. The generator's annual report shall name the transporter(s) who removed the industrial solid waste from the generator's site and the permitted solid waste processing or disposal facility or facilities that processed or disposed of the waste. The form to be used shall be obtained from the Solid Waste Division.
3. The reporting period shall be from July 1 through June 30.
4. The report shall be submitted to the administrative authority by August 1 of each reporting year.
5. Generators of industrial solid waste shall maintain, for two years, all records concerning the types and quantities of industrial solid waste disposed of off site.

B. Generator Notification and Waste Testing

1. Prior to the initial transport of an industrial solid waste off site, generators of industrial solid waste shall:
a. submit a generator notification form (which is to be provided by the administrative authority) which includes analysis, analytical data, and/or process knowledge which confirms that the waste is
not a characteristic or listed hazardous waste as defined in LAC 33:PartV or by federal regulations; and
b. obtain an industrial waste code number from the Solid Waste Division.
2. Subsequent movements of the same industrial waste off site shall not require new waste testing or a new industrial waste code number unless the process which generates the waste or the characteristics of the waste change. However, the waste characterization data and the waste code required in Subsection B.1 of this Section must be maintained by the generator.
3. Subsections B.1 and 2 of this Section are applicable to solid waste shipments on or after April 1, 1993.

the contingent management 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. The state-required records noted by the comment may be sufficient for making the required demonstration. The Agency notes that generators should be able to demonstrate that all shipments of EDC/VCM wastewater treatment sludges are managed in accordance with the conditions of the listing and be able to make such a demonstration at any time during the calendar year.

12.41 LCA Comment

2. The Contingent Management Option Approach Should Be Expanded to Allow Other Forms of Waste Management Which Do Not Pose Excess Risk

The LCA supports EPA's concept of using contingent management options to preclude listing of a waste when the management option selected clearly poses no excess risk. This concept allows both regulators and regulated industries to focus their resources on addressing reduction of such potential risks without creating unnecessary economic and regulatory burdens for those facilities whose management practices do no pose any substantial risk. For this reason, EPA should extend the rule to add two additional contingent management options for K174 wastes: 1) incineration of K174 sludges or materials classified as K174 wastes by virtue of the mixture rule or derived from rule and 2) management of mixture or derived from wastewaters resulting from vessel cleanouts or equipment washing in a permitted NPDES (or state equivalent) system.[10]

Both of these management scenarios should be acceptable contingent management option for management of such wastes. While it is unlikely that any EDC/VCM production facilities will routinely burn sludges in incinerators or BIFs , it is possible that spills and contaminated debris could be effectively managed this way. In addition, because EPA has not proposed to exempt K174 wastes from the mixture or derived from rules, there will be wastes such as vessel washout and equipment washdown that fall into the mixture/derived from categories. EPA should either exempt such waste from the mixture/derived from rules or allow treatment in a permitted NPDES/state delegated equivalent permitted system.

Destruction in an incinerator, boiler, or industrial furnace is at least equivalent to management in a landfill with respect to risk. Likewise, treatment of dilute rinsate wastewaters in a permitted NPDES system poses little or no risk. These conclusions are evident from EPA's own risk assessments pursuant to this rule and under other rulemakings, such as the Combustion MACT rule.

[10] LCA believes that EPA failed to consider the cost of management of such mixture/derived from wastes associated with K174 sludges in its Economic Analysis. This analysis should be revised for this reason.

With respect to the contingent management option involving burning in an incinerator or BIF, the option should apply regardless of whether the incinerator or BIF is a permitted RCRA unit. Air emissions from such combustion devices are regulated under state and federal air laws, and with respect to incinerators, solid waste permits are required for waste burning activities. Thus, existing regulatory programs already provide the regulation necessary to ensure proper operation of such devices. With respect to the contingent management option involving treatment of mixture/derived from waste waters in an NPDES system, the federal or state equivalent NPDES rules provide the necessary framework for control.

Agency Response:

Regarding incineration as a contingent management option, see EPA's response to comment in Section 3.31 of this Response to Comment Document (Dow Chemical).

The commenter also describes the "management of mixture or derived from wastewaters resulting from vessel cleanouts or equipment washing in a permitted NPDES (or state equivalent) system" as a contingent management option that the Agency should consider exempting from the K174 listing. The commenter also states that management of EDC/VCM sludges in this manner has costs associated with it that EPA failed to include in its economic analysis at proposal.

If EPA understands the comment correctly, there may be situations where not all of the EDC/VCM sludge is completely removed from the tank system, therefore some remains within the wastewater treatment system as a result of "vessels" that are cleaned out and "equipment" that is washed. This residual sludge mixed with water is either returned for additional treatment (to the same system that continually generates wastewater treatment sludge) or is discharged under the facility's NPDES permit.

If this is correct, EPA does not consider the small amounts of residual sludges sent with wastewater to the plant's wastewater treatment system to be K174 sludge within the scope of the listing. Nor are the wastewaters subject to regulation by operation of the mixture or derived-from rules. EPA does not intend for this listing to capture small amounts of residual sludges, which, as a normal part of a well-managed treatment process get rinsed out of treatment vessels and managed in the wastewater treatment system. Similarly, wastewaters often contain particles of listed sludges due to contact with sludge at the bottom of treatment vessels; EPA does not regulate those wastewaters under the mixture and derived-from rules.

Even if, due to situation-specific circumstances not fully explored in this comment, the activity was considered hazardous waste management as a result of the mixture and/or derived-from rules, EPA disagrees that there would be any incremental costs associated with it as a result of this listing, because these tank-based systems are already exempt from RCRA regulation as wastewater treatment units (40 CFR 260.10, 264.1(g)(6), and 265.1(c)(10)).

Finally, because the commenter referred to "vessel cleanouts," the Agency notes that there is a specific, existing hazardous waste listing for the chlorinated aliphatics industry (F024) that includes "reactor clean out wastes," and EPA wishes to clarify that the response above is not related to that listing.

12.42 LCA Comment

D. Comments on Listing and Management of K175 Sludges

EPA has proposed to list as "hazardous" wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM-A) as listed waste K175. This waste listed as waste K175 is generated by only one facility in the country, which is located in Louisiana. The facility already sends such sludge to a permitted RCRA landfill as a conservative measure since the material is typically non-hazardous. Despite the fact that it is already classified as a characteristic hazardous waste pursuant to the TCLP test because the concentrations of mercury in the tested leachate exceed the toxicity characteristic levels. Despite the fact that it is already classified as a characteristic hazardous waste subject to RCRA standards, EPA is proposing to make this a listed hazardous waste for two reasons: 1) it is plausible that it may be mismanaged by sending it to an unlined and uncovered landfill and 2) even if sent to a RCRA permitted landfill, the information EPA has on liner performance and the mobility of mercury under some pH conditions indicates that mercury could leach at significant concentrations when the liner deteriorates after post closure, thus presenting an excess risk from mercury discharge to groundwater.

LCA believes that EPA cannot rely on the first of its rationales in any way. Louisiana solid waste regulations require liners. See LAC 33:VII Ch. 7 standards. EPA must consider these regulations per 40 CFR 261.11(a)(3)(x). Thus, even if the generator stopped sending the sludge to a RCRA subtitle C facility and began sending it to a nonhazardous landfill, EPA's scenario of mismanagement is implausible.

Agency Response:

See EPA's responses to comment in Section 5 of this Response to Comment Document, as well as Section VI.C.1. of the preamble to the final rule.

12.43 LCA Comment

With respect to the second rationale, LCA believes that EPA is departing from its long established assumptions regarding the validity of the TCLP procedure. EPA developed such procedure to mimic potential worst case conditions in landfills. Now EPA is adding other assumptions to the landfill scenario used in developing the TCLP that could establish precedent with respect to all TCLP wastes. Such a wholesale departure from this established regulatory program sets a dangerous precedent and creates uncertainty in accepted waste management practices.

Agency Response:

See EPA's responses to comment in Section 5 of this Response to Comment Document, as well as Section VI.C.1. of the preamble to the final rule.

12.44 LCA Comment

This is all the more egregarious when EPA acknowledges that the data upon which it bases its concerns are "preliminary". EPA stated:

The Agency notes that the single facility generating this waste reports managing the waste by disposing of it in a subtitle C landfill....Therefore, a simple conclusion may be to dismiss the potential risk for the groundwater pathway (assuming it continues to go to a subtitle C landfill) due to the presence of a landfill liner and leachate collection. In addition, (as mentioned previously) the mercury in the waste is in the form of mercuric sulfide, which generally is found to be a relatively insoluble form of mercury (indicated by only a relatively small percentage of the total mercury content of the waste leaching under the TCLP). However, **data recently collected by the Agency and preliminary results from the analysis of this waste** indicate that this waste may not behave in the same manner (in terms of the mobility of mercury in sulfidic form) in all environments. As discussed briefly below (and further in the Land Disposal Restrictions, Section V.F.) available data indicate that although the mercury in the VCM-A sludge remains relatively immobile at pH levels of 6 or lower, higher pH conditions will result in mercury mobilizing to the aqueous phase. 64 Fed.Reg. at 46511 (emphasis added). The results of the "data recently collected" in this statement are referenced only as "e-mail communication to John Austin, U.S.EPA, from Mitch Hahn, Waste Management Corporation." Such slim information certainly cannot form the basis of a rulemaking action.

Agency Response:

See EPA's responses to comment in Section 5 of this Response to Comment Document, as well as Section VI.C.1. of the preamble to the final rule.

12.45 LCA Comment

Moreover, EPA is establishing an extremely dangerous and unwarranted precedent by postulating that the subtitle C liner and leachate systems are not adequate to prevent long term releases as well as by jumping to the conclusion, with little evidence that the mercury "may" behave differently than assumed under the TCLP assumptions in a subtitle C landfill. EPA's conclusion that K175 wastes pose a "substantial threat" to public health even when disposed in a subtitle C landfill is built upon a string of unfounded and yet unanalyzed suppositions. EPA's own language belies the tenuousness of its conclusions:

However, even assuming a low probability of [liner] failure, because the TCLP **may be** significantly under predicting leachability for this waste in this subtitle C disposal scenario, there **may** still be a release of mercury that results in an exceedance of the MCL. While there are uncertainties in this

assessment, it still illustrates that the mercury concentrations in the receptor **well may be close to, and could even be higher than the MCL.**

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

Id., (emphasis added).

Does EPA intend to reevaluate all TCLP characteristic wastes in a similar manner?

LCA believes that EPA should not proceed with this listing based upon the dearth of evidence it possesses and the lack of a comprehensive review of the assumptions which it is using to list wastes that are already protectively managed in a subtitle C landfill. There is no reason whatsoever that justifies proceeding at this time with this rule given current management of the waste as hazardous. This factor enables EPA to justify taking the additional time to evaluate this waste, and other similarly situated wastes, in order to develop well reasoned decisions.

Agency Response:

See EPA's responses to comment in Section 5 of this Response to Comment Document, as well as Section VI.C.1. of the preamble to the final rule. Also, EPA disagrees that the "current management of the waste as hazardous" accurately describes the current management practices for the VCM-A sludge. While the generator has chosen to manage the VCM-A sludge in a Subtitle C landfill, other provisions of Subtitle C (e.g., manifesting, LDR treatment, etc.) are not part of the current management practice. Also, the data placed in the record for the proposed rule, including the record sample collected and analyzed by EPA, indicates that this waste does at times fail the TC for mercury, yet there is no indication that the waste was manifested nor subjected to the LDR requirements for TC-hazardous (for mercury) waste.

12.46 LCA Comment

E. Comments on Non-listing Determinations

The LCA supports EPA's decision not to list 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. None of these wastes pose any significant risk to human health or the environment.

Agency Response:

The Agency acknowledges LCA's support for these no list determinations.

SECTION 13
Shell Chemicals
CALP-00011

Shell Chemical Company (Shell) is pleased to provide these comments on the Proposed Listing of Chlorinated Aliphatics Production Wastes at 64 FR 46476, August 25, 1999. The proposal solicits comments on a number of issues related to listing three new wastes associated with specific Chlorinated Aliphatics Production Processes.

Shell is a chemical company whose manufacturing plants produce Chlorinated Aliphatics or manage wastewater from such production. We are very interested in the proposed rule because of the innovative options which are proposed and because the rule has a potentially higher significant financial impact on Shell than any other petrochemical company. Overall we support the innovative options such as conditional listing, but we do not believe that the risk assessment justifies the proposed requirement to list the three chlorinated aliphatics waste.

13.1 Shell Comment:

Shell previously requested the withdrawal of this rule because we believe that the overall economic impact of this rule on the regulated community will exceed $100MM - an amount that requires a cost-benefit analysis under the Unfunded Mandates Reform Act of 1995 and Executive Order 12866. We would be pleased to respond further to any questions the EPA may have regarding our comments. For additional information contact Michael L. Fuson [(713) 241-4529, mikefuson@shellus.com].

Agency Response:

In retrospect, EPA agrees that the economic analysis for the 1999 proposed listing rule understated the potential magnitude of industry compliance costs because of the unintentional lack of information and resultant exclusion of consideration of potential impacts on Shell's surface impoundments. However, the revised final economic analysis addresses the Shell facility. The reference to the $100 million trigger threshold in 1995 UMRA and EO-12866, requires the following further consideration: each defines cost in specific terms: UMRA's $100 million trigger is keyed to only "direct costs" (i.e. expenditures) "in any one year", whereas EO-12866's $100 million trigger is keyed to [adverse] "annual effects". Consequently, (a) some rules may trigger the benefit-cost analysis requirements of only one or the other depending upon not only the dollar magnitude but on the types of "costs" and "effects", and (b) some rules may exceed $100 million in economic cost (i.e. displacement of physical resources) in a single year, but still be less the $100 million trigger under both UMRA's "direct cost" trigger (because of cost-financing amortization of initial lump-sum costs over future multiple years – which may correspond to plant/equipment construction periods or to

rule lifespans – so that expenditures "in any one year" are significantly less than the initial lump-sum cost), and under EO-12866's "annual effect" trigger (because EO-12866 is not restricted to only "direct costs", but is oriented to societal economic costs, which are usually annualized over a multi-year period-of-analysis which corresponds to the expected future lifespan of a rule).

13.2 Shell Comment:

Shell Chemical Company (Shell) is committed to safe management of all hazardous waste that we generate. We have conducted efforts in accordance with Responsible Care®, a Chemical Manufacturers Association (CMA) initiative, and numerous other programs such as the 33/50 program for reducing or preventing pollution. Shell supports waste management efforts that focus on protecting human health and the environment. Shell would like to commend EPA and register our support for a number of innovative and logical improvements to waste listing that has been proposed. Specifically we support:

Conditional Listing

Shell supports the concept that any listing of hazardous waste should be limited in scope, whenever possible, to only those wastestreams that are shown to pose significant actual or potential risks to health or the environment when improperly managed in a plausible mismanagement scenario. In addition, when EPA has determined that a wastestream may not pose significant risks when managed by a given method (e.g., disposal in a landfill), we support conditioning the listing by making it applicable only to wastes disposed of in alternate manners that do pose significant risks. In the current proposed rulemaking, EPA has stated that the placement of EDC/VCM wastewater treatment sludges in lined landfills does occur and would lessen the potential risks, 64 Fed Reg. 46509. Shell supports, as a general matter, the use of this more tailored, conditional listing approach as an alternative to the ultra-conservative "across-the board" listing approach, which frequently subjects wastes that pose no significant risks to the costs and other burdens of regulation as "hazardous waste" under Subtitle C of RCRA.

Please note that Shell finds that the risk assessment for this sludge indicated only marginal risks, and given the uncertainty and conservatism built into EPA's risk assessment, Shell believes this sludge would pose no harm to human health or the environment, even if land applied. While supporting the concept of contingent management, Shell does not support the listing of the EDC/VCM sludges.

Agency Response:

EPA thanks the commenter for its stated support of the conditional listing approach and notes that the Agency did reevaluate the risk assessments developed for the proposed rule in light of public comments. The commenter's concerns about the

uncertainty and conservatism of the risk assessment for EDC/VCM sludge managed in a land treatment unit are addressed in Section 12.39 of this Response to Comment document (responses to Louisiana Chemical Association, CALP-00010).

Based upon the Agency's findings that EDC/VCM wastewater treatment sludges pose significant risks when managed in land treatment units but pose no significant risks when managed in landfills, the Agency is promulgating a "contingent management 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.

13.3 Shell Comment:

Concentration-Based Requirements

Management Requirements: In this rulemaking, EPA has proposed a "concentration-based" management requirement in that "CC" controls would be required on wastewater treatment tanks only if the listed wastewater exceed a level of contamination. If the level of contamination is set correctly this provides protection when warranted and allows alternate methods to provide that protection.

Listing Cutoff: On the other hand this conditional management approach does not go far enough in that it fails to set a level above which a wastewater stream would be regulated. Assuming that there is an adequate basis for listing a waste in the first place, Shell believes that a concentration-based listing approach is preferable to an across-the-board listing, which subjects all wastes of a certain description to Subtitle C regulation, no matter how miniscule the constituent concentrations - and thus potential risks -- may be in a given case. Shell has long advocated that the traditional listing approach frequently results in needless overregulation of non-hazardous wastes, and that more tailored approaches should be used wherever possible. Shell urges EPA to consider a concentration-based listing -- in addition to the concentration-based controls-- for the chlorinated aliphatics listing.

Note: Shell endorses the concentration-based listing approach proposed by EPA for the dyes/pigments industries, whereby a concentration-based listing:

- specifies constituent-specific levels in a waste that causes the waste to become a listed hazardous waste; and
- an operator must determine whether or not the waste is hazardous OR assume that it is hazardous as generated (64 FR 40198, July 23, 1999).

Agency Response:

The Agency acknowledges Shell's support of a concentration-based listing approach. However, 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.

13.4 Shell Comment:

New Point of Generation (Not Listing Sludges Derived From K173)

Sludges derived from the treatment of proposed K173 would ordinarily be considered hazardous, because they are derived from the treatment of a hazardous waste, but EPA is specifically excluding this stream from the derived-from rule. The Agency's decision was based on a risk assessment of the sludge itself, with such risk evaluation superceding "… any presumed risk imparted by application of the derived-from rule…" (64 CFR 46502). Shell strongly supports this specific exclusion from the derived-from rule.

Agency Response:

See EPA's response to comment in Section 3.30 of this Response to Comment Document (comment from Dow Chemical, CALP-00012).

13.5 Shell Comment:

EPA is proposing a "contingent management" approach for those sludges generated from EDC/VCM wastewater treatment. That is, the EDC/VCM sludges are not hazardous IF they are managed in landfills. Shell, while supporting the concept of contingent management, does not support the listing of the EDC/VCM sludges based on CMA's review of the risk assessment which indicated only marginal risks and existing requirements to manage the waste as hazardous due to the presence of mercury.

Agency Response:

The Agency acknowledges Shell's support of a contingent management listing approach. Regarding the commenter's reference to CMA's review of the risk assessment, please see the Agency's response to CMA's comments in Section 19 of this Response to Comment document. See also the Agency's response to the Louisiana Chemical Association in **Section 12.39** of this Response to Comment Document. However, based upon the Agency's findings, including the results of a modified risk assessment which accounts for several issues raised in public comments, that EDC/VCM wastewater treatment sludges pose significant risks when managed in land treatment units but pose no significant risks when managed in landfills, the Agency is promulgating a "contingent management listing" for this waste.

The Agency notes that EPA is listing EDC/VCM wastewater treatment sludges due to the fact that these sludges contain dioxins at levels of concern. EDC/VCM sludges (K174) do not contain mercury at levels of concern. However, the Agency also is finalizing a listing determination for wastewater treatment sludges generated from the production VCM using an acetylene-based process (in the presence of a mercury catalyst). These VCM-A sludges are being listed on the basis of mercury.

13.6 Shell Comment:

Shell also has the following clarifications and concerns with the proposed listing.

1. THE "ECONOMICS BACKGROUND DOCUMENT" UNDERESTIMATES THE ANNUAL IMPACT OF THE PROPOSED REGULATION

2. DIOXINS AVAILABLE FOR AIR RELEASE FROM AGGRESSIVE BIOLOGICAL TREATMENT UNIT ARE OVERESTIMATED

3. A K173 WASTEWATER LISTING SHOULD BE QUALIFIED WITH A DIOXIN CONCENTRATION

4. THE SCOPE OF THE PROPOSED LISTING DOES NOT INCLUDE EPICHLOROHYDRIN (ECH)

5. WASTEWATER FROM THE INCINERATION OF CHLORINATED ALIPHATIC WASTE IS NOT COVERED BY THE PROPOSED LISTING

6. THE RISK ASSESSMENT DOES NOT JUSTIFY THE REQUIREMENT TO COVER NON-AGGRESSIVE BIOLOGICAL TREATMENT TANKS

7. EPA DID NOT BALANCE THE POTENTIAL RISK TO AN INDIVIDUAL WITH THE MORE PROBABLE POPULATION RISK

8. THE COST OF AVOIDING ONE POTENTIAL CANCER CASE EXCEEDS $15 BILLION DOLLARS

9. THE ANALYTICAL METHODS SHOULD BE CLARIFIED

10. THE LEACHATE FROM LANDFILLS RECEIVING NEWLY LISTED WASTE SHOULD BE CONSIDERED A NEW POINT OF GENERATION

Agency Response:

Responses to individual comments/issues are provided below.

13.7 Shell Comment:

1. THE "ECONOMICS BACKGROUND DOCUMENT" UNDERESTIMATES THE ANNUAL IMPACT OF THE PROPOSED REGULATION

The "Economics Background Document" (30 July 1999) seriously underestimated the potential cost of compliance with the tank cover requirements for K173 and the requirements for other waste.

Shell maintains that the potential annual cost of this rule in the first year of construction may exceed $100 Million - an amount that exceeds the trigger for a cost-benefit analysis under the Unfunded Mandates Reform Act of 1995 and Executive Order 12866. Furthermore, Shell believes that as proposed the rule would have a significant inequitable financial impact equity on our Company. We submitted the attached request to the EPA Administrator to withdraw this rule for this reason on November 1 (the request was verbally denied on 11/18).

Our estimate is based on the following known costs:

		Updated Amounts	**EPA Estimate**
1.	Impact on Shell Deer Park Chemical Plant	**$50,000,000**	$0
2.	CMA's PERA Critique of EPA's Economic Analysis	**$7,673,000**	$3,109,000
Total		**$57,673,000**	$3,109,000

Agency Response:

The Agency thanks the commenter for its information on potential cost impacts. The Agency notes that prior to the proposed rule, EPA had no information indicating that Shell's Deer Park facility was managing chlorinated aliphatic wastewaters. Therefore, the Agency had not included an assessment of potential impacts upon this facility in the economic analysis for the proposed rule. Since information was provided to the Agency regarding Shell's management of chlorinated aliphatic wastewaters in response to the proposed rule, the Agency has modified its economic analysis for the final rule to account for potential impacts to Shell Deer Park. However, in the case of the proposed listing for chlorinated aliphatic wastewaters, the K173 wastewater listing (conditionally requiring tank covers) is not being finalized.

13.8 Shell Comment:

A discussion of these estimates follows.

1. Impact on Shell Deer Park Chemical Plant

The Deer Park Chemical Plant in Texas manages wastewater for the Shell Chemicals processes, a portion of the Shell Deer Park Refinery, and the Oxy Vinyls vinyl chloride monomer production facility (formally know as Occidental Chemical).. The Oxy Vinyls Plant discharges 695,255 Metric tons of wastewater per year which could be classified as a listed hazardous waste by the proposed rule. This stream comprises 7.5% of the approximate 9,298,000 Metric tons per year of the total wastewater flow through the Chemical Plant wastewater treatment system.

The wastewater flow from Oxy Vinyls enters the chemical plant sewer where it commingles with wastewater flows from the other sources described above. The combined wastewater stream is treated by activated sludge aggressive biological treatment in three impoundments and three secondary clarifiers operating in parallel. The treated wastewater is discharged under Texas Discharge Permit #00402.

An engineering review of required construction to replace the three impoundments with tanks resulted in a capital cost estimate of $50 million. This cost was developed in part from other recently completed projects of similar scope, including the replacement of two impoundments at the Equilon (formerly Shell) Wood River Refinery ($35 million). At Deer Park, the construction would be complicated, and hence more costly, since the new tanks would have to be built on the site of the existing facilities. This would increase costs of the foundation etc. (i.e. pilings, bringing in fill material) to the estimated $50 million level.

The cost for replacing this impoundment was not considered in the EPA's Economic Background Document of 30 July 1999.

Agency Response:

In the final rule, EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. Although EPA was unaware in the 1999 proposed listing rule that chlorinated aliphatic manufacturing wastewaters were managed in the Shell facility's surface impoundments, as a result of Shell's comment, EPA has included this new information in the final rule. The potential economic impact of the final listing on this particular (OxyVinyl VCM) industrial wastewater stream, and on the use of this Shell surface impoundment, are discussed in both the preamble and in the Economics Background Document to the final rule.

13.9 Shell Comment:

2. CMA's PERA Critique of Economic Analysis

CMA's Policy Economic and Risk Assessment ("PERA") Team reviewed and critique EPA's economic analysis for the proposed rule on chlorinated aliphatic compounds. PERA reviewed the Economics Background Document and identified flaws in EPA's analysis that have the effect of understating the potential cost of the proposed rule.

PERA re-estimated the potential cost of the rule by replacing some, but not all, of EPA's data/assumptions with more accurate and representative data/assumptions. Specifically, PERA assumed 38 facilities would be covered by the rule, a 5.4 % growth rate for future production, and an equipment life of 20 years. These changes alone raise EPA's "annual average equivalent" estimate from $3.109 million to $7.673 million. The present value of the total cost to regulated entities is $38.6 million in EPA's analysis; PERA estimates the cost to be at least $95 million.

Note: The final PERA Critique is submitted as part of the CMA's comments.

Attached to this Section: November 1, Shell Chemical Company Request to Withdraw the Proposal.

Agency Response:

EPA appreciates CMA's critique of the 1999 Economics Background Document, as well CMA's response to EPA's request (in the 25 Aug 1999 Federal Register notice), for public comment on specific aspects of the 1999 economics analysis. USEPA-OSW examined CMA's list of 38 facilities, for purpose of comparing it to USEPA's 1999 list of 23 facilities, and for purpose of determining whether other facilities on CMA's list may be subject to and affected by the proposed and final listing. The detailed findings of this examination and comparison are provided in a RCRA Docket Memorandum referenced elsewhere in the "Response to Public Comments; Final Listing Determination for Chlorinated Aliphatics Industry Wastes" background document available from the RCRA Docket. Basically, the 15 additional facilities identified by CMA are not affected by the proposed or final listing, because (a) some do not manufacture (as of 1997-1999) the specific types of chlorinated aliphatics products covered by the listing, and (b) some are duplicate listings to those identified by USEPA.

The 1999 economic analysis applied a 1.9% average annual future production growth rate (for 2001-2030), which is based upon the historical growth rate of 4.1% average annual for 1970-1996. The economic analysis for the final rule includes CMA's 5.4% average annual growth rate as an alternative assumption. The annualization period in the final economic analysis is maintained at 30-years, because

the tank equipment lifespan of 20-years indicated by CMA, is no longer relevant for constraining the analysis, since the K173 listing options is dropped from the final rule. However, for one compliance aspect (hypothetical option) of the final rule (concerning installing wastewater piping), a 20-year operating lifespan is applied to that particular initial lump-sum cost, so that the lump-sum cost appears again at year 21 in the 30-year period-of-analysis. However, the net effect of these changes in the final economic analysis, as compared to the proposed rule economic analysis, is not directly comparable because the K173 listing is dropped from the final listing rule.

13.10 Shell Comment:

November 1, 1999
Ms. Carol M. Browner, Administrator
U.S. Environmental Protection Agency
401 M Street SW
Washington, D.C. 20460

Dear Administrator Browner:

Shell Chemicals (Shell) requests that the rule proposing the listing of chlorinated aliphatic production waste (64 FR 46476, August 25, 1999) be withdrawn. This request is being made because we believe that the overall economic impact of this rule on the regulated community as proposed will exceed $100MM - an amount that exceeds the trigger for a cost-benefit analysis under the Unfunded Mandates Reform Act of 1995.

Review of the background documents indicates that the potential impact of this rule on a facility having impoundments in the wastewater treatment train was not considered. As written, the rule would subject impoundments receiving proposed wastewater K173 to the Minimum Technology Requirements of RCRA. The rule would thus require the closure of 4 acres of impoundments at Shell facilities alone and their replacement with tanks. The cost for closure and replacement tanks for Shell will be in excess of $50MM. We believe that similar closures and tank installations will be required for other companies in the petroleum and petrochemical industries.

We appreciate your consideration of this request and believe the withdrawal will allow for the necessary reconsideration of the economic impact of the proposed rule. Given the relatively short timeframe remaining before the close of the comment period, we hope to receive a prompt response to this request. I can be reached at (713) 241-7826 or via email to pjsnyder@shellus.com.

Agency Response:

[*Please note that EPA responded to this letter in a response dated November 19, 1999, from Elizabeth Cotsworth, Director, Office of Solid Waste, a copy of which was placed in the docket of today's rule*]

In retrospect, EPA agrees that the economic analysis for the 1999 proposed listing rule understated the potential magnitude of industry compliance costs because of the unintentional lack of information and resultant exclusion of consideration of potential impacts on Shell's surface impoundments. However, the revised final economic analysis addresses the Shell facility. The reference to the $100 million trigger threshold in 1995 UMRA and EO-12866, requires the following further consideration: each defines cost in specific terms: UMRA's $100 million trigger is keyed to only "direct costs" (i.e. expenditures) "in any one year", whereas EO-12866's $100 million trigger is keyed to [adverse] "annual effects". Consequently, (a) some rules may trigger the benefit-cost analysis requirements of only one or the other depending upon not only the dollar magnitude but on the types of "costs" and "effects", and (b) some rules may exceed $100 million in economic cost (i.e. displacement of physical resources) in a single year, but still be less the $100 million trigger under both UMRA's "direct cost" trigger (because of cost-financing amortization of initial lump-sum costs over future multiple years – which may correspond to plant/equipment construction periods or to rule lifespans – so that expenditures "in any one year" are significantly less than the initial lump-sum cost), and under EO-12866's "annual effect" trigger (because EO-12866 is not restricted to only "direct costs", but is oriented to societal economic costs, which are usually annualized over a multi-year period-of-analysis which corresponds to the expected future lifespan of a rule).

[end of Agency response]

Sincerely,

Phil J. Snyder
Manager HSE

13.11 Shell Comment:

2. DIOXINS AVAILABLE FOR AIR RELEASE FROM AGGRESSIVE BIOLOGICAL TREATMENT UNIT ARE OVERESTIMATED

In the EPA's Risk Assessment background document (Section 3.0, Tables 3-1a and 3-1b) the dioxin emissions are overestimated. This is because the inlet concentration of dioxins available for stripping from an aggressive biological treatment unit is overestimated.

EPA states that the estimated emissions from biological treatment units are based on the assumption that the dioxin concentration in the aqueous phase is equal to the solubility limit when the measured dioxin concentration is greater than the solubility. If the measured concentration does not exceed the solubility limit, the concentration measured in the high end sample, GL-02, is used.

EPA has overlooked the degree to which dioxins partition to solids in the aqueous environment and has erroneously assumed CHEMDAT8 accounts for sorption correctly. Dioxins will be absorbed onto solids even when the measured concentration is less than the solubility limit and as such it cannot be assumed that all measured dioxin is truly soluble and available for stripping just because that measured dioxin concentration is less than the solubility limit. As a result, EPA has overestimated the concentration of dioxins available for stripping in the biological treatment unit by one, and possibly more, orders of magnitude.

This partitioning underestimation is especially important for the three congeners (1,2,3,4,7,8 HxCDF and 2,3,4,7,8 PeCDF) having the highest TEQ emissions in Table 3-lb of the Risk Assessment Report. As stated in the McLaren-Hart report, these drive the high end individual risk value. An equilibrium partitioning calculation using accepted estimating methods, and EPA's chemical properties for these congeners suggest that the aqueous phase concentration of these congeners are over an order of magnitude less than the concentration used to estimate emissions. Only the aqueous phase concentration should be considered in emissions calculations.

Note: While the focus of this section of the comments is on the emissions modeling, a comment must be made about how the overestimate in calculated emissions impacts the high end individual risk value estimated for the farmer in the risk assessment scenario. When emissions from the source decrease by an order of magnitude, the exposure and hence the risk would be expected to decrease in proportion. EPA should reevaluate the high end individual risk (i.e. the farmer exposure and life time cancer risk) basis the revised emissions and adjust the findings relative to listing chlorinated aliphatic process wastewater as a hazardous waste accordingly.

The following discussion explains and supports our assertion about the overestimate in dioxin emissions. In an aqueous wastewater sample containing suspended solids (TSS), the total measured concentration of dioxins will be the combination of dissolved and adsorbed fractions. In equation form,

$C_m Q = C_{aq} Q + C_{x/m} X Q$ (1)

C_m = measured dioxin concentration (aqueous and on solids), ng/L
C_{aq} = truly aqueous phase concentration, ng/L
$C_{x/m}$ = dioxins already sorbed onto the incoming solids, µg/g
X = incoming solids, mg/L
Q = flow rate, L/day

Assuming the incoming dioxin is in equilibrium with the incoming solids (Lyman, Warren J. et al. Handbook of Chemical Property Estimation Methods. McGraw-Hill, New York. 1982.).

$C_{x/m} = KC_{aq}^{1/n}$ (2)

K = Fruendlich isotherm coeff., µg/g TSS/µg/mL
l/n = constant (0.7- 1.1), assume 1.

$C_m = C_{aq} + XKC_{aq}^{1/n}$ (3)

$C_m = C_{aq} + XKC_{aq}$ (because 1/n = 1) (4)

$C_{aq} = C_m /(1+XK)$ (5)

is the truly soluble dioxin that is available for stripping/adsorption upon entry into the biotreater.

K can be estimated from the methods of Lyman, using the relationships;

$K = K_{oc}(\%OC)/100$ (6)

Where %OC = percent organic carbon in solids, conservatively assumed to be 3%, and K_{oc} is estimated from the given octanol water partition coefficients in App. C of the Risk Assessment Background document using the correlation equations below from Lyman. These three equations were selected for use here based on the similarity of the chemicals used to develop the equations to dioxins.

$\log K_{oc} = -0.54 \log S + 0.44$ (S in mole fraction) Lyman, Equation 4-6
$\log K_{oc} = -0.557 \log S + 4.277$ (S in umole/L) Lyman, Equation 4-7
$\log K_{oc} = 1.00 \log Kow - 0.21$ Lyman, Equation 4-10

S = solubility in consistent units
K_{ow} = octanol water partition coefficient from App. C of the Risk Assessment Background Document

Sample GL-02 is a wastewater stream that has been air stripped. The measured dioxin results are shown below in Table 1 as a summary of Table 3-1b in the Risk Assessment Background Information

Document. Columns showing the aqueous solubility limit (column 4) and the estimated C_{aq} (column 5) from the above equations have been added.

Notes:

1. The estimated aqueous phase dioxin concentrations are more than an order of magnitude lower than the solubility values, which is consistent with a stream containing 300 mg/L suspended solids.
2. The OCDF concentration, even corrected for solids sorption is above the solubility limit.
3. It appears that the reported total concentration of 6000 ng/L OCDF is either a reporting or an analytical error.
4. It also appears that the estimated emission of 1,2,3,6,7,8 HxCDD of 1.80e-2 is an error as well. The value is three orders of magnitude greater than the congener 1,2,3,4,7,8 HxCDD, which is present at approximately the same measured concentration.

Had EPA used the actual aqueous phase concentrations shown in the fifth column below, the total emissions would have been reduced considerably, as shown in the last column.

Because of the errors pointed out above, and in light of the solids sorption issue, EPA should reassess the high end risk based on revised emissions estimates.

Table 1
Selected Examples of Corrected Soluble Dioxin Concentrations and Resulting Lower Annual Emission

Congener	TEF	Conc. ng/L Table 3-1b	Solubility ng/L	Estimated soluble concentration Caq from data in Column 3 and Equation (5) TSS=308 mg/L	Annual Quantity g/yr Table 3-1b	Annual TEQ, g/yr Table 3-1b	Annual emissions, g/yr from Table 3-1b	Annual emissions of column 8 adjusted to the soluble concentration, Caq,g/yr in column 5
1,2,3,4,6,7,8 HpCDD	0.01	0.88			0.283	0.003	4.03E-04	
1,2,3,4,6,7,8 HpCDF	0.01	43			13.844	0.138	6.92E-03	
1,2,3,4,7,8,9 HpCDF	0.01	12			3.863	0.039	6.92E-03	
1,2,3,4,7,8 HxCDD	0.1	0.052			0.017	0.002	7.25E-05	
l,2,3,6,7,8 HxCDD	0.1	0.091			0.029	0.003	1.80E-02	
l,2,3,7,8,9 HxCDD	0.1	0.11			0.035	0.004	2.65E-04	
l,2,3,4,7,8 HxCDF	0.1	5.3	8.3	0.0461	1.706	0.171	1.80E-03	1.00E-05
1,2,3,6,7,8 HxCDF	0.1	1.2			0.386	0.039	3.20E-04	
1,2,3,7,8,9 HxCDF	0.1	0			0.000	0.000	0	
2,3,4,6,7,8 HxCDF	0.1	0.43			0.138	0.014	1.05E-03	
2,3,4,7,8 PeCDF	0.5	0.21	200	0.0828	0.068	0.034	5.96E-04	2.47E-07
2,3,7,8 TCDD	1	0.017			0.005	0.005	6.30E-05	
2,3,7,8 TCDF	0.1	0.082			0.026	0.003	5.77E-04	
OCDD	0.001	6.9			2.221	0.002	7.79E-08	
OCDF*	0.001	6000			1931.676	1.932	5.52E-05	

*OCDF annual emissions was not corrected because it appears that EPA failed to use the solubility of 1.2 ng/L to derive the annual emission of 5.52E-05 and the footnote to Table 3-lb claims. The

estimated soluble (aqueous phase) concentration exceeds the solubility limit. This is probably due to error in measurement, error in reporting, or the presence of a suspended organic phase containing more dioxin. The equilibrium sorption used in this table does not account for a second organic phase, but that phase could make the measured concentration appear higher, but will still not contribute to the concentration of dioxin available for stripping.

These calculations are consistent with the results of field studies of wastewater treatment unit effluents where the aqueous concentrations of dioxins were measured, and found to be in the pg/L or below range (Carroll, W. F. et al., "*Characterization of emissions of dioxins and furans from ethylene dichloride (EDC), vinyl chloride (VCM) and Polyvinylchloride (PVC) manufacturing facilities in the united states. I. Resin, treated wastewater and ethylene dichloride.*" Chemosphere, 37(9-12), 1957-1972, (1998)). In this study, effluents from biological wastewater treatment units receiving EDC/VCM wastewaters were analyzed for dioxin concentrations. Table 2 below compares the GL-02 measured and estimated C_{aq} values with values from four treated effluents from the study by Carroll. The ND indicates that the congener was below detection. The number following the ND is the detection limit for that congener in that sample analysis. Very few dioxins were detected in the biotreater effluent. When detected, the concentration ranged from 0.9 ng/L for OCDF (a congener with a TEF of 0.001) down to 0.0030 ng/L (3.0 pg/L).

In a complete mix biological reactor, such as the one modeled by CHEMDAT8, the effluent concentration equals the reactor concentration. These effluent concentration values are thus more representative of the driving force for air emissions from the biological treatment unit than are the measured concentrations of an incoming stream that is only part of the feed to the reactor. These values are more consistent with the data presented earlier on the C_{aq} estimates. We believe that this supports the need for EPA to correct its high end emissions estimates and resulting exposure and risk assessment using the lower dioxin wastewater concentrations.

Table 2
Comparison of EPA's Selected Data for High End Emissions With Independently Measured Effluent Concentrations from an Aggressive Biological Treatment Unit

Sample description	GL-02 ww from EDC/VCM after stripping ng/L	GL-02' estimated Caq, ng/L using Equation (5) and data in column 2, ng/L	Carroll, et al, ng/L			
dioxin			105 EDC/VCM	132 EDC/VCM	159 EDC/VCM	201 EDC/VCM
2,3,7,8 TCDF	0.0820		ND 0.0026	ND 0.00077	ND 0.0018	ND 0.0055
Total TCDF	0.8600					
2,3,7,8 TCDD	0.0170		ND 0.006	ND 0.0016	ND 0.0019	ND 0.0018
Total TCDD	0.0490					
1,2,3,7,8 PeCDF			ND 0.0061	ND 0.0015	ND 0.0029	ND 0.0041
2,3,4,7,8 PeCDF	0.2100	0.0828	ND 0.0053	ND 0.0013	ND 0.0027	ND 0.0033
Total PeCDF	0.4400					
1,2,3,7,8 PeCDD			ND 0.0031	ND 0.00074	ND 0.0021	ND 0.0030
Total PeCDD						
1,2,3,4,7,8 HxCDF	5.3000	0.0461	ND 0.0024	ND 0.0030	ND 0.0018	ND 0.0034
1,2,3,6,7,8 HxCDF	1.2000		ND 0.0023	ND 0.0027	ND 0.0017	ND 0.0033
2,3,4,6,7,8 HxCDF	0.4300		ND 0.0024	0.0065	ND 0.0018	ND 0.0034
1,2,3,7,8,9 HxCDF			ND 0.0023	ND 0.0011	ND 0.0017	ND 0.0033
Total HxCDF	9.3000					
l,2,3,4,7,8 HxCDD	0.0520		ND 0.0043	ND 0.0013	ND 0.0016	ND 0.0030
l,2,3,6,7,8 HxCDD	0.0910	0.0008	ND 0.0040	ND 0.0013	ND 0.0015	ND 0.0028
l,2,3,7,8,9 HxCDD	0.1100		ND 0.0038	ND 0.0013	ND 0.0014	ND 0.0027
Total HxCDD	0.5100					
l,2,3,4,6,7,8 HpCDF	43.0000	0.1238	ND 0.0055	0.078	0.0064	0.03
l,2,3,4,7,8,9 HpCDF	12.0000	0.0346	ND 0.0062	0.02	ND 0.0030	0.004
Total HpCDF	60.0000					
1,2,3,4,6,7,8 HpCDD	0.8800		ND 0.010	0.014	ND 0.0050	ND 0.0052
Total HpCDD	1.3000					
OCDF*	6000.0000	15.2	0.018	0.31	0.032	0.9
OCDD	6.9000	0.0065	ND 0.047	0.13	ND 0.0011	ND 0.0011

The Total TEQ value reported by EPA for sample GL-02 and used in Table 3-lb for High End Risk is driven by the erroneous assumption that dioxins will exist at their aqueous solubility limit regardless of the total measured concentration in the presence of suspended solids. Equilibrium calculations demonstrate that this is not the case, and the aqueous phase concentration is indeed much less than the solubility limits when suspended solids are present. Dioxins adsorbed onto suspended solids are unavailable for air stripping, and should not be included in the CHEMDAT8 calculations. An approach such as that above to determine the true aqueous, available for stripping, concentration should be used by EPA to adjust the calculated emissions in Tables 3-la and 3-lb.

We believe that these changes will significantly reduce the overall high end individual risk, and encourage EPA to reassess the risk values using these corrected data.

Agency Response:

The Agency's response to this comment is provided in Section **4.5** of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

13.12 Shell Comment:

Additional Notes on Modeling Problems

Chemdat8 and the ISCST3 fail to consider Photolysis which, according to an EPA draft document, is an important factor for dioxin stability in water and its transport in air. ("The Inventory of Sources of Dioxin in the U.S." April 1998, External Review Draft.) We were not able to quantify the impact of photolysis but have included the referenced here for EPA's consideration.

· "Photolysis is slow in pure water, but it increases dramatically when solvents serving as hydrogen donors such as hexane, benzene, methanol, acetonitrile, hexadecane, ethyl oleate, dioxane, and isooctane were present." P. 10-3

· "... photolysis appears to be a significant mechanism for degradation (i.e., principally dechlorination of the peri-substuted chlorines) of those CDD/CDFs present in the atmosphere in the gas phase."

· "... degradation followed first order kinetics and that an inverse relationship exists between the degree of chlorination and the rate of disappearance."

· "... the degradation rate for 2,3,7,8-TCDD (30 % loss in 20 minutes) was reported to be slower than the rates for all other tested CDDs." P. 10-7

From EPA's Risk Assessment

"ISCST3 (used to model air dispersion and wet deposition of vapors) does not include photochemical reactions or degradation of a chemical in the air, which results in additional model uncertainty for some chemicals. Dispersion modeling is highly sensitive to meteorological data and the surface area and dimensions of the waste management unit. Meteorological data used in the dispersion modeling include wind-speed and direction, temperature, precipitation type and amount, and stability class, among others. ISCST3 currently does not calculate dry deposition of vapors; however, the next version of ISCST3 will include this option. We used a conservative approach for modeling dry deposition as discussed in Section 3.3. The ISCST3 model uses hourly data as inputs, and this analysis used 5 years of hourly data to develop longterm unitized air concentrations (UACs)." [5-42 Risk Assessment Summary]

Agency Response:

While it is true that neither the CHEMDAT8 nor ISCST3 model consider photolysis, our review of the cited document indicates that research in this area is currently evolving. The document presents evidence that photolysis may be a significant degradation mechanism; however, at this time, it is not possible to quantify such losses. The use of words such as "appears" in the document help to illustrate the uncertainty associated with this phenomenon. Although photolysis in pure water and organic solution under controlled conditions has been demonstrated, data are not sufficient to quantify photolysis losses in an open tank given the range of suspended solids, engineering practices, waste streams, and environmental conditions that are possible. Given the uncertainty in current research and the lack of suitable rate constants specific to tanks used in the chlorinated aliphatics industry, this loss mechanism was not added to the modeling framework. Until further data are available for quantifying photolysis under typical operating conditions, we contend that it is reasonable to assume that these losses will be negligible. Concerning photolysis in air, the cited reference points out that photolysis of dioxins and furans in the atmosphere has not been well-characterized. We believe that it is reasonable to assume that contaminant degradation via photolysis will be a negligible process in air, given, as explained in the preamble to the proposed rule, that the average time required for emissions from the waste management units to reach a receptor located 300 meters away (our central tendency distance to receptor) is 1.2 minutes.

Furthermore, an opinion contrary to the commenter's was provided by another commenter on the proposed rule. That commenter's opinion was that photolysis is a significant mechanism for transforming less toxic OCDD into the more highly toxic dioxin congeners (not just a mechanism for degrading dioxins into innocuous substances). This comment is as follows:

> "Finally, a paper entitled, "Photolysis of Octachlorodibenzo-p-dioxin on Soils: Production of 2,3,7,8-TCDD," concludes that when exposed to UV light (sunlight), complex forms of octachlorodibenzo-p-dioxin (OCDD) will breakdown into more toxic dioxin congeners. The paper is attached as

Appendix 1. From the paper, the photolysis of OCDD begins within hours of exposure to UV light. Under regulatory requirements, the active face of a landfill must be covered at the end of each workday. It is conceivable that wastewater treatment sludge could be exposed to direct sunlight for several hours when managed at a Subtitle D landfill. However, the paper also concludes that the breakdown of complex dioxin congeners would take several days of exposure to complete. A greater impact of photolysis is when sludge is released to the environment, i.e., transportation incidents and upsets/poor handling at the point of generation. These uncontrolled releases could lead to significant levels of the most toxic dioxin congeners in the environment due to the fact that a quick response for clean-up is not required because the waste is not regulated as hazardous." (Comments from Onyx Environmental Services, CALP 00017)

With regard to our methodology for modeling dry deposition of vapors, one of the peer reviewers made the following positive statements regarding EPA's methodology for evaluating dry deposition of dioxin vapors:

"The report uses a default vapor deposition velocity of 0.2 cm/s according to page 3-4. This is a provisional assumption filling the gap in ISC3, which in its official form, does not yet compute vapor deposition. The Human Health Risk Assessment Protocol (originated in Region VI and now undergoing national peer review by OSWER) suggests a default of 3 cm/s. Earlier, the California Air resources Board suggested a default of 2 cm/s. Based on the observed range of values (roughly 0.1 to 1 cm/s) the report's assumption of 0.2 cm/s seems right in the ballpark. We have used 1 cm/s in the past. If the report wishes to duplicate current EPA recommended practice, 3 cm/s should be used despite the fact that it is unrealistically high. (It is believed to have been derived from ozone absorption rates on pine needles!). This suggestion is made in the spirit of consistency, but with apologies to true science."

As noted by the peer reviewer, EPA used a deposition velocity of 0.2 cm/sec for dioxins to estimate dry vapor deposition to soils. This value was reported by Koester and Hites (1992) and was determined from field measurements. EPA acknowledges that there is considerable uncertainty in this parameter value for specific application to vapors, but chose to use it because it is based on direct measurements of dioxin deposition.

References:

Koester, C.J. and R.A. Hites. 1992. Wet and Dry Deposition of Chlorinated Dioxins and Furans. *Environ. Sci. Technol.* 26(7): 1375-1382.

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

13.13 Shell Comment:

3. **ANY K173 WASTEWATER LISTING SHOULD BE QUALIFIED WITH A DIOXIN CONCENTRATION**

As currently crafted, the definition of K173 captures all wastewater from all chlorinated aliphatics production (except certain vinyl chloride monomer production units).

"*K173* ***Wastewaters from the production of chlorinated aliphatic hydrocarbons****, except for wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons that have carbon chain lengths ranging from one to, and including five, with varying amounts and positions of chlorine substitution."* [64 FR 46480, 8/25/99: emphasis added]

The definition was designed when the EPA believed that all chlorinated aliphatic wastewater was managed in tanks. A trigger of 1 ng/l was set for enclosing the wastewater treatment tanks with covers. Because it was not know at that time that there were wastewater treatment systems that used impoundments (such as at Shell Deer Park) there was no concern that the definition would force the closure of such impoundments and their replacement with tanks.

Shell believes that this unintended impact on impoundments could and should be mitigated by restricting the proposed listing to wastewaters that exceed a dioxin level. An example of how this could be accomplished would be to list only wastewaters from the production of chlorinated aliphatics that contain more than 10 ng/l of dioxin (or that contain more than 1 ng/l of dioxin at the discharge of an aggressive biological treatment unit).

Note: The 10 and 1 ng/l level is used for example purposes and does not represent our support for that level as a definitional trigger. We do not, however, believe that a lower trigger would be necessary based on our review of the current risk assessment.

Measured at the Aggressive Biological Treatment Unit

Restricting the listing to those wastewaters that exceed a trigger threshold at the aggressive biological treatment unit would solve several problems with the current definition.

- Only wastewater treatment impoundments that were also aggressive biological treatment unit would be subject to the retrofit (MTR) requirements of RCRA.

Note : Comments on why only aggressive biological treatment unit (ABTU) should be subject to the proposed listing are provided elsewhere in the Shell submittal.

- Testing/measurement to determine if wastewater is classified as K173 should be done on the wastewater discharge from the ABTU. In this manner, interference caused by dioxins adsorbed into the biosolids will be avoided and only the dioxin available for release to the atmosphere from the water phase will be measured.

- The owner of the aggressive biological treatment impoundment would be afforded a measure of control over the fate of the ABTU.

The owner/operator could be required to monitor and provide assurance that the unit is not receiving wastewater that exceeds the trigger level as a condition of continued operation. As EPA is aware, the owner/operator of the ABTU may not be the owner/operator of the chlorinated aliphatic production unit. Placing the responsibility to monitor on the owner/operator of the ABTU would allow that owner to negotiate a reduction in the dioxin reaching their unit (rather than requiring a retrofit regardless of the dioxin concentration).

Note: An exceedance of the trigger level should not automatically require the replacement of the ABTU but should require immediate action to reduce the dioxin levels. Documentation of exceedance and follow up correction could be required.

- Setting a trigger level for the listing would provide additional incentive for the owner/operator to reduce the level of dioxin at its source.

Note: Shell submitted a request to withdraw the proposed rule on November 1, 1999 because the economic impact of the proposed K173 definition on impoundments was not considered. Modification of the definition as proposed by Shell above would negate the potential inequitable impact on the Shell Deer Park Chemical Plant.

Agency Response:

Because EPA is not finalizing the listing for chlorinated aliphatic wastewaters as proposed, the proposed amendments to regulations for wastewater treatment tanks managing chlorinated aliphatic wastewaters are not being finalized in today's rule. This includes the proposed amendments to the wastewater treatment unit exemption in 40 CFR sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

13.14 Shell Comment:

4. THE SCOPE OF THE PROPOSED LISTING DOES NOT INCLUDE EPICHLOROHYDRIN (ECH)

Shell does not believe that the proposal includes waste from the production of Epichlorohydrin (ECH). Shell produces ECH and is taking this opportunity to clarify the reasons ECH does not meet the listing criteria for future reference.

Epichlorohydrin (ECH) is not a Chlorinated Aliphatic. ECH contains an Oxygen molecule (C_3H_5OCl) and therefore does not meet the listing description of chlorinated aliphatic which is a compound consisting of only Carbon, Hydrogen and Chlorine. The following quotes from the Federal Register notice and various background documents are provided as reference to EPA's discussion of the scope of the listing.

*"**Aliphatic hydrocarbons are compounds composed of the atoms of hydrogen and carbon**, where the carbon atoms are linked by covalent bonds in an open-chain (straight and branched) structure, and those cyclic compounds that resemble the open-chain compounds. Aliphatics are distinguished from aromatic hydrocarbons, which are defined as benzene and compounds that resemble benzene in chemical behavior. For an aliphatic to be chlorinated, one or more hydrogen atoms have been chemically replaced with chlorine atoms. The chlorinated aliphatic chemicals, the wastes of which are described in the (existing) F024 listing description, and identified in the consent decree, are those produced by free-radical catalyzed processes with carbon chain lengths ranging from one to five."* [64 FR 46479, 8/25/99: emphasis added]

*"K173 Wastewaters from the **production of chlorinated aliphatic hydrocarbons**, except for wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons that have carbon chain lengths ranging from one to, and including five, with varying amounts and positions of chlorine substitution."* [64 FR 46480, 8/25/99: emphasis added]

"For purpose of this document and the RCRA listing proposal, CAHCs are defined as:

*"Organic compounds characterized by straight-chain, branched-chain, or cyclic **hydrocarbons containing one to five carbon atoms, with varying amounts and locations of chlorine substitution**." (source: USEPA-OSW "Management Briefing" memo, January 1998, p.11)*

"Hydrocarbons" are organic compounds (molecules) composed solely of the atoms hydrogen and carbon; "chlorinated" means that some of the hydrogen atoms attached to carbon atoms, have

been replaced with chlorine atoms at one or more different positions; and "aliphatic" means that the chemical bonding between the carbon atoms are single, double, or triple covalent bonds (not aromatic bonds), and include the subgroups alkanes, alkenes or alkadienes, and alkynes, respectively. 8 The USEPA-OSW has limited the proposed listing to C1 –C5 CAHCs for two reasons:

- *Higher molecular weight C6+ CAHCs are not produced in significant quantities in the US.*
- *The manufacture of C6+ CAHCs typically does not produce large quantities of organic residuals and wastes (Federal Register, 50968, 11 Dec 1989).*

CAHCs are largely man-made materials synthesized for commercial purposes. The replacement of halogens such as chlorine in a halogenated (e.g. chlorinated) aliphatic compound, by another chemical group, is regarded as one of the most important reactions in organic chemistry, because of the wide range of chemical product classes that may be produced using CAHCs as intermediates (Streitwieser, pp.127, 132). For industrial uses, chlorinated aliphatic hydrocarbons are used almost exclusively because of the comparatively high cost of bromine and iodine, however for small volume laboratory uses where cost is not as great a consideration, brominated aliphatic hydrocarbons are used preferentially because they are generally more reactive than chlorinated versions (Streitwieser, p.100). [p. 17, ECONOMICS BACKGROUND DOCUMENT]

Note: The NIOSH Pocket Guide on Epichlorohydrin from the following web site is provided below for easy reference. [http://www.cdc.gov/niosh/npg/npgd0254.html]

NIOSH Pocket Guide to Chemical Hazards

Epichlorohydrin **CAS** 106-89-8
C_3H_5OCl
Synonyms & Trade Names **RTECS TX4900000**
1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide; gamma-Chloropropylene oxide **DOT ID & Guide**
2023 131P

Exposure Limits NIOSH REL: Ca See Appendix A
OSHA PEL: TWA 5ppm (19 mg/m^3) [skin]

IDLH Ca [75 ppm] See: 106898 **Conversion** 1 ppm = 3.78 mg/m^3

Physical Description
Colorless liquid with a slightly irritating, chloroform-like odor.

MW: 92.5	BP: 242°F	FRZ: -54°F	Sol: 7%
VP: 13 mmHg	IP: 10.60 eV		Sp.Gr: 1.18
Fl.P: 93°F	UEL: 21.0%	LEL: 3.8%	

Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.

Incompatibilities & Reactivities

Strong oxidizers, strong acids, certain salts, caustics, zinc, aluminum, water [Note: May polymerize in presence of strong acids and bases, particularly when hot.]

Measurement Method

Charcoal tube; CS_2; Gas chromatography/Flame ionization detection; IV [#1010] See: NMAM INDEX

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye Contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: N.R.
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin with deep pain; nausea, vomiting; abdominal pain; respiratory distress, cough; cyanosis; reproductive effects; [Potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, kidneys, liver, reproductive system

Cancer Site [in animals: nasal cancer]

See also: INTRODUCTION See ICSC CARD: 0043 See MEDICAL TESTS: 0093

Agency Response:

The Agency agrees with Shell's comment that epichlorohydrin is not a chlorinated aliphatic as defined by this rulemaking. The scope of this rulemaking was limited to organic compounds comprised solely of carbon, hydrogen and chlorine. The chemical structure of epichlorohydrin contains an oxygen molecule, and therefore, is not a chlorinated aliphatic under this rulemaking.

13.15 Shell Comment:

5. WASTEWATER FROM THE INCINERATION OF CHLORINATED ALIPHATIC WASTE IS NOT COVERED BY THE PROPOSED LISTING

Although Shell believes that wastewater from incineration of chlorinated aliphatics is not covered by the proposed F173 listing we are providing the following comments on that stream and streams from other non-chlorinated aliphatics production units for the record. It is Shell's understanding that if a chlorinated aliphatic process was not part of the study the wastewater from that process would not be part of the proposed listing.

The EPA has specified that the proposed listing only includes waste generated from the "production" of chlorinated aliphatics. Shell understands this definition to exclude the incidental generation of chlorinated aliphatics from sources that are not intentionally producing a chlorinated aliphatics product. The proposed definition would clearly exclude the wastewater from an incinerator that had chlorinated aliphatics in its feed.

"K173 Wastewaters from the ***production of chlorinated aliphatic hydrocarbons,*** *except for wastewaters generated from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. This listing includes wastewaters from the production of chlorinated aliphatic hydrocarbons that have carbon chain lengths ranging from one to, and including five, with varying amounts and positions of chlorine substitution."* [64 FR 46480, 8/25/99: emphasis added]

Agency Response:

The Agency notes that in the final rule EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. However, EPA disagrees with the commenter that the scope of the proposed K173 chlorinated aliphatic wastewater did not include ancillary processes. In Section 3.1.1.2 of the Listing Background Document prepared for the proposed rule (July 30, 1999) EPA specifically described EDC/VCM wastewater as including two types of wastewaters: process wastewater, and wastewater generated from various ancillary processes, such as "scrubber waters generated during startup/shutdown operations, drainage wastewaters generated from equipment washdown, and rainwater in the process areas." Again, EPA reiterates that in the final rule EPA is not listing chlorinated aliphatic wastewaters as hazardous waste. EPA agrees with the commenter that there may be situations where incidental production of a chlorinated aliphatic chemical, for example as the result of an undesirable side reaction at a facility producing non-chlorinated aliphatic chemical products, could be viewed as outside the scope of this rulemaking. EPA describes such a situation in Section 5 of the Listing Background Document prepared for the final rule. However, this determination would likely be situation specific.

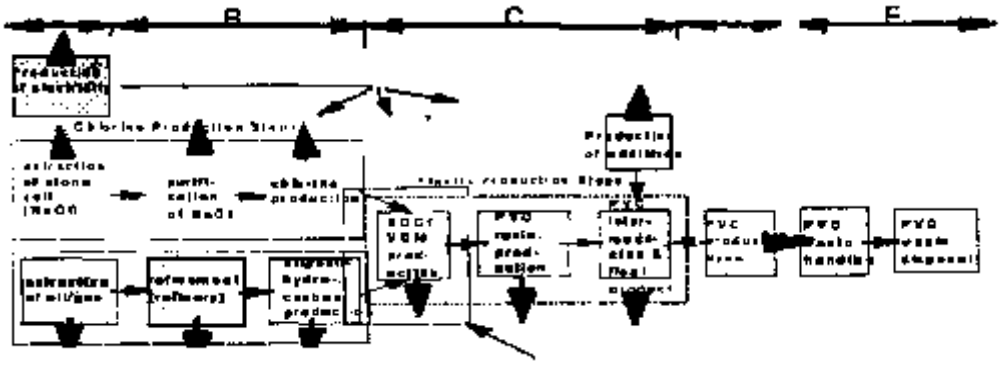
13.16 Shell Comment:

Economic Background Document Clarification

Further clarification of what is meant by the "production of chlorinated aliphatic hydrocarbons" is set out in The Economic Background Document in Exhibit 13 and 14 on page 35.

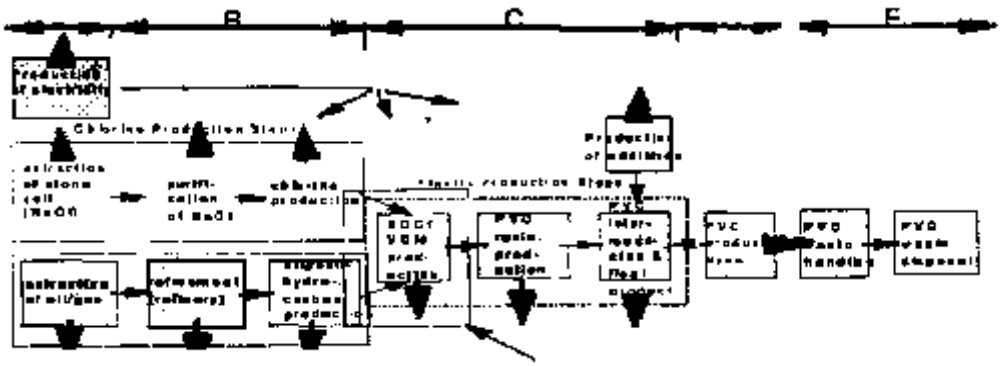
As shown in Exhibit 13 the plastic "process" from which the "listing proposal" waste is generated is the process where chlorine is added to the aliphatic hydrocarbon - the EDC/VCM production unit. Waste from the other plastic production units which include the PVC resin production unit and the PVC intermediates and final production unit are not included in the proposed listing.

EXHIBIT 13
Industrial Ecology Life Cycle Depiction of CAHC-Based Plastics Manufacturing



As shown in Exhibit 14 the solvent "process" from which the "listing proposal" waste is generated is also the process where chlorine is added to the aliphatic hydrocarbon - the apply-named Chlorination of hydrocarbons production unit. Waste from the other solvent production units which include the solvent recycling units are not included in the proposed listing.

EXHIBIT 14
Industrial Ecology Life Cycle Depiction of CAHC Solvent Manufacturing



Agency Response:

This comment about the scope of the listing (*i.e.* the listing is focused or targeted at the "chlorinated aliphatics manufacturing industry"), is a correct interpretation of the two process-flow exhibits provided (which correspond to the two major economic use categories for this class of chemicals). However, other types of industrial processes and operations not depicted in these two process-flow exhibits may be impacted by the listing; for example, the commercial waste management industry is impacted by the listing, but not shown within these two "industrial ecology" perspectives. USEPA-OSW's intention in providing these exhibits was not to depict all potentially affected economic sectors, but to provide the public with an overview of the interconnected economic sectors both "upstream" and "downstream" to the chlorinated aliphatics manufacturing sector.

13.17 Shell Comment:

Risk Assessment Background Document Clarification

The Risk Assessment document (p. 2-2) clarified that the K173 listing was limited to chlorinated aliphatics wastewaters from the production of one or more of the following chlorinated aliphatics chemicals:

• EDC/VCM via the balanced process

• Chlorinated methanes: methyl chloride (chloromethane, CH3 Cl), methylene chloride (dichloromethane, CH2 Cl2), chloroform (trichloromethane, CHCl3), and carbon tetrachloride (tetrachloromethane, CCl4).

- Chloroprene
- Allyl chloride
- Vinylidene chloride
- Hexachlorocyclopentadiene
- Trichloroethylene

- Tetrachloroethylene
- Carbon tetrachloride
- 1,1,1 -Trichloroethane
- Methallyl chloride.

Listing Determination Background Document Clarification

The Listing Determination document indicated (p. 24) that wastewater from the following processes are the only ones covered by the listing.

- Vinyl Chloride Monomer from Acetylene
- Chlorinated methanes
- Chloroprene and chlorobutadiene
- Methyl chloroform (1,1,1-trichloroethane)
- Vinylidene chloride monomer (VDCM) or 1,1-Dichloroethylene
- Trichloroethylene
- Hexachlorocyclopentadiene
- Methallyl chloride [(sp.?) is this Methyl chloride?]
- Perchloroethylene/Trichloroethylene/Carbon tetrachloride (and Tetrachloroethylene?)

Not included in the list but included in the text was wastewater from the EDC/VCM process.

Several manufacturing processes that do not generate wastewater were also identified. It is unclear if a (new) manufacturing process that produced one of these materials also produces a wastewater - whether the wastewater would be K173 or not. Since it would not have been part of the study we assume the wastewater would not be listed.

- 1,1,2-Trichloroethane (Vinyl Trichloride)
- Ethyl Chloride
- trans-1,2-dichloroethene
- 1,1-dichloroethane
- 1,1,2,2-Tetrachloroethane
- Pentachloroethane
- beta-Trichloroethane

Agency Response:

The commenter has pointed out a small discrepancy between the Risk Background Document and the Listing Background Document regarding the description of the scope of the proposed listing for chlorinated aliphatic wastewaters. EPA notes that at proposal both documents presented the same list of chemicals, with the following exception. One chemical (allyl chloride) should have appeared on *both* lists instead of just

on the list on page 2-2 of the Risk Document. The commenter also appears to ask whether EPA intended to refer to *methyl* chloride instead of *methallyl* chloride, the latter of which appears on both lists; EPA would like to clarify that it did intend to include methallyl chloride (3-chloro-2-methyl propene) as is indicated on both lists. Also, the commenter appears to ask whether EPA intended to include tetrachloroethylene; EPA notes that both lists include perchloroethylene, which is the same as tetrachloroethylene. Finally, the list of chemicals describing the scope of chlorinated aliphatic wastewaters in Section 3.1 of the Listing Background Document refers to VCM-A wastewaters, which of course were assessed as a separate waste group, and should not have appeared on this list.

Finally, the commenter refers to seven other chlorinated aliphatics chemicals that EPA presented in Section 3.1.6 of the Listing Background Document as coming from manufacturing processes that did not generate any wastewaters. The commenter asked that were a "new" manufacturing process for any of these chemicals to begin that *did* generate wastewaters, would these wastewaters meet the proposed K173 listing. The commenter's question is really how the chlorinated aliphatic listing would be implemented (or how would the listing description be interpreted) under a hypothetical situation. Because EPA is *not* listing chlorinated aliphatic wastewaters as hazardous waste, this question is moot. The Agency's listing determination for chlorinated aliphatic wastewaters is based upon the chlorinated aliphatic manufacturing facilities and processes that EPA identified through its information collection activities, described in the rulemaking record, and that actually generate process wastewater.

13.18 Shell Comment:

6. THE RISK ASSESSMENT DOES NOT JUSTIFY THE PROPOSED REQUIREMENT TO COVER NON-AGGRESSIVE BIOLOGICAL TREATMENT TANKS

The EPA used an aggressive biological treatment tank in Chemdat8 to estimate the risk level to a potential receptor. The decision to list K173 and the requirement to cover a biological treatment tank (if the influent contained more than 1 ng/L of dioxin) was based on the releases estimated from this type of tank as indicated in the following Federal Register excerpts.

We also centered our analysis on an evaluation of chlorinated aliphatic wastewaters not currently defined as hazardous waste, and that are managed in ***aerated, uncovered biological treatment tanks.*** *While not every facility currently uses biological treatment, this was the predominant practice observed during facility site visits and indicated in the RCRA Section 3007 survey.* ***The risk analysis assumed that biological treatment occurs in aerated, uncovered tanks,*** *because these conditions are typical for biological treatment in tanks and were confirmed to be occurring at some chlorinated aliphatic facilities treating non-hazardous, dedicated chlorinated aliphatic*

wastewaters. ***Also, because aeration increases air emissions, this scenario is expected to result in the highest risk estimates (compared with non-aerated and/or covered tanks****).* (p. *46501, emphasis added)*

Based on an analysis of the risks associated with current management practices, EPA is proposing to list wastewaters from the production of chlorinated aliphatic hydrocarbons as hazardous waste (EPA Hazardous Waste Number K173.) EPA's proposal to list this waste is consistent with the guidance the Agency has used for determining that a waste is hazardous (see 59 FR 66077), i.e., the risks associated with ***management of wastewaters in aerated biological treatment tanks due to vapor emissions*** *of dioxins are above the 1E-5 listing benchmark (p. 46501,* emphasis added)

Shell does not believe that it is appropriate to extend the proposed requirement to cover an aggressive biological treatment tank to non-aggressive biological treatment tanks without modeling the potential releases from these other types of tanks. The potential emissions from a wastewater tank with non-aerated or mixed conditions is (as EPA indicates) less than from the active aeration of an aggressive biological treatment tank and not likely to exceed EPA's significant risk threshold of $1x10^{-5}$.

Agency Response:

As discussed above, 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 decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units. 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.

13.19 Shell Comment:

CHEMDAT8 Overestimates Emissions of Dioxin

Dioxin emissions are overestimated in aerated (and non-aerated) systems because CHEMDAT8 ignores sorption onto solids.

The EPA's assumption that a wastewater stream would contain 1 ng/L of truly soluble dioxin when solids are present is much too conservative. Our calculations based on Log Kow of 6.3 for dioxins would suggest that any stream with 1 ng/L soluble dioxins entering an aggressive biotreater unit with 2 g/L MLSS

would find all the dioxin associated with the solids. Further, other studies show that no dioxins are found in treated effluents at the pg/L level. Since effluent and basin concentrations would be the same in a biotreater, the emissions should be modeled on pg/L levels. The use of a more appropriate reactor aqueous phase dioxin concentration of pg/L would have a corresponding decrease in estimated emissions by at least the same three orders of magnitude.

Note: EPA did not model emissions from a non-aerated tank and emissions from such tanks would be significantly less than aerated condition. Even non-aerated tanks would have some solids, so the same sorption impact on emissions (reduced) would be in effect.

For additional information please see our discussion under Section 2: "Dioxins Available For Air Release From Aggressive Biological Treatment Unit Are Overestimated."

Agency Response:

The Agency's response to this comment is provided in Section **4.5** of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

13.20 Shell Comment:

7. **EPA DID NOT BALANCE THE POTENTIAL RISK TO AN INDIVIDUAL WITH THE MORE PROBABLE POPULATION RISK**

The proposal to list the K173 supposedly rests primarily upon EPA's assessment of the potential hazards or "risks" posed to human health by the environmental transport of toxic constituents from aggressive biological treatment units to points of human exposure. The principal constituent of concern is a dioxin (2,3,7,8-TCDD).

Individual Risk

In order to demonstrate this risk, EPA performed a risk assessments to project "high-end individual risk," i.e., the chance that a theoretical individual exposed to pollution from a waste under assumed, worst-case conditions will become ill (e.g., develop cancer). With various mathematical models EPA estimated a high-end individual lifetime risk of 2 x 10-5 (i.e., two potential cancer cases per 100,000 persons exposed). Most of this risk is due to ingestion of beef and dairy products. [p. 5-11 Risk Assessment]

Population Risk

After this very conservative individual risk assessment EPA failed to adequately factor in "population risk." If the Agency had taken into account the number of persons (if any) that in reality are expected to be exposed to the pollution, we believe they would not have proposed listing K173.

For K173 wastewater, EPA's indicted that "the population risks resulting from management of chlorinated aliphatics wastewaters in tanks and EDC/VCM sludges in on-site land treatment units and landfills is **not significant**." [p. 5-28 Risk Assessment] "Results of the population risk analysis indicate that **0.0002 excess cancer cases would be expected annually in a population of 1,411 individuals ingesting beef produced from cattle raised within 2 km of the land treatment unit over a 40-year operational period for the land treatment unit."** [p. 5-30 Risk Assessment]

EPA Argument (Justification)

The justification EPA uses for listing K173 which presents this low level of population risk is that "population risk" is not identified explicitly in the RCRA statute or the hazardous waste listing regulations at 40 CFR 261.11 as one of the factors that EPA must consider in making listing decisions. EPA further justifies their position by stating that it "does not believe it is appropriate to allow contamination from waste management activities to cause substantial risk to nearby residents simply because there are few individual in the immediate vicinity of the waste management units." The Agency indicates that they believe that the criteria in 40 CFR 261.11, which mandate that wastes are to be listed if they are "capable of posing a substantial present or potential hazard," is met if any number of people may be affected. Finally they point to their own Guidance for Risk characterization (U.S. EPA 1995) which states that when small populations are exposed, population risk estimates may be very small, however, "in such situations, individual risk estimates **will usually be** a more meaningful parameter for decision-makers." Consequently, EPA indicates that their decision to list these wastes is based primarily on the concern over risks to those individuals who may be "significantly" (2x10-5) exposed, even if there are relatively few such individuals." [p. 5-30 Risk Assessment]

Counter Arguments

While reducing any amount of risk is laudable, in the real world of limited resources it is important that we apply those resources to situations that truly pose a "substantial present or potential hazard to human health or the environment." In this listing proposal we do not believe that the EPA has met the "substantial" test (not withstanding their arguments presented above) and do not believe that K173 should be listed.

We base our opinion in part of several court decisions which evaluate EPA desecration in determining what is substantial. In one case, the Court has emphasized that the term "substantial" is critical and does not afford EPA unlimited discretion. Dithiocarbamate Task Force v. EPA ("DTF"), 98 F.3d 1394, 1400 (D.C. Cir. 1996) ("Again, one should bear in mind that the ultimate question under § 261.11 (a)(3) … is whether the waste poses a 'substantial' hazard").

The term "substantial … hazard" must be given its ordinary meaning, absent relevant evidence of legislative or regulatory intent to the contrary. See, e.g., Securities Industry Ass'n v. Board of Governors, 468 U.S. 137, 149 (1984). The ordinary meaning of the word "substantial" is: "not imaginary or illusory: REAL, TRUE" and "considerable in quantity: significantly large." Webster's Ninth New Collegiate Dictionary

1176 (1988). There is nothing to indicate that Congress or EPA intended the word "substantial" to have other than its ordinary meaning. Thus, to be listed as a hazardous waste, a waste must pose hazards that are "real," not merely theoretical, and those risks must be considerable in quantity or significantly large.

Contrary to this court opinion, the EPA proposes listing K173, even though the only theoretical hazards that EPA identified are, at worst, "not significant." We believe this decision is not justified based on the "substantial hazard" test.

Population Risk is Essential

EPA, as discussed above, based its listings on its projection of theoretical "high-end individual risk." Such projections of risk are meaningless without consideration of the number of persons likely to be exposed. Were it otherwise, EPA could find "substantial hazard" even if not one person were ever expected to be harmed. Thus, population risk is not merely a "factor" or an "alternative" to be considered in determining hazard to human health -- it is an essential variable in the calculus. It is the second part of a two-part process for assessing hazards.

Thus, the only theoretical hazards that EPA found were negligible, and certainly not considerable in quantity or significantly large. EPA may enjoy some measure of discretion to determine what is or is not "substantial hazard," but at some point risks are so low that they cannot be considered "substantial" within the ordinary meaning of the term, as understood by reasonable people.

Agency Response:

We note that in the final rule we are finalizing a decision not to list chlorinated aliphatic wastewaters as hazardous waste, as described in detail in the preamble to the final rule and associated background documents. The Agency's complete response to the commenter's concerns regarding population risk is provided in Section 7.4 of this Response to Comment document (response to comments from American Petroleum Institute CALP-00002).

13.21 Shell Comment:

8. THE COST OF AVOIDING ONE STATISTICAL (POTENTIAL) CANCER CASE EXCEEDS $15 BILLION DOLLARS

Shell believes that the RCRA goal of protecting human health and the environment from risks associated with hazardous waste is an extremely important goal, and one that is appropriately entrusted to the EPA for implementation. We understand that balancing this goal within the confines of fiscal responsibility consideration is not expressly required by the RCRA legislation. We however believe that Congress, the Administration and the American people expect the EPA to address these risks with appropriate priorities

that reduce the greatest risk. We also believe that it is EPA's responsibility to insure that the public is not done an injustice by programs that consume excessive amounts of limited monetary resources to protect against a non-substantial risk.

Based on the above criteria, Shell believes that the proposed listing of K173 incurs a disproportional cost for the potential reduced risk.

Agency Response:

In contrast to some other Federal agencies, and to some authorizing statutes for other USEPA programs (e.g. the economic achievability criterion for effluent guidelines of Section 301(b)(2)(A) of the 1977 Clean Water Act), Congress' 1976 RCRA hazardous waste authorizing statute (with 1984 amendments) does not direct the USEPA to apply economic analysis criteria, such as measures of cost-effectiveness, in either (a) promulgating RCRA Subtitle C hazardous waste regulations in general, or in (b) developing and promulgating criteria for identifying and listing hazardous wastes, in particular (see RCRA Subtitle C Sections 3001(a) & (b)(1)). For additional information about this specific aspect of RCRA, see USEPA's 1980 review of the legal history of RCRA (Federal Register, Vol.45, No.98, 19 May 1980, p.33089), which arrived at the following determination:

> "*Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most cost effective regulation among various alternatives... There is no explicit requirement in the Act directing EPA to consider costs in the development of its initial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from other major pollution control statutes... The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration... Congress was aware that the hazardous waste regulation would impose substantial costs on the regulated community. Despite this recognition, Congress deliberately rejected provisions that would require consideration of cost burden on industry or to moderate the Act's environmental objectives. For these reasons, the Agency concludes that the Act prohibits it from considering such costs in the development of Subtitle C regulations as a basis for lessening the standards it considers necessary to ensure protection of human health or the environment.*"

As of 1999, two other Congressional statutes direct Federal regulatory agencies to conduct benefit-cost analyses in special circumstances where (a) unfunded Federal

mandates may exceed $100 million in direct cost in any single year (1995 UMRA), or if (b) small entities are disproportionately affected (1980 RFA & 1996 SBREFA). Furthermore, the Executive Branch (Executive Order 12866 of 30 Sept 1993) only directs Federal regulatory agencies such as the USEPA to conduct benefit-cost analyses in cases of economically "significant" rulemakings, which are defined as having adverse effects greater than $100 million on the national economy. Based on USEPA's cost/impact estimates, both the proposed and final listing rules were not expected to exceed any one of these various benefit-cost analysis criteria. Consequently, the USEPA did not develop a cost-effectiveness measure for either the proposed or final listing rule.

13.22 Shell Comment:

De Minimis Population Risk

In the proposed rule EPA is using a de minimis cutoff for the theoretical farmer at a high-end individual lifetime risk of 2 x 10-5. There is however no de minimis level considered for population risk. Based on *"Cancer Risk Management-- A review of 132 Federal Regulatory Decisions", Curtis Travis, Edmund Crouch, et al, Environ. Sci. Technol. Vol. 21, No. 5, 1987,* it is suggested that it would be appropriate for EPA to stop seeking controls if the population burden is less than one cancer in 100 years. This or a similar cutoff such as the individual risk range of 10-4 to 10-6 that EPA uses would provide a tool to decide whether the population risks are in a "substantial risk" category.

The Travis study showed that 'for small-population effects, regulatory action was never taken for individual risk levels below 10-4' (one in 10,000). It cited 13 regulatory decisions where low population risk was cited as the reason not to regulate. For the small population in the study the individual risk level is 2 x 10-5 --- a risk level significantly lower than the level cited in the Travis study.

Note: The average de minimis potential cancer incidence any of those decisions was 1 in 2 years -- much higher than the 1 in 5000 years incidence rates for - the chlorinated aliphatics waste.

In the Final Rule on National Emission Standards for Hazardous Air Pollutants: Petroleum Refineries; 60 FR 43245, August 18, 1995, the EPA made a decision that the cancer benefits (reduction in potential cancer risk) associated with the proposed HAP reductions were low because baseline conditions for cancer incidents were less than one life per year.

"Using emissions data for equipment leaks and the Human Exposure Model (version 1), the annual cancer risk caused by HAP emissions from petroleum refineries was estimated. Generally, this benefit category is calculated as the difference in estimated annual cancer incidence before and after implementation of each regulatory alternative. Since the annual cancer incidence associated with baseline conditions was ***less than one life per year, the cancer benefits associated with HAP***

reductions for the petroleum refinery NESHAP were determined to be low*. Therefore, these quantified benefits are not part of the overall quantified benefits estimate for the analysis."*

EPA maintains in the Risk Assessment Document that there is a "substantial risk" to a small population and that justifies the proposed regulation. However the "substantial risk" discussed in the document equates to one potential cancer in 5000 years.

Results of the population risk analysis indicate that 0.0002 excess cancer cases would be expected annually in a population of 1,411 individuals ingesting beef produced from cattle raised within 2 km of the land treatment unit over a 40-year operational period for the land treatment unit*. Although the population risks attributable to the management of chlorinated aliphatics wastes are expected to be very small, "population risk" is not identified explicitly in the RCRA statute or the hazardous waste listing regulations at 40 CFR 261.11 as one of the factors that EPA must consider in making listing decisions. EPA does not believe it is appropriate to allow contamination from waste management activities to cause substantial risk to nearby residents simply because there are few individual in the immediate vicinity of the waste management units. 40 CFR 261.11 clearly states that wastes are to be listed if they are "capable of posing a substantial present or potential hazard," it does not imply that a large number of people must be affected. Moreover, EPA 's Guidance for Risk Characterization (US. EPA 1995) states that when small populations are exposed, population risk estimates may be very small, however, "in such situations, individual risk estimates will usually be a more meaningful parameter for decision-makers. "Consequently, EPA's decision to list wastes is based primarily on the concern over risks to those individuals who are significantly exposed, even if there are relatively few such individuals.*

EPA has in effect based its listing decisions on standardless discretion which leaves the potentially regulated community without an effective yardstick to measure appropriate concern or incredulity. EPA's justifications for ignoring the low population hazards seems to have no logical basis. On one hand EPA indicates it is concerned about even a relatively few "theoretical" individuals who are significantly exposed but on the other hand EPA never explains how so few potential exposures constitute "substantial" hazards justifying nationwide hazardous waste listings.

We are aware that in other similar situations the EPA has declined to list wastes or to do further assessments of wastes where volumes are small, generators are few, or risks are site-specific. See, e.g., 63 FR 42,133 (declining to model waste management practices that "involved small volumes or very few generators, and are not expected to present significant risk"). This is a logical approach to determining the need for regulation that is based on the fact that there is a point where it is not reasonable to pay an unreasonable price to prevent a theoretical *de minimis* risk.

EPA further indicates that it must protect against "potential" risks as well as "present" risks. However, EPA must remember that in all cases of listing a waste the risk or hazard must be "substantial." We do not believe it is appropriate for the EPA to simply rely on "potential" risk which is paramount to an "accidents

will happen," approach for the listing of a hazardous waste. This position was also supported by a District Court which decided that such an analysis will not support a RCRA listing. (DTF, 98 F.3d at 1400-01.)

EPA also cites a "guidance document" on risk assessment for the proposition that where "population risk estimates [are] small … 'individual risk estimates will usually be a more meaningful parameter for decision-makers.'" Not only is that guidance not controlling, it begs the question of how a realistic population risk "near zero" can equate to "substantial hazard," especially when the hypothetical individual risk on which EPA relies is itself extremely small and dubious.

Agency Response:

The study cited by the commenter[1] 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 made regulatory decisions 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. EPA disagrees with the suggestion that the Agency base its listing decisions on total population risk or total number of cancer cases avoided for several reasons.

In the first place and as previously noted, EPA does not believe it ignores a finding of substantial risks to individuals, and therefore consign individuals to substantial risks, simply because few individuals actually will be potentially exposed. In addition, risk numbers 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 the waste as hazardous, based upon the consideration of all factors. Furthermore, EPA is not using standardless discretion to make its listing determinations. Plainly, EPA is not listing most of the wastes under consideration and the standard must exist somewhere. In fact, in finalizing today's listing determinations, the Agency is basing its decisions on the listing policy described in the proposed December, 1994 proposed listing determination for dyes and pigment industry wastes (59 *FR* 66072), which the comment does not challenge. 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, potentially unrelated, rulemakings. The Agency considers all the 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

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

background documents, in this case we think the individual risk estimates provide an adequate justification for listing both EDC/VCM and VCM-A wastewater treatment sludges as hazardous wastes.

13.23 Shell Comment:

Cost per Unit Harm

EPA estimates this rule will cost $3 million per year. EPA also estimates the population risk controlled by this rule will amount to 0.0002 potential cancers per year. Thus, the proposed rule will cost $15 billion per potential cancer prevented. We believe that this is an excessive amount exceeding any previous waste listing decision not currently in litigation.

Notes:
1. We understand that the cost of the recent refinery listings was $670 billion /cancer and is in litigation.

2. We believe the actual costs of this rule are at least 10 times higher and the potential cancer risk is at least 10 times smaller -- putting the real cost of this rule at $1.5 trillion per potential cancer case prevented. (See additional discussion in sections 1, 2 & 7 of Shell's comments.)

3. The Travis report indicates that most agencies implement controls up to $2 million/cancer.

4. EPA used a value of $4.8 million per life as the upper range estimates for its rule setting ambient air standards for ozone and particulate matter.

5. Other Agency values for a life-year have varied. FDA used a value of $8.2 million ($116,500 per life-year x 70) for its tobacco rule and $25.7 million ($368,000 per life-year x 70) in its mammography rule.

Agency Response:

See Responses to Comment in Section 13.21 and 13.22 above.

13.24 Shell Comment:

9. A NUMBER OF ANALYTICAL ISSUES SHOULD BE CLARIFIED

A number of analytical issues, related to dioxin, should be clarified. Because of the sensitivity of the dioxin analysis and the importance to the need to regulate and or take remedial action it is critical that the analytical methods not measure dioxins that are not available for release.

- Samples of wastewater should be centrifuged and the centrate analyzed. As an alternative the wastewater should be filtered and the filtrate without the filter analyzed.

- Because dioxins bound to particles in the water do not vaporize and are not available for transportation to a receptor, they should not be measured for trigger consideration (to cover or not cover an aggressive biological tank) or for future risk assessments.

- Testing/measurement to determine if wastewater is classified as K173 should be done on the wastewater discharge from the Aggressive Biological Treatment Unit. In this manner, interference caused by dioxins adsorbed into the biosolids will be avoided and only the dioxin available for release to the atmosphere from the water phase will be measured.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

13.25 Shell Comment:

10. THE LEACHATE FROM LANDFILLS RECEIVING NEWLY LISTED WASTE SHOULD BE CONSIDERED A NEW POINT OF GENERATION

Shell supports the EPA's proposal to temporarily defer the regulation of landfill leachate and gas condensate derived from the VCM–A wastes, with the same conditions as described in 40 CFR 261.4(b)(15) for petroleum wastes.

Shell does, however, have significant concerns if the proposal is ultimately promulgated. If this occurs, all leachate resulting from the disposal of more than one restricted hazardous waste could subject wastewater treatment impoundments to the Minimum Technology Requirements of RCRA.

Background

Due to the "derived-from rule," leachate from landfills or from land treatment units containing listed hazardous waste must be managed as listed hazardous wastes. However, these leachates differ dramatically in their physical and chemical makeup from the original listed hazardous wastes from which they are derived. For this reason, EPA has developed a separate listing code for multi-source leachate, F039. These "derived-from" leachates are normally subjected to costly and unnecessary incineration or other treatment at off-site facilities. In addition, the additional transportation and management from sending the wastes off-site may actually increase environmental risks and energy usage relative to the protective and cost-effective management in industrial wastewater systems, in which such leachates are clearly amenable to treatment.

Example

At one of Shell's plants we currently incinerate approximately 10,000 gallons of landfill leachate a week at a cost of $12,400. This amounts to a yearly cost of $645,000 -- not an insignificant amount. This is especially frustrating because:

- As generated from the on-site landfill the leachate meets our NPDES discharge limits for discharge but cannot be placed into the wastewater treatment system because the F039 listed waste would subject an in-line impoundment to MTRs.

- An alternate use of this leachate could be for coker quench waster. However, because of EPA policies the use of wastewater as a substitute for commercial chemical products (water from a PWS) is not allowed.

- The distance to directly pipe the water to the NPDES discharge point is prohibitive even with the current yearly cost for disposal.

- Delisting the leachate has proven to be a moving target, because of newly listed waste, and not feasible.

- If the leachate was placed in the WWTS it would be further treated prior to discharge in an aggressive biological treatment unit.

EPA's Position

EPA has maintained that management of listed leachate should not be a problem:

"... in many, indeed most circumstances, active management of leachate would be exempt from subtitle regulation because the usual pattern management is discharge either to POTWs via the

sewer system, where leachate mixes with domestic sewage and is excluded from RCRA jurisdiction (see RCRA Section 1004(27) and 40 CFR 261.4 (a)(1)), or to navigable waters, also excluded from RCRA jurisdiction (see RCRA Section 1004(27) and 40 CFR 261.4(a)(2)).” (p. 46515)

Based on our example and discussions with others in the petroleum and petrochemical industry, we do not believe that the above EPA assumption is true. We agree with EPA that the issue of whether disruptions can be minimized through integration of CWA and RCRA rules will be more amenable to resolution once the CWA rulemaking is completed. In lieu of that rulemaking, we offer the following alternate solution.

Alternate Solution 1: New Point of Generation

EPA could amend 40 CFR 261.3(c)(2)(ii) to establish a new point of “generation” for leachates derived from landfills or land treatment units managing listed hazardous waste, so long as the leachates are managed in a wastewater treatment system and would be permitted under an NPDES discharge permit. This new-point-of-generation approach has been part of the Land Disposal Restriction program for characteristic wastes for many years. See, e.g., 55 Fed. Reg. at 22,661-62 (June 1, 1990). In the LDR program, EPA recognized that various treatment residuals differ from the wastes from which they are derived and thus should not continue to be regulated as the same wastes.

Suggested regulatory language is provided below. Changes to existing language are indicated in italics:

261.3(c)(2)(ii). The following solid wastes are not hazardous even though they are generated from the treatment, storage, or disposal of a hazardous waste, unless they exhibit one or more of the characteristics of hazardous waste: …

(_) leachate derived from landfills or land treatment units containing listed hazardous waste, which is managed in a wastewater treatment system the discharge of which is subject to regulation under either section 402 or section 307(b) of the Clean Water Act (including wastewater at facilities which have eliminated the discharge of wastewater)

Justification

- Leachate from landfills or land treatment units containing listed waste is not the waste that EPA originally listed. Leachate bears neither physical nor chemical similarities to the original listed waste, and does not pose the hazards that caused EPA to list the waste in the first instance. EPA thus should not continue to regulate such leachate as hazardous waste under the “derived-from rule,” as if leachate were the listed waste itself.

- Any such leachate that exhibits a characteristic of hazard would remain subject to RCRA hazardous waste requirements. Federal and state hazardous waste characteristics thus assure that hazardous leaches will be subjected to protective management under RCRA or state law.

- Industrial wastewater treatment systems regulated under the National Pollution Discharge Elimination System are very effective and efficient in treating constituents of concern. There is no need to subject leachates derived from hazardous waste landfills and land treatment units to additional and unnecessary Subtitle C regulation, when they can be safely and efficiently managed in wastewater treatment systems. Leachates, which are dilute wastewaters, are clearly amenable to treatment in such systems.

- Substantial civil and criminal penalties assure that permitted wastewater treatment systems are properly operated and that the wastewaters they manage are properly treated. The treated wastewaters would be discharged under the terms of the facility's applicable permit, and the treatment sludges would be managed as a non-hazardous waste in compliance with the state's industrial waste management requirements.

- By allowing treatment of such leachate in industrial non-hazardous wastewater treatment systems and avoiding off-site incineration or other costly treatment, facilities would conserve their financial resources, reduce their energy usage, and reduce environmental risks relative to transpiration to and management in incinerators.

Alternate Solution 2: Headworks Exemption

EPA could amend 40 CFR 261.3(a)(2)(iv)(A) and (B) to create another headworks exemption for leachate from an on-site landfill to an on-site WWTS. This exemption should allow the F039 multi-source leachate to be managed as non-hazardous waste provided that compliance with certain provisions can be demonstrated.

Suggested regulatory language is provided below. Changes to existing language are indicated in italics:

40 CFR 261.3(a)(2)(iv)(C) One of the following wastes listed in § 261.32, provided that the wastes are discharged to the refinery oil recovery sewer before primary oil/water/solids separation -- heat exchanger bundle cleaning sludge from the petroleum refining industry (EPA Hazardous Waste No. K050), crude oil storage tank sediment from petroleum refining operations (EPA Hazardous Waste No. K169), clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations (EPA Hazardous Waste No. K170), spent hydrotreating catalyst (EPA Hazardous Waste No. K171), spent hydrorefining catalyst (EPA Hazardous Waste No. K172), and *on-site landfill or landfarm leachate (EPA Hazardous waste No. F039);* or

Other possible revisions include the following - less simple and desirable - changes.

40 CFR 261.3(a)(2)(iv)(H). *F039 from an on-site landfill or landfarm - Provided, that the 40 CFR 261 Appendix VII constituents for any listed hazardous waste in the landfill does not exceed the*

LDR levels established for the constituents in the discharge from the permitted NPDES discharge point.

Or...

40 CFR 261.3(a)(2)(iv)(H). *F039 from an on-site landfill or landfarm - Provided that the landfill does not accept off-site waste (unless the off-site waste is essentially identical to the waste generated and disposed of in the on-site landfill by the owner/operator of the landfill).*

Or...

40 CFR 261.3(a)(2)(iv)(H). *F039 resulting from an on-site landfill or landfarm - Provided, That the* ***annualize****d average flow of F039 leachate does not exceed one percent of total wastewater flow into the headworks of the facility's wastewater treatment or pre-treatment system or provided the wastes, combined* ***annualize****d average concentration of any 261.3 Appendix VII constituents (of the listed waste in the landfill) does not exceed one part per million in the headworks of the facility's wastewater treatment or pre- treatment facility.*

Justification (in addition to those provided for Alternate Solution 1)

- Actual monitoring provides flexibility and yields reliable, statistically defensible data.

- Stringent civil and criminal penalties attach to non-compliance with RCRA management standards for hazardous wastes. The potential for regulatory enforcement assures that the exemption for the wastewaters will not be used as a means of unregulated disposal of F039 listed leachate into wastewater treatment systems, or of unregulated volatilization in such systems. In recent rules, such as the HON, Subpart YYY and Subpart CC, the Agency has determined that incidental losses which might occur from managing these types of wastes do not pose any significant emission risk. Further, the wastewaters are managed in treatment systems that are subject to regulatory controls under the CWA. Stringent civil and criminal penalties also attach to non-compliance with the operating conditions specified by CWA regulations or in permits.

- Including multi-source leachate derived from the disposal of identified and on-site listed hazardous waste is a logical extension of the Agency's intent not to subject to full Subtitle C requirements dilute mixtures and de minimis concentrations of Appendix VII constituents themselves.

Agency Response:

See EPA's response to comment in Section 3.33 of this Response to Comment Document (comments from Dow Chemical).

The other issues and options raised by the commenter regarding a new point of generation for leachate, or the modification of the headworks exemption, are well beyond the scope of this rulemaking, but EPA thanks the commenter for their input on this matter. The Agency notes that EPA received comments from CMA (now the American Chemistry Council) of a similar nature in response to a recent Hazardous Waste Identification Rule (HWIR) proposed rulemaking.

SECTION 14
Occidental Chemical Corporation
CALP-00013

Introduction:

Date: November 22, 1999

Occidental Chemical Corporation (OxyChem) and Oxy Vinyls, LP (OxyVinyls is a joint venture between Occidental Chemical Corporation and The Geon Company) appreciate the opportunity to provide comment on the Environmental Protection Agency's (EPA's) "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; Proposed Rule", Docket Number – F-1999-CALP-FFFFF, 64 Fed Reg 46,475 (August 25, 1999)

OxyChem and OxyVinyls are among the world's largest producers of chemicals, with annual sales of more than 4.3 billion dollars. OxyChem and OxyVinyls have interests in basic chemicals, petrochemicals, polymers and plastics and specialty products. These chemicals are used in manufacturing such important products as pharmaceuticals, auto parts, audio CDs, solvents, appliances, pesticides, water treatment chemicals, coatings, vinyl siding, medical supplies, detergents, and aircraft parts. In addition, OxyChem and OxyVinyls actively participate in several trade associations such as the Chemical Manufacturers Association (CMA), Vinyl Institute (VI), and the Chlorine Chemical Council (CCC). OxyChem and OxyVinyls are fully supportive of the comments submitted by these organizations as part of this docket.

GENERAL ISSUES

OxyChem and OxyVinyls support several of the innovative options in this proposed rulemaking, such as conditional listing and concentration-based requirements. However, we do not believe the Agency's risk assessment supports the proposed requirements to retrofit wastewater treatment tanks with air emission controls.

14.1 Occidental Comment:

EPA's Has Underestimated the Cost of Compliance

OxyChem and OxyVinyls believe the Agency has severely underestimated the cost of compliance with this proposal, and urge the Agency to withdraw the proposal pending a more complete and accurate cost evaluation, as required by current Executive Order 12866. By conservative estimate, we could be

expected to spend in excess of $24 million achieving compliance with the requirements of this proposal at four facilities for an average of $6 million per facility. Using the EPA's own estimate that 23 facilities will be impacted by this proposal, this gives a total cost of compliance as a minimum of $138 million, well in excess of the Executive Order's $100 million review requirement.

Agency Response:

The assumption that the average lump-sum compliance cost of $6 million for four Occidental facilities (totaling $24 million in initial cost) is representative of the other 17 facilities owned by other companies in this industrial sector, may not be accurate. For example, as evidenced by certain statements contained in the 20 sets of public comments received in response to the 25 Aug 1999 proposed listing , there are a variety of unique facility-specific situations and conditions (*e.g.,* facility size and layout, types and layout of industrial processes, plant equipment configurations, waste management practices) across this industrial sector. However, because EPA is not finalizing the listing for chlorinated aliphatics wastewaters for reasons described in the preamble to the proposed rule, and in the relevant background documents, the total cost of the final rule is considerably less than it otherwise might be with the K173 listing retained.

In EPA's estimate, both the 1999 proposed listing and the final listing are significantly less than both: (a) $100 million mandated "direct cost," private sector "expenditures" in any one year (which is the 1995 Unfunded Mandates Reform Act economic review trigger), and (b) $100 million in "annual effect" on the national economy (which is the 1993 Executive Order 12866 economic review trigger). It is important to note that in general, before comparing regulatory compliance costs with either of these two $100 million regulatory review triggers – which appear identical but are actually defined in different nuanced ways – that lump-sum "costs" must be transformed into multi-year financial direct cost expenditure streams (for comparison with UMRA's $100 million trigger), and into discounted annualized economic (societal) cost streams (for comparison with EO-12866's $100 million trigger). In some cases, the resultant annual cost stream may be identical when private costs are equal to social costs, but in other cases, the resultant streams may be significantly different when private and social costs are not equal. The differences in the resultant magnitude of annual cost outcomes largely reflect the differences inherent in the financial accounting approach, compared to the engineering economics "equivalent uniform annual cost method", respectively.

14.2 Occidental Comment:

We also believe that the RCRA goal of protecting human health and the environment from risks associated with hazardous waste is an important goal. While we understand that balancing this goal within the confines of monetary considerations is not required by RCRA, we do, however, believe Congress, the Administration and the American people expect EPA to insure that the public is not done an injustice by programs that consume excessive amounts of money to protect against non-substantial risk. OxyChem and OxyVinyls believe the proposed listing of K173 falls outside any reasonable return on risk reduced compared to cost expended. EPA estimates this rule will cost $3 million per year. EPA also estimates the population risk controlled by this rule will result in 0.0002 cancers per year. Using EPA's own figures, this rule will cost $15 billion per cancer prevented. OxyChem and OxyVinyls believe this is an amount that simply cannot be justified and urge the Agency to withdraw the proposed rule and not list as hazardous any of the wastes.

Agency Response:

In contrast to some other Federal agencies, and to some authorizing statutes for other USEPA programs (*e.g.,* the economic achievability criterion for effluent guidelines of Section 301(b)(2)(A) of the 1977 Clean Water Act), Congress' 1976 RCRA hazardous waste authorizing statute (with 1984 amendments) does not direct the EPA to apply economic analysis criteria, such as measures of cost-effectiveness, in either (a) promulgating RCRA Subtitle C hazardous waste regulations in general, or in (b) developing and promulgating criteria for identifying and listing hazardous wastes, in particular (see RCRA Subtitle C Sections 3001(a) & (b)(1)). For additional information about this specific aspect of RCRA, see USEPA's 1980 review of the legal history of RCRA (Federal Register, Vol.45, No.98, 19 May 1980, p.33089), which arrived at the following determination:

> "*Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most cost effective regulation among various alternatives... There is no explicit requirement in the Act directing EPA to consider costs in the development of its initial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from other major pollution control statutes... The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration... Congress was aware that the hazardous waste*

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

As of 1999, two other Congressional statutes direct Federal regulatory agencies to conduct benefit-cost analyses in special circumstances where (a) unfunded Federal mandates may exceed $100 million in direct cost in any single year (1995 UMRA), or if (b) small entities are disproportionately affected (1980 RFA & 1996 SBREFA). Furthermore, the Executive Branch (Executive Order 12866 of 30 Sept 1993) only directs Federal regulatory agencies such as the USEPA to conduct benefit-cost analyses in cases of economically "significant" rulemakings, which are defined as having adverse effects greater than $100 million on the national economy. Based on USEPA's cost/impact estimates, both the proposed and final listing rules were not expected to exceed any one of these various benefit-cost analysis criteria. Consequently, the USEPA did not develop a cost-effectiveness measure for either the proposed or final listing rule.

14.3 Occidental Comment:

K173 ISSUES

EPA Has Failed to Consider That Most Dioxins in Wastewater are Associated With the Contained Solids and Are Not Available for Air Entrainment

OxyChem and OxyVinyls believe the Agency has incorrectly assumed the fraction of polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDD/Fs) which could volatilize from wastewaters in its consideration of listing wastewaters from the production of chlorinated aliphatic hydrocarbons (proposed K173). We base this belief on the following:

It is well known and accepted that polychlorinated dibenzodioxins and polychlorinated dibenzofurans (PCDD/Fs) have an affinity towards solids in process waters. In EDC/VCM production facilities that utilize fluidized bed oxychlorination processes, the attrited catalyst fines exit the process via the waste water treatment system. These small particles (1 to 20 micrometers) have very high surface area (around >50 m2/g), and thus strongly adsorb PCDD/F's that are present in the waste water system.

Therefore, the PCDD/F's are not dissolved in the water phase and thus do not possess any volatility character whatsoever. In waste water treatment units within EDC/VCM production facilities, the solids containing PCDD/F's have higher density than water and are therefore found below a layer of (PCDD/F free) water. The PCDD/F's are thus not in contact with the environment, even in open top tanks or vessels.

The data presented below clearly illustrates this phenomenon.

1. Data collected by the Vinyl Institute (VI), The European Council of Vinyl Manufactures (ECVM), US EPA and others consistently show octachlorodibenzofuran (OCDF) to be the most abundant congener of PCDD/F found in EDC/VCM processes. The ratio of Total PCDD/F to OCDF is around 1.1 on a mass basis. For example, in the samples collected at the OxyVinyls VCM plant in La Porte, TX in July 1997 for the US EPA, the ratio of Total PCDD/F to OCDF were found to be 1.043 for the water after stripping and 1.078 for the final waste water sludges. When the individual components are scaled by the appropriate WHO-TEF factors, the ratio of Total PCDD/F to OCDF is 6.77 for the water after stripping and 11.275 for the final sludge. The differences between the results for the water after stripping and final sludge samples are most likely the result of analytical uncertainty.

Based on this finding, if the TEQ for the OCDF in a sample is known, maximum values for the total TEQ for all PCDD/F's in the sample can be estimated by multiplying the result by 11.275:

Total WHO-TEQ ? 11.275 x concentration of OCDF x WHO-TEF for OCDF

2. OxyVinyls scientists, together with scientists working for The GEON Company have developed a screening test to quantify the concentration of OCDF in process and waste water samples. This method has been found to give excellent agreement with the accepted methods (US EPA Method 1613) utilized by expert laboratories. Ten samples of process waste water (before stripping) collected over a two year period have been analyzed by this procedure. The waste water samples were filtered to separate the solids from the aqueous phase. In some cases the filtration was performed immediately on the hot (50 to 90 degree C) sample. All samples show unequivocally the OCDF (and by inference the other PCDD/F's) are strongly associated with the solids present in the samples. No OCDF was detected in the aqueous phase (the lower detection limit was 0.002 ng/L WHO-TEQ for OCDF).

A summary of these results is provided in the Table below.

PCDD's and PCDF's Remain with the Solids

Sample WHO-TEF Solids, dry basis Filtrate, ng/L TEQ Estimated Total PCDD/F in
Ng/kg TEQ (ND = DL/2)* Filtrate, ng/L TEQ (ND=DL/2)**

1.	0.0001	13,444	0.001	0.0113
2.	0.0001	5,838	0.001	0.0113
3.	0.0001	5,300	0.001	0.0113
4.	0.0001	11,682	0.001	0.0113
5.	0.0001	6,082	0.001	0.0113
6.	0.0001	23,470	0.001	0.0113
7.	0.0001	823	0.001	0.0113
8.	0.0001	1,202	0.001	0.0113
9.	0.0001	3,867	0.001	0.0113
10.	0.0001	3,773	0.001	0.0113

3. The data in the Table for OCDF in the solids and aqueous phases of process wastewater (before stripping) clearly indicate the PCDD/F's are strongly associated with the solids. The OCDF concentration in the aqueous phase was below the detection limit. If one assumes the aqueous phase contains PCDD/F's at levels equal to ½ the lower detection limit, the total WHO-TEQ of the PCDD/F's in this phase is estimated to be 0.0113 ng/L. This level is two orders of magnitude below the action level proposed by the US EPA (1 ng/L TEQ).

4. The solid particles have higher density than the aqueous phase and settle out in the clarification units in the waste water treatment process. The PCDD/F's contained in the solids are thus insulated from the atmosphere by the aqueous layer. Since the aqueous layer is essentially free from PCDD/F's, there is no direct contact between the PCDD/F's and the environment (even in vessels that are open to the atmosphere).

5. The US EPA is not concerned with air emissions from PCDD/F's in the solids so long as the eventual disposal site for the solids is a Subtitle C or Subtitle D landfill. Since essentially all of the PCDD/F's in the process waste water are contained in the solids, there is no rational basis to seek controls on air emissions in the waste stream prior to removal of the solids. Indeed, prior to removal of the solids from the water the solids are isolated from the environment by a layer of PCDD/F free water. It follows that if there is no reason for air emission controls on the final waste water sludge, then there is even less reason for air emission controls on the waste water.

Agency Response:

The Agency's response to this comment is provided in Section 4.5 of this Response to Comment document (response to Vinyl Institute, CALP-0004).

14.4 Occidental Comment:

EPA's Risk Assessment Should Have Been Conducted on a Site-Specific Basis

In a recent final National Emission Standard for Hazardous Air Pollutants (NESHAP) rulemaking under the Clean Air Act, EPA used facility-specific data in determining actual risks. This NESHAP regulates, among other things, emissions of dioxins and furans from hazardous waste incinerators, hazardous waste burning cement kilns, and hazardous waste burning lightweight aggregate kilns. As a result of the public and peer review comments received on the risk assessment in the proposed NESHAP, EPA modified its risk analysis to focus on the entire population of persons that may be exposed to facility emissions rather than persons living on a few individual farms and residences.

OxyChem and OxyVinyls recommend EPA use the same approach for chlorinated aliphatic production wastes. For example, it is our understanding that EPA's human risk analyses are based on dioxin emissions from K173 wastewater treatment systems affecting farmers and farmers children living within 300 meters (0.18 miles) of a EDC/VCM plant that live in the same location for 48.3 years or more. EPA assumed that the farmer raises fruits, exposed vegetables, root vegetables, beef cattle, and daily cattle within this 0.18 mile range and that the farmer consumes approximately 42 percent of the exposed vegetables, 17 percent of the root vegetables, 33 percent of the fruits, 49 percent of the beef, and 25 percent of the dairy products. EPA explains that the farmer meeting this criteria is a human at a health risk for an excess lifetime cancer risk due to exposure to a cancer causing contaminant, namely dioxin (i.e., "affected receptor").

Because we are not aware of any farmers living within 0.18 miles of our facilities that meet all the criteria detailed above, we are unclear as to why our operations would be regulated under this proposal. It makes no sense to regulate a waste stream or to require controls and expenditures, to protect an individual that will not be present in the area.

Additionally, EPA's estimates of consumption patterns by various receptors seem unreasonable in general and extremely unlikely for our facilities in particular. It is difficult to believe that a farmer living 0.18 miles from a chlorinated aliphatic production facility would grow fruit trees and vegetables, along with raising beef and dairy cattle all on the same plot of land. In fact, in the South Texas area where our EDC/VCM manufacturing facilities are located, dairy cattle production is non-existent due to the climate. More importantly perhaps is the proposed connection between milk consumption and exposure to dioxin for children of farmers given their relatively high consumption of milk and the tendency of chlorinated dioxins and furans to bioaccumulate in milk fat. Given its disproportionate significance in the exposure calculation, site-specific data on dairy/milk production should be used to improve the accuracy of the risk assessment for this particular exposure route.

An EPA Peer Reviewer also raises these types of issues. While generally stating that EPA's overall risk assessment methodology was reasonable and technically defensible, the Peer Review stated the following with regard to the Risk Assessment Document and receptors:

Page 2-31, paragraph 4. Where do the percentages of food eaten by the home gardener that are home grown come from? It is hard to believe that a home gardener gets 11.6% of his exposed fruit (apples,

peaches, pears, and berries) from a home garden. That would mean that 11.6% of home gardeners are growing apple, peach or pear trees in their home garden; a figure that is hard to believe given that most home gardens are small and mainly used to grow vegetables.

Page 2-34, Paragraph 1. It is hard to believe that a recreational angler obtained 32 percent of the fish in his/her diet from a stream located near a waste management unit or near his home. This figure represents that fraction of the total fish is his diet that is caught. However, of the total fish that an angler catches, what fraction is caught within one mile of his residence? I would expect this fraction to be small. But even if assumed to be 58%, it would reduce the total intake from the fish pathway by 50%.

Page 2-34, Paragraph 2 Where do the percentages of food eaten by the farmer that are home grown come from?

If scientific information demonstrates that dioxin is present in wastewater in concentrations that warrant air emissions controls, it would make sense to regulate only those situations where the risks are justified (i.e., when the risk threshold is exceeded and when an affected receptor is present). Given that the proposed rule is addressing such a limited number of facilities (23 sites), why not allow each facility to run the same modeling program EPA used with site-specific data, distance to nearest receptor, wastewater concentrations, etc. Facilities that remain below the critical dioxin emission level would be allowed to "opt-out" of the requirements and their wastewaters and wastewater sludges would not be considered hazardous waste.

This is the same rational allowed under this proposed rule for the management of K174 hazardous waste under the "contingent management" option. Under this approach, EPA is proposing to list particular wastes as hazardous only if the wastes are managed in a way other than the manner in which EPA has determined is protective of human health and the environment. If a facility's current operations can be reasonably estimated to be protective of human health and the environment, why impose costly emission control requirements?

In the proposal, EPA itself expresses concern with regard to its lack of site-specific information. EPA states:

The risk analyses were based on a limited set of waste sample data. It is possible that these data do not represent the true distribution of contaminant concentrations in the waste categories evaluated, resulting in either an overestimation or underestimation of the actual risk to receptors . . . EPA obtained little site-specific information regarding waste management units for the chlorinated aliphatics industry, necessitating that we make a number of assumptions regarding waste management in off-site landfills, the land treatment unit, and wastewater tanks … We typically used regional databases to obtain the parameter values necessary to model contaminant fate and transport. Because the data that we used are not specific to the facilities at which the actual wastes are managed, the data represent our best

estimates of actual site conditions. Use of these databases in lieu of site-specific data may result in either overestimates or underestimates of risk

64 Fed Reg. at 46,498.

One of the Peer Reviewers also agrees with the observation that more site-specific data should be used. In particular, while acknowledging that the CHEMDAT8 model used by EPA in developing the proposal has undergone extensive review by both EPA and industry and is considered to provide reasonable accurate emission estimates, the Peer Reviewer noted that

The annual waste quantity (flow rate) and dimensions of the tank are sensitive input parameters. Specific data on these parameters were not available for the aerated tanks; therefore, the flow rate and dimensions of the tanks were estimates based on reported annual waste quantities. It is not clear why such fundamental data were not available, but given that they were not, the assumptions make [sic] seem reasonable.

Review of Risk Assessment Technical Background Document; Chlorinated Aliphatics Listing Determination, by Curtis Travis, at 10 (emphasis added).

In light of the preceding, OxyChem and OxyVinyls believe that a risk based, site-specific risk assessment procedure should be used by EPA so that only actual risks are regulated.

Agency Response:

The Agency's response to this comment is included in Section 4.6 of this Response to Comments Document (response to Vinyl Institute, CALP-0004).

Additionally, EPA notes that although the Agency did not propose a conditional listing for chlorinated aliphatic wastewaters similar to the K174 listing (but rather took comment on a concentration-based alternative), implementation of the RCRA subpart CC tank covers and emissions controls would have been 'conditioned' on the concentration of dioxins in a facility's wastewater, as measured through sampling and analysis. Therefore, had the Agency finalized the proposed hazardous waste listing for chlorinated aliphatic wastewaters, the rule would not have imposed costly emission control requirements upon a facility if, on the basis of sampling and analysis results, facility wastewaters contained dioxins at concentrations below levels of concern.

14.5 Occidental Comment:

If the PCDD/F Concentration in Wastewaters is Less than the Trigger Concentration, Wastewater Should Be Considered Non-Hazardous

EPA has proposed three Options for addressing K173 Waste determination (64 FR 46504), as summarized below:

Option	Dioxin Concentration	Status of Wastewaters, RCRA Requirements
Option 1	> 1 ppt TCDD TEQ	Hazardous Waste & RCRA Subpart CC
	< 1 ppt TCDD TEQ	Hazardous Waste
Option 2	> 1 ppt TCDD TEQ	Hazardous Waste & RCRA Subpart CC
	< 1 ppt TCDD TEQ	Non- Hazardous Waste
Option 3	> 1 ppt TCDD TEQ	Hazardous Waste & RCRA Subpart CC
	< 1 ppt TCDD TEQ	Non- Hazardous Waste if determination requirements are followed and the determination is certified to EPA. Method used in the Dyes & Pigments RCRA Listing (64 Fed. Reg. 40,210; 40,227 (July 23, 1999).

Basing the proposed K173 listing on the 1 ng/L trigger level would make sense for several reasons, if that concentration limit were based on the wastewater stream after filtration to remove solids. OxyChem and OxyVinyls specifically recommend that EPA select a fourth option which would be described as follows:

Option 4	> 1 ppt TCDD TEQ (filtered wastewater)	Hazardous Waste & RCRA Subpart CC
	< 1 ppt TCDD TEQ (filtered wastewater)	Non- Hazardous Waste

First, as EPA explains in the preamble, the trigger level is based on a risk level that is considered protective by EPA. Substances and streams that present no risks should not be classified as hazardous. Recently, EPA proposed to allow properly managed cement kiln dust (CKD) to remain non-hazardous providing the management standards are met. EPA stated:

Today's proposed rule would regulate CKD under RCRA to address the concerns identified in the [Report to Congress on Cement Kiln Dust] while avoiding unnecessary requirements. The approach taken is to establish management standards for CKD and make it clear that all CKD managed in accordance with those standards is not classified as a hazardous waste . . . [t]he concept of regulating a waste if it fails to meet certain standards forms the basis of many RCRA regulations.

64 Fed. Reg. 45,633, 45,641 (August 20, 1999).

EPA should take a similar approach here.

Agency Response:

EPA responds to this comment in Section 4.8 of this Response to Comment Document (comment from Vinyl Institute, CALP-00004).

14.6 Occidental Comment:

Second, as noted in the preamble, EPA's basis for determining "risk" was the single highest dioxin concentration in wastewater found during its testing, while the majority of companies had wastewater concentrations of dioxins that were well below that measured value (and below the 1 ng/L trigger as well). Thus, EPA is basing the entire rule making process and the threshold of concern on only one test result of the 6 samples was over the 1 ng/L threshold. Does the Agency truly believe that this small sample size is representative of the industry and justifies the proposed rulemaking? In evaluating the wastewater streams of concern and the potential applicability of the rule, in order to properly address temporal and spatial factors, the Vinyl Institute estimates that between 25 to 30 wastewater samples may need to be tested to defensibly evaluate the impact of the proposed rule at one facility. In contrast, EPA appears to be willing to accept scant evidence for the rule making that it would not typically accept as adequate evidence to support a facility's determination for non-applicability. Making a "blanket" listing determination would make "generators" of facilities whose wastewaters essentially don't meet the criteria for listing and in some cases may be more than an order of magnitude below the trigger level.

In addition, the risk assessment used only the sampling results from the dedicated (i.e., wastewater from EDC/VCM production facilities only) chlorinated aliphatics wastewater samples and the dedicated EDC/VCM sludge samples (6 of 41 wastewater samples and 4 of 7 sludge samples). Although EPA acknowledged that most facilities commingle their EDC/VCM wastewater, it chose to exclude the samples from the commingled wastewaters from its analysis. As a result, the conclusion based on the dedicated samples may exaggerate the risks associated with chlorinated aliphatics wastewater and EDC/VCM wastewater sludge from commingled facilities. Accordingly, EPA should use sample results from the commingled wastewaters and sludges in its risk assessment.

Agency Response:

The Agency's response to this comment is provided in Sections 4.9 (sample results on which the risk assessment and trigger level are based) and 4.10 (use of dedicated wastewater samples) of this Response to Comments Document (response to Vinyl Institute, CALP-0004).

14.7 Occidental Comment:

Finally, particularly because the K173 listing as proposed would be a more traditional listing option (i.e., listed no matter what the concentration), OxyChem and OxyVinyls are concerned about reporting and recordkeeping implications not addressed in the proposed rule. For example, what implications would the newly regulated "generation" of this material have with respect to biennial reporting and for the purpose of hazardous waste taxation? This issue could have a tremendous economic impact since all wastewaters would have the listing once this stream enters biological treatment. We believe that if EPA decides to list the K173 stream, a concentration-based approach is the only way to address EPA's protectiveness concerns and to ensure that regulation is fair and equitable.

Agency Response:

EPA acknowledges the issues raised regarding the impacts to a generator when listing a hazardous waste under a 'standard' listing approach versus a concentration-based one. However, as discussed above, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

14.8 Occidental Comment:

Based on EPA's recent rulemaking activity and for the reasons discussed above, OxyChem and OxyVinyls strongly recommend EPA select the newly identified Option 4 with regard to the classification of chlorinated aliphatic wastewaters.

Agency Response:

As discussed above, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents.

14.9 Occidental Comment:

EPA Has Failed To Consider Significant Non-Economic Impacts of The Proposal

The proposal reflects an overly simplistic view of what the rule would mean in terms of retrofitting tanks, while adding layers of complication and thus compounding what would already be a significant engineering task. We have performed assessments of the cost associated with covering and controlling tanks in our biological treatment plant, even though it is likely that newly constructed, dedicated systems would be installed in lieu of retrofit (at a significantly greater initial capital expense).

Biological treatment systems at EDC/VCM manufacturing sites rely on aeration and mixing of wastewater to obtain proper treatment of the constituents of concern. Unlike tanks used for storage of materials, tanks used for biological treatment are often equipped with various pieces of equipment that facilitate the desired treatment (e.g., clarifiers). If it were simply a matter of covering/controlling storage tanks (i.e., without any equipment concerns) the required action would amount to tank retrofit and the addition of piping, albeit at significant cost due to the size of the tanks involved. However, with biological treatment tanks there are many considerations over and above tank retrofit, which render re-design efforts considerably more difficult. There is the question of how equipment repairs will be effected. The re-design must allow for safe access as personnel would now be required to enter a confined space for routine maintenance of treatment plant equipment. This would present new hazards and would require additional monitoring to ensure against an unsafe work environment during maintenance and repair activities. Personnel would no longer be able to perform even the simplest of maintenance or repair tasks without significant effort.

Agency Response:

Please see EPA's response to comment in Section 4.14 of this Response to Comment Document (response to Vinyl Institute Comment, CALP-00004).

14.10 Occidental Comment:

Our facilities would also be forced to address the issue of water management when considering repairs. Production processes are such that large quantities of water must be managed on a daily basis. Presently, operation personnel have discretion over which situations require draining of tanks for equipment maintenance/repair and which situations do not. If the rule is made final as proposed, this discretion would be eliminated, since the tanks would have to be drained every time maintenance/repair is performed regardless of how minor the activity. Such a scenario would require either frequent plant shut down or the addition of substantial tank storage capacity. We must also consider the issue of equipment removal. There are certain instances when the removal of equipment is required. Many times, this removal cannot be accomplished through some relatively small access port. Rather, larger/heavier pieces of equipment would have to be removed by way of the top of the tank using heavy machinery. This presents the necessity of installing and using a removable top, a prospect that is impractical at best.

One key aspect of biological treatment plant operation that the proposal fails to take into account is the importance of inspection to ensuring proper operation. For certain pieces of equipment there is a visual aspect to monitoring proper operation that is as important, if not more important, than electronic monitoring of operations. Creating an enclosed space would not only hamper efforts at visual inspection of the process; it would transform a normally routine operation into a complicated procedure for vessel entry. In turn, the decreased effectiveness of visual inspection may result in an increase in wastewater NPDES difficulties and/or excursions. As mentioned, issues related to risk and the

economic impact of these proposed regulations are being addressed by other companies/organizations. However, it appears that EPA failed to adequately consider practical implications related to this proposed rule and whether or not the added risk of personnel exposure and possible NPDES non-compliance were outweighed by the estimated risks to the general population.

Agency Response:

EPA notes the specific engineering issues described by the commenter regarding repairs and inspections to wastewater treatment tanks in light of EPA's proposed tank cover requirements. However, EPA is issuing a final decision not to list this wastestream, for reasons described in the preamble to the final rule and relevant background documents. EPA is therefore not finalizing the proposed amendments to the wastewater treatment unit exemption in 40 CFR sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

14.11 Occidental Comment:

OxyChem and OxyVinyls did not find within EPA's economic cost analysis any indication of the time and effort necessary to obtain and operate under an air permit for these newly regulated emission sources being considered. This effort can be substantial under the Clean Air Act's Federal Title V Air Permit Program. It has been our experience that receiving a State Air Operating Permit can take between 8 and 18 months. Amending a Title V Air Operating Permit may take even longer. EPA's cost analysis also did take into account the cost to comply with RCRA Subpart CC's inspection, monitoring, recordkeeping and reporting requirements (see Exhibit D-6 of the Economics Background Document).

Finally, it was not apparent whether EPA considered the cost to conduct performance testing on the control devices. This effort can cost between $150,000 to more than $300,000 per control device. These costs are simply the costs associated with having a third party conduct the test and develop results - they do not account for the cost of :

- operating the process at the required operating rate to indicate performance at a maximum production rate;
- environmental personnel to coordinate testing, escort third party testing personnel, review testing protocols, etc.; and results; and,
- purchasing and contracting personnel efforts.

Taking these additional efforts into account adds to the cost to demonstrate that the control device is operating as required by the RCRA Subpart CC standard.

Agency Response:

See EPA's response to the comment in Section 14.10 above.

14.12 Occidental Comment:

OxyChem and OxyVinyls Support the Proposed Exemption From the Derived From Rule for K173

OxyChem and OxyVinyls support EPA's proposal to exempt sludges generated from the treatment of K173 from being classified as hazardous waste as a result of the "derived-from" rule as long as the wastes would not otherwise be defined as hazardous waste. We also agree that EPA's specific evaluations of the potential risks associated with sludges derived from K173 should supercede any presumed risk imparted by application of the derived-from rule, which presumes risk absent any information on toxicity.

Agency Response:

See EPA's response to comment in Section 3.30 of this Response to Comment Document (comment from Dow Chemical, CALP-00012).

14.13 Occidental Comment:

K174 ISSUES

While OxyChem and OxyVinyls Agree With EPA's Contingent Management Approach, Sludges Managed in Incineration Units Should Also Be Considered to be Non-Hazardous

EPA proposes to list EDC/VCM wastewater sludges as hazardous under K174 unless the sludges are managed in a Subtitle C or D landfill. EPA proposes this "contingent management" approach because it has determined that "no significant risks are posed from managing EDC/VCM wastewater treatment sludges in a landfill." According to EPA, the management scenarios selected for its risk assessment for K174 were chosen based upon the waste management practices known to be practiced by the chlorinated aliphatic industry for non-hazardous sludges. According to EPA, based on survey results, these practices are: (1) on-site land treatment (one facility), (2) on-site disposal in a non-hazardous landfill (two facilities), (3) on-site co-disposal in a hazardous waste landfill (one facility), and (4) off-site disposal in a subtitle D landfill (7 facilities).

Accordingly, EPA modeled risks from two management scenarios of most concern - an off-site non-hazardous municipal landfill, and a land treatment unit. EPA concluded that "other non-hazardous waste management practices currently are not used by industry and would not serve as an appropriate basis for listing the waste as hazardous." Given EPA's survey results and the Agency's view that land disposal and landfilling are "established management practices," EPA also states that it "believes it is unlikely that these sludges will be sent to any type of facility other than a landfill, particularly if the approach proposed in today's rule is promulgated."

OxyChem and OxyVinyls agree with EPA's contingent management approach for this waste stream but believe that it should be expanded to include as non-hazardous wastes EDC/VCM wastewater sludges that are disposed in incineration units. As EPA states, "incineration has been fully demonstrated for treating dioxin-containing wastes." OxyChem and OxyVinyls are not aware of any EDC/VCM manufacturing sites that incinerate wastewater treatment sludges, but given that EPA has concluded that incineration is an acceptable means of managing dioxin-containing wastes, the contingent management option for K174 should be expanded to include incineration as a disposal method in the event incineration is used to manage these wastes.

Agency Response:

The Agency's response to this comment is included in Section 4.21 of this Response to Comment Document (response to Vinyl Institute, CALP-0004).

14.14 Occidental Comment:

The Proposed Recordkeeping Requirements Are Overly Burdensome

Wastewater treatment sludges generated at EDC/VCM manufacturing site biological treatment plants are typically stored in roll-off boxes and shipped to Subtitle D landfills. All shipments are accompanied by a non-hazardous waste manifest that clearly identifies the waste, the quantity shipped, the destination landfill, and the transporter. Records of these shipments are maintained.
OxyChem and OxyVinyls believe that documentation as described above, which is analogous to documentation for existing hazardous waste activities, should be sufficient proof of disposal in accordance with the conditions for exclusion from this hazardous waste listing. As for documentation of intent, such a concept would be difficult to prove by means of paperwork. It would seem that sufficient tracking based on a history of proper disposal would be sufficient proof of intent to landfill. Additionally, agency inspection should be more than adequate to ensure that land treatment or storage on land is not taking place. Inspectors merely have to verify that sludge is stored in containers and that there is no visual evidence of placement on land. Given that inspections are random and unannounced, we believe that current practices should more than adequately satisfy concerns regarding intent.

As proposed, recordkeeping requirements for non-hazardous wastes are as restrictive as if the waste were regulated. Existing RCRA regulations provide guidance for documentation of claims that materials are not solid wastes or are conditionally exempt from regulation. There is no need to establish a new or more specific set of rules or guidelines to demonstrate compliance with the contingent management option. Our facilities are familiar with the current requirement to provide "appropriate documentation (such as legally binding contracts) to demonstrate that a material is not a waste or is exempt from regulation. Any new set of standards or rules would only create additional unnecessary burden and confusion.

Agency Response:

See EPA's response to comment in Section 4.22 of this Response to Comment Document.

SECTION 15
Waste Management
CALP-00014

15.1 Waste Management Comment

Waste Management (WM) is pleased to comment on the subject proposed regulation for hazardous waste generated by the production of chlorinated aliphatics. WM is the nation's largest operator of municipal solid waste landfills and hazardous waste landfills.

WMs landfills generate hundreds of millions of gallons of leachate annually, all of which is managed in accordance with federal, state, and local regulations to ensure proper treatment prior to discharge.

A variety of means are used for leachate management, to include recirculation back into the landfill, direct discharge to sewers for treatment at a Publicly Owned Treatment Works (POTW), truck hauling to a POTW, on-site pretreatment and hauling to an industrial wastewater pretreatment plant prior to POTW treatment, and direct discharge under terms of an National Pollutant Discharge Elimination System (NPDES) permit. In establishing its proposed Clean Water Act effluent guidelines for landfills (63 FR 6426), EPA determined that the practices described above which lead to treatment at a POTW were protective of public health and the environment, and has only proposed standards for direct discharges.

The diverse method which EPA now uses for listing hazardous waste manifests the need for a single, environmentally effective solution to the derived-from rule as it applies to MSW leachate. In the petroleum refinery listing, EPA employed a standard method for listing certain waste streams. As a result, with adequate records, MSW landfills could relatively easily identify whether any of the waste streams had been received prior to its designation as a hazardous waste, thereby triggering the concern with the derived-from rule for leachate. In the case of the proposed listings for the pigment and dye industry, EPA employed a concentration-based approach, which significantly complicates the determination regarding the leachate because it requires knowledge and records of having received the waste stream, and also records of the precise concentration of contaminants of concern.

In this proposed listing for chlorinated aliphatics, EPA employs a third approach by granting a conditional exemption for MSW landfill leachate based on risk assessment methodology for K174, combined with a deferral for the K175 wastes.

Without judging the legitimacy of any of these approaches, WM is concerned that the result for the MSW landfill operator is one of increasing uncertainty of leachate management requirements based on which approach EPA may use for any individual listing.

Although on a national scale the number of affected landfills may be relatively small for any individual listing, the cost implications for the individual landfill may be staggering, given the difference in management costs between ordinary MSW leachate and hazardous waste leachate. WM continues to believe that it is in the best interests of EPA and the MSW landfill operators, both publicly-owned and privately-owned, to develop a single solution for the derived-from issue as it applies to MSW leachate. As part of the recently signed re-proposal of the Hazardous Waste Identification Rule, EPA notes that the Chemical Manufacturers Association has recommended to EPA that landfill leachate be exempt from the derived-from rule in general (under certain conditions, to include deferral to CWA standards) and has proposed several mechanisms to achieve this outcome.

EPA has taken no position on the issue in the proposal but agrees to study the matter. WM urges EPA to avail itself of this opportunity to clarify once and for all the regulatory status of MSW landfill leachate that may be subject to retroactive derived-from rule applications.

Agency Response:

EPA thanks the commenter for providing their perspective on the potential impact of hazardous waste listings on municipal solid waste leachate management, and its support for the development by EPA of a single solution to this issue. Of course the commenter's request for a single solution for all leachate generated by municipal solid waste landfills is beyond the scope of this rulemaking. Please see the EPA's response to comment in Section 3.33 of this Response to Comment Document (response to Dow Chemical's comments).

SECTION 16
Equiva Services LLC
CALP-00016

These comments are submitted in response to the Proposed Listing of Chlorinated Aliphatics Production Waste published in the August 25, 1999 Federal Register (64 FR 46476). This letter presents the comments of Equiva Services LLC (Equiva) and is submitted on behalf of Equilon Enterprises LLC (Equilon) and Motiva Enterprises LLC (Motiva). Equilon was formed in 1998 as a joint venture company co-owned by Shell Oil Company and Texaco, Inc., and includes the refining and marketing operations of the parent companies in the western United States, as well as all U.S. pipeline operations. Motiva was also formed in 1998 as a joint venture company co-owned by Shell Oil Company, Texaco Inc. and Saudi Refining Company, and includes the refining and marketing operations of the parent companies in the eastern U.S.

While we are not directly impacted by this rule making, the listing process in the proposal is applicable to future EPA listing decisions, and we believe there are important procedural aspects on which to make comment. We are supportive of innovative suggestions within the proposal to address listing decisions in a more realistic and balanced approach, e.g., the proposal regarding a conditional listing. At the same time however, we have some general concerns regarding the basis for the risk assessment and the manner in which high-end risk is used to justify a listing decision. We believe our comments will complement those submitted by the Chemical Manufacturers Association (CMA), Shell Chemical Company (SCC) and the American Petroleum Institute (API).

16.1 Equiva Comment:

A Conditional Listing is a Reasonable Alternative to Ensure that Listing Decisions Apply Only to those Waste Management Scenarios Presenting Substantial Present or Potential Hazard to Human Health or the Environment

We agree that a waste should not be listed as hazardous in waste management scenarios that do not present a substantial hazard. A conditional listing alternative provides one mechanism to avoid needless regulation of waste management scenarios that do not pose a substantial hazard. We suggest that EPA also consider identifying other conditions that may be used to limit listing decisions. For example, if EPA is concerned about an air exposure pathway from a particular type of waste management unit, a condition could be specified identifying a minimum distance from the waste management unit to a receptor of concern below which the listing would not apply.

Agency Response:

The Agency appreciates the commenter's stated support for a conditional listing approach. Although the Agency sees the merits of conditioning a listing on particular waste management practices which the Agency has determined do not present significant risk, the Agency does not at this time foresee developing conditional listings based upon specific exposure pathways or a distance to receptor, as the commenter suggests.

16.2 Equiva Comment:

Concentration Based Criteria Should be Used To Limit a Listing Decision To Only Those Wastes that Present a Substantial Present or Potential Hazard

We agree that concentration-based criteria are an appropriate means to limit a listing decision. However, a realistic risk assessment process must be used to identify the constituent of concern that may contribute to substantial hazard and identify a concentration below which there is no substantial hazard. Once this concentration limit is defined, we agree that the listing definition should explicitly incorporate the concentration threshold to avoid future confusion.

Agency Response:

The Agency acknowledges Equiva's support of a concentration-based listing approach. However, EPA is issuing a final decision not to list chlorinated aliphatic wastewaters for reasons described in the preamble to the final rule and relevant background documents.

16.3 Equiva Comment:

Independent Risk Assessments of WWT Sludge should Supercede Derived-From Presumptions of Risk

We agree with EPA's comments that independent risk assessments of WWT sludges showing insignificant risk "… logically should take precedent over the application of the derived-from rule, which presumes risk absent any information on toxicity of the treatment residue."

Agency Response:

Because we are not finalizing the listing for chlorinated aliphatic wastewaters as proposed, wastewater treatment sludges derived from such wastewaters will not become hazardous as a result from being derived-from K173; therefore we are not finalizing the proposed regulations at 40 CFR 261.3(c)(2)(ii).

16.4 Equiva Comment:

The Regulation of Leachate from Land Management Units Receiving Newly Listed Wastes should be Deferred to Allow for Further Evaluation.

We agree with EPA's proposal to at least temporarily defer the regulation of landfill leachate and gas condensate derived from land management scenarios. The leachate will not have the same characteristics as the original waste and is likely to present less risk (similar in principle to what EPA discovered when evaluating wastewater sludges as compared to wastewater streams). We are supportive of comments by Shell Chemical Company that the leachate be considered a new "point of generation" exempt from the hazardous waste definition, or that the "Headworks" exemption could be modified to include "on-site landfill or landfarm leachate (EPA Hazardous Waste No. F039)". Either option would help ensure management of such leachate in a manner presenting insignificant risk to human health or the environment in a cost-effective manner.

Agency Response:

Please see EPA's response to comment in Sections 3.33 (Dow Chemical comments) and 13.25 (Shell comments).

16.5 Equiva Comment:

Proposed Controls Must be Based Only Upon the Constituent(s) of Concern.

We agree that <u>should</u> controls be proposed, and that they are justified basis a sound demonstration of substantial hazard, that they be limited to only those streams having specific constituents of concern over certain risk-based concentration thresholds. We agree that a threshold based upon the level of total volatile organic compounds (VOC) is not appropriate for establishing the need for additional controls.

The Risk Assessment Using Data for (Uncovered) Aerated Tanks does Not Support Controls on Covered or Non-Aerated Tanks.

EPA states "… because aeration increases air emissions, this scenario is expected to result in the highest risk estimates (compared with non-aerated and/or covered tanks)". EPA has not demonstrated that non-aerated or covered tanks contribute substantially to risk, or that controls on such tanks are required to reduce substantial hazard.

Agency Response:

Because EPA is issuing a final decision not to list chlorinated aliphatic wastewaters for reasons described in the preamble to the final rule and relevant

background documents, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

16.6 Equiva Comment:

The Risk Assessment Process Must Reduce Uncertainty to a Reasonable Degree to Ensure that there is a Sufficient Basis for Determining there is Substantial Real or Potential Hazard.

Basis the preamble discussion, it appears that EPA has used many "assumptions" rather than site-specific data. The more "assumptions" that are made, the more uncertainty that exists in the risk calculations. 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 can be better understood. However, with the limited number of facilities and waste management units involved in this proposed rule making, more time could have been spent on gathering real, site-specific data to reduce the uncertainty in risk modeling. For example, while the high-end risk assessment to a farmer is used to justify the listing for chlorinated wastewaters, the preamble notes at least the following:

* EPA assumes the farmer raises fruits, exposed vegetables, root vegetables, beef cattle and dairy cattle (yet there is no discussion that such practices actually occur near the WMUs);

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

16.7 Equiva Comment:

* The distance to the receptor for air pathways is 75m (high-end analysis) basis the 1990 rulemaking supporting controls on process vents and leaks (yet there is no discussion that this is true for the limited facilities involved in this rulemaking);

* That receptors are located along the centerline of the area most greatly impacted by air releases (yet there is no discussion that wind direction is predominately from the WMUs to the receptors of concern);

Agency Response:

EPA wishes to clarify that we did not use a 75 meter distance to receptor in calculating the high end deterministic risk estimates on which the proposed listing decision was based (see Section 5.1.4.1 in the Risk Assessment Technical Background Document [USEPA, 1999]). Our basis for concluding that a 300 meter distance is a plausible distance to receptor is provided in Section 4.6 of this Response to Comments Document (Responses to the Vinyl Institute, CALP-00004). EPA acknowledges that our evaluation for the proposal was performed for receptors located along the centerline of the area most greatly impacted by air releases. In the course of our evaluation of 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, and we modified our analysis accordingly.

As described in Section 4.6 of this Response to Comments Document (Responses to the Vinyl Institute, CALP-00004) we do not feel our understanding of the industry justified an assumption that there would always exist exactly 23 chlorinated aliphatics facilities at 23 specific locations. Consequently, we are not evaluating exposure only to current receptors, but also to receptors who may locate in the vicinity of existing facilities in the future, as well as receptors who may reside in the vicinity of facilities and facility expansions that are constructed in the future. Therefore, even if we had performed a facility-by-facility evaluation of the location of receptors relative to the prevailing wind direction, and had determined that no receptors currently are located in that direction, we could not assume that this scenario would hold true even over the short term. We contend that we have established the plausibility that the types of receptors we evaluated would be located in the vicinity of chlorinated aliphatics manufacturing facilities (see our response to the Vinyl Institute, CALP-00004, in Section 4.6 of this Response to Comment document).

16.8 Equiva Comment:

* That a single high analytical value for dioxin at one plant is the number for calculating air emissions in the risk assessment (yet the sampling procedures do not appear to meet EPA's proposal that future compliance sampling "… be grab samples collected within a time period that will accurately account for potential variability in the wastestream…";

Agency Response:

Regarding the commenter's reference to the use of a single high-end analytical value for dioxin in the wastewater risk assessment, please see EPA's response to the

comment in Section 4.9 of this Response to Comments document (response to Vinyl Institute comment, CALP-00004).

EPA notes that 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

16.9 Equiva Comment:

* That in the absence of site-specific data on operation of wastewater biological aeration tanks that EPA chose to use operating data "believed to be" representative of actual operation.

Given the rather significant costs that could be incurred basis this proposed rule, additional effort should be made by EPA to reduce the uncertainty in basic data utilized to justify proposed regulation.

Agency Response:

The Agency's response to this comment is provided in Section 4.6 of this Response to Comment document (responses to The Vinyl Institute, CALP-00004).

16.10 Equiva Comment:

Population Risk is an Essential Component in Risk-Based Decisions to Ensure that Limited Resources are appropriately Allocated to the Control of Only "Substantial Hazards"

For a waste to be regulated as hazardous it must pose "substantial present or potential hazard to human health or the environment". In this rule making EPA states "no actual damage incidents have been observed" (64 FR 46502) and that "EPA expects that the population risks ... are not significant" (64 FR 46496). As a default when small populations are exposed, EPA cites internal guidance that individual risk estimates will "usually" be a more meaningful parameter. Setting aside concerns regarding how the high-end individual risk is calculated, and the uncertainty in the data used to model high-end risk, high-end risk assessment may be the first but not the only factor when establishing "substantial present or potential hazard". This general point is expanded upon in *American Petroleum Institute, et al v. United States Environmental Protection Agency Nos. 94-1683, and consolidated cases,* and the court decisions cited within that document. Those comments are incorporated herein by reference.

The actual population exposed and the true (not theoretical) substantial hazard controlled must be considered when determining whether to list a waste as hazardous. Without this final step significant

resources can be spent limiting theoretical risk that has no meaningful impact on actual human health or the environment. As society is not blessed with unlimited resources, those resources must be effectively used to manage those risks that are clearly "substantial". EPA's own numbers show that the potential cost per theoretical cancer case avoided for this proposed rule is around $15 billion. Both Shell Chemical Company and CMA are citing other regulatory decisions showing this avoidance cost to be significantly above most other decisions to regulate.

Agency Response:

A response to the commenter's concern's regarding the Agency's use of population risk results is provided in section 7.4 of this Response to Comments document (response to comment from the American Petroleum Institute, CALP-00002).

The Agency also notes that in contrast to some other Federal agencies, and to some authorizing statutes for other EPA programs (*e.g.,* the economic achievability criterion for effluent guidelines of Section 301(b)(2)(A) of the 1977 Clean Water Act), Congress' 1976 RCRA hazardous waste authorizing statute (with 1984 amendments) does not direct the EPA to apply economic analysis criteria, such as measures of cost-effectiveness, in either (a) promulgating RCRA Subtitle C hazardous waste regulations in general, or in (b) developing and promulgating criteria for identifying and listing hazardous wastes, in particular (see RCRA Subtitle C Sections 3001(a) & (b)(1)). For additional information about this specific aspect of RCRA, see USEPA's 1980 review of the legal history of RCRA (Federal Register, Vol.45, No.98, 19 May 1980, p.33089), which arrived at the following determination:

> "*Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most cost effective regulation among various alternatives... There is no explicit requirement in the Act directing EPA to consider costs in the development of its initial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from other major pollution control statutes... The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration... Congress was aware that the hazardous waste regulation would impose substantial costs on the regulated community. Despite this recognition, Congress deliberately*

rejected provisions that would require consideration of cost burden on industry or to moderate the Act's environmental objectives. For these reasons, the Agency concludes that the Act prohibits it from considering such costs in the development of Subtitle C regulations as a basis for lessening the standards it considers necessary to ensure protection of human health or the environment."

As of 1999, two other Congressional statutes direct Federal regulatory agencies to conduct benefit-cost analyses in special circumstances where (a) unfunded Federal mandates may exceed $100 million in direct cost in any single year (1995 UMRA), or if (b) small entities are disproportionately affected (1980 RFA & 1996 SBREFA). Furthermore, the Executive Branch (Executive Order 12866 of 30 Sept 1993) only directs Federal regulatory agencies such as the EPA to conduct benefit-cost analyses in cases of economically "significant" rulemakings, which are defined as having adverse effects greater than $100 million on the national economy. Based on EPA's cost/impact estimates, both the proposed and final listing rules were not expected to exceed any one of these various benefit-cost analysis criteria. Consequently, the EPA did not develop a cost-effectiveness measure for either the proposed or final listing rule.

SECTION 17
Onyx Environmental Services, L.LC.
CALP-00017

Introduction:

Date: November 23, 1999

Enclosed are 2 copies and an original containing comments from Onyx Environmental Services, L.L.C., concerning the above referenced proposed rule and request for comments.

If you have any questions regarding these comments please contact me at (630) 572-2418.

Sincerely,

Scott G. Hoffert
Manager, Environmental
Onyx Environmental Services, L.L.C

Cc: Mitchell Hahn - Onyx

Onyx Environmental Services, L.L.C. began business on June 30, 1999, as a joint venture between Waste Management, Inc. (49%) and Vivendi, Inc. (51%), a French company which has been in the hazardous waste management business for over 25 years in international markets. Onyx operates 11 RCRA permitted treatment and storage facilities in the United States. Its hazardous waste management services include transportation, incineration, on-site services, treatment, fuel blending, and resource recovery. These services are provided principally to commercial and industrial customers, other waste management companies, and government entities.

17.1 Onyx Comment:

II. Specific Comments

Contingent-Management Listing for K174

Onyx Environmental Services, L.L.C. (Onyx) does not support the contingent-management listing approach proposed by the Agency for K174 waste for the following reasons.

First, at the point of generation, the material either meets the criteria of hazardous waste listing, or it does not. On page 46,480 of the proposed rule it is stated, "EPA is proposing to list these wastes because these residuals meet the criteria set out in 40 CFR 261.11 (a)(3) for listing waste as hazardous." The management process should not decide whether the waste is hazardous or not. The management process should only ensure that the waste is properly treated. One could argue the contingent-management listing approach to the extreme. For example, if F-listed solvent wastes are managed at hazardous waste incinerators, where enough evidence is available to show that once treated there is minimal risk to human health and the environment, then F-listed solvent wastes destined for incineration should not be hazardous wastes.

Agency Response:

The Agency agrees with the commenter that a determination of a waste's regulatory status must be made at the point of generation. Since the generator of a waste is responsible for making both the waste identification decision and the waste management decision, EPA does not foresee a problem regarding the determination of the regulatory status for the EDC/VCM wastewater treatment sludges affected by the conditional listing determination by the waste generator. It is the generator who determines how to manage waste it generates. However, as with all wastes sent off-site to be managed, handling activities conducted by off-site waste handlers may alter the regulatory status of the waste after it leaves the generator site. Although there is some potential for any non-hazardous waste to be mismanaged after being shipped off-site of the generator facility, information collected by the Agency regarding the management of EDC/VCM wastewater treatment sludges indicates that these sludges almost always are managed in subtitle C or non-hazardous waste landfills. In cases where the sludges are not managed in the landfill, it is the generator's decision to manage it otherwise. Therefore, the Agency sees no reason to anticipate that these sludges will not be accurately identified as hazardous or non-hazardous waste at the point of generation.

The Agency disagrees with the commenter's assertion that how a waste is managed should not be considered in determining the regulatory status of waste. EPA assesses plausible management practices in each of its listing determinations.

Given the Agency's finding that the predominate approach for managing EDC/VCM wastewater treatment sludges poses no significant risks 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. It does not make sense to list all EDC/VCM wastewater treatment sludges based upon the management approaches used by only a few facilities. On the other hand, even though the predominate management approach used by the chlorinated aliphatics industry does not result in significant risks, we do not believe that it is appropriate to promulgate a no list determination, given the fact that the Agency's risk assessment shows significant risks from one management approach. Therefore, the Agency is promulgating a contingent management listing to ensure that EDC/VCM wastewater treatment sludges are managed only in a manner that does not present significant risks to human health and the environment.

17.2 Onyx Comment:

Second, under the contingent-management approach, wastewater treatment sludge from the production of ethylene dichloride or vinyl chloride monomer is not K174 waste if managed at subtitle C or D landfills; therefore, any other management process will trigger the K174 listing. In the following scenario, two plants that produce vinyl chloride monomer are located next to each other. Plant A manages its sludge at a landfill and therefore is not covered under RCRA. Plant B, on the other hand, manages its wastewater treatment sludge in some other manner that makes the sludge a K174 waste. When Plant A transports its sludge to the local subtitle D landfill, it will be as a non-hazardous, non-regulated sludge on a bill of lading. In the case of a release of Plant A's sludge to the environment caused by a transportation incident, there would be no need to report the release or any urgency to remediate the spill or any surrounding contaminate soil and water. Yet, when Plant B ships its waste sludge, the applicable requirements under RCRA and the Department of Transportation's Hazardous Material Regulations must be followed. It is illogical to have such vast differences in management practices when talking about the exact same material, with the exact same threat to human health and the environment.

Agency Response:

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 sludge would constitute the release of a

CERCLA hazardous substance, and provided that an amount exceeding the RQ had been released, would be subject to CERCLA notification requirements.

17.3 Onyx Comment:

Third, in this proposed rule, the Agency is designating K174 listed sludge a hazardous substance under CERCLA. However, the sludge is not regulated under CERCLA if it is managed in a landfill. Therefore, any releases of this sludge at the generator's facility would not be reportable under CERCLA, and any potential contamination to soil and groundwater would not be remediated until its discovery. Households down gradient of such a facility would be potentially exposed to dioxins/furans compounds. Again, it is illogical to have such different requirements when it comes to the same waste.

Agency Response:

As noted above, releases of EDC/VCM sludge at the generator's facility (or any spill prior to placing the sludge in a landfill) that results in the sludge being placed on the land would result in the sludge meeting the K174 hazardous waste listing; this means that the sludge would also be defined as a CERCLA hazardous substance, and subject to release reporting if an amount equal to or exceeding the reportable quantity has been released.

EPA also notes that the contingent management listing being finalized for EDC/VCM wastewater treatment sludges does not limit EPA's authority under CERCLA to respond to releases of hazardous substances designated under CERCLA Section 102(a) and identified in 40 CFR Part 302.4, including TCDD, or pollutants or contaminants that pose an imminent and substantial danger to the public health or welfare.

17.4 Onyx Comment:

Fourth, the Agency is proposing to add several dioxin and furan congeners to the Table of Universal Treatment Standards (UTS) at 268.48 and to the list of regulated constituents in hazardous waste leachate, F039, in 268.40. These same congeners are present in proposed K174 waste. If the contingent-management listing approach is applied to the sludge, it can be directly landfilled without treatment of the hazardous constituents the Agency is proposing to make UTSs. Onyx does not support adding these proposed congeners when the sludge can be landfilled while containing hazardous constituents above the proposed UTSs. To add these congeners so they apply to other wastes as possible Underlying Hazardous Constituents puts an unnecessary burden on the regulated community to determine if these congeners are present. Compared to other chemical analysis, testing for dioxins and furans is expensive, ranging from several hundred to several thousand dollars depending on turnaround time. The argument concerning F039 leachate is the same. It is possible that these congeners may be present in the leachate because of some other source, if the wastewater treatment sludge is managed at

a Subtitle D landfill, eventually these congeners may be detected in the leachate. However, since it is not considered a hazardous waste when disposed, the leachate is not considered F039 waste[1] and therefore is not required to meet applicable treatment standards. Also, on page 46,522 of this proposed rule, the following is stated, "… ,the treatment standards for F039 are updated each time a new LDR standard is developed for listed wastes." This statement is incorrect. For example, carbamate wastes that were first listed under Land Disposal Restriction - Phase III (61 FR 15,566) and revised by several rules since, are not listed as regulated hazardous constituents for F039. If carbamates are not listed as hazardous constituents for F039, then why should these proposed dioxin/furan congeners be added?

Agency Response:

The commenter correctly notes the substantial cost of dioxin and furan analysis. However, current regulations already require the analysis of tetra-, penta-, and hepta-dioxins and furans. Analysis of the remaining hepta- and octa- dioxin/furan congeners can be accomplished with the same labor and instrument analysis time. Standards with the additional congeners would have to be procured or prepared for the analysis. However, many laboratories purchase standards prepared by vendors for analysis via SW-846 Method 8280 which already contain the hepta- and octa- dioxin/furan congeners. Therefore, we do not project any substantial financial analytical cost burden as a result of the addition of the new dioxin and furan congeners to the Table of Universal Treatment Standards(UTS) at 268.48 and to the list of regulated constituents in hazardous waste leachate, F039, in 268.40.

The Agency disagrees with the commenter's contention that EDC/VCM wastewater treatment sludges should be identified and managed as hazardous wastes (including subject to the LDR treatment requirements) until all conditions of the conditional exclusion are met (*i.e.,* sludges should be listed as hazardous wastes until disposed of in a landfill). The Agency's risk analysis indicates that this waste poses no significant risks when managed in a landfill. Therefore, the Agency has determined that it is appropriate to finalize a conditional listing for this waste. The waste is *not* hazardous when disposed in a landfill (and not placed on the land prior to being landfilled). Therefore, EDC/VCM wastewater treatment sludges destined for management in a landfill are not subject to RCRA subtitle C management requirements (including the LDR requirements), as is the case with all other solid wastes for which EPA has made a determination not to list the waste as hazardous.

[1] Please note that in some instances, especially with older landfills, the leachate from a subtitle D landfill may be identified as F039 due to past co-disposal practices. In Onyx's discussion, it is assumed that the landfill has never received hazardous waste in its past and its leachate is not listed as F039.

The commenter correctly notes that under the contingent-management option if the wastewater sludge is managed at a Subtitle D landfill, eventually these congeners may be detected in the leachate. However since it is not considered a hazardous waste when disposed, the leachate is not considered F039 waste and therefore is not required to meet applicable treatment standards. Should the wastes be co-disposed in Subtitle C hazardous waste landfills with more than one other hazardous waste, then the resulting leachate would be F039 and subject to treatment for all UHCs specified for F039 wastes in 40 CFR 268.40.

The Agency has selected to regulate the subject K174 wastes conditioned on their disposal in a manner in which the Agency has determined is protective of human health and the environment. The Agency sees no reason to include sludges managed in a protective manner in the listing scope. Also, given that the practice of land treatment occurred only at one site, the Agency concludes that a more tailored approach was needed. See 64 FR 46508.

The commenter correctly notes that the carbamate rulemaking did not co-propose additions of the newly regulated substances to F039. This occurred largely by oversight during the hurried and then separate listing determination and land disposal restriction rulemakings required to meet a judicially mandated schedule. We have subsequently adopted a policy of co-proposing listing determination and land disposal restriction rulemakings to better coordinate the regulatory relationship between these programs.

Since the constituents in the wastes listed in the Carbamate Final Rule (60 FR 7824, February 9, 1995) were promulgated after F039 and not excluded or added to F039, it is the Agency's position that multisource leachates that contain carbamate waste codes and non-carbamate hazardous wastes must comply with the lowest treatment standard for the constituent of concern. (See 40 CFR 268.40(c).) Therefore, such wastes must meet both F039 and any carbamate waste standards that may apply. Resources permitting, the Agency may in a future rulemaking clarify the scope of multisource leachates that contain carbamate wastes, such that F039 may again be a sole replacement of multiple codes as originally intended. (See 55 FR 22619, June 1, 1990). We are promulgating the addition of the constituents of concern for K174 to F039, because it will avoid further applicability of multiple waste codes to multisource leachates.

Furthermore, because the hepta-and octa- dioxin/furan isomers are believed to contribute to the overall carcinogenic activity of dioxin/furan congeners, they also must be controlled if human health and the environment are to be protected. The absence of the existing regulated isomers alone can not assure that further treatment of the waste is

not required, as formation pathways differ for the individual congeners, and photolysis of octa isomers may result in the formation of more toxic congeners (as noted by the commenter) at the exposed waste surface within 4 days of exposure.[2] For these reasons, the Agency is promulgating the proposed additions to the Table of Universal Treatment Standards (UTS) at 268.48 and to the list of regulated constituents in hazardous waste leachate, F039, in 268.40.

17.5 Onyx Comment:

Finally, a paper entitled, "Photolysis of Octachlorodibenzo-p-dioxin on Soils: Production of 2,3,7,8-TCDD," concludes that when exposed to UV light (sunlight), complex forms of octachlorodibenzo-p-dioxin (OCDD) will breakdown into more toxic dioxin congeners. The paper is attached as Appendix 1. From the paper, the photolysis of OCDD begins within hours of exposure to UV light. Under regulatory requirements, the active face of a landfill must be covered at the end of each workday. It is conceivable that wastewater treatment sludge could be exposed to direct sunlight for several hours when managed at a Subtitle D landfill. However, the paper also concludes that the breakdown of complex dioxin congeners would take several days of exposure to complete. A greater impact of photolysis is when sludge is released to the environment, i.e., transportation incidents and upsets/poor handling at the point of generation. These uncontrolled releases could lead to significant levels of the most toxic dioxin congeners in the environment due to the fact that a quick response for clean-up is not required because the waste is not regulated as hazardous.

Agency Response:

As discussed above, because the hepta-and octa- dioxin/furan isomers are believed to contribute to the overall carcinogenic activity of dioxin/furan congeners, they also must be controlled if human health and the environment are to be protected. The absence of the existing regulated isomers alone can not assure that further treatment of the waste is not required, as formation pathways differ for the individual congeners, and photolysis of octa isomers may result in the formation of more toxic congeners (as noted by the commenter) at the exposed waste surface within 4 days of exposure.[3] For these reasons, the Agency is promulgating the proposed additions to the Table of Universal Treatment Standards (UTS) at 268.48 and to the list of regulated constituents in hazardous waste leachate, F039, in 268.40.

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[2]Chemosphere, Vol.18., pp 1265-1274, 1989.

[3]Chemosphere, Vol.18., pp 1265-1274, 1989.

SECTION 18
Vulcan Chemicals (Wichita, KS)
CALP-00018

18.1 Vulcan Comment:

SUMMARY

We are submitting our comments on the above proposed rule, specifically the K173 listing of waste waters from the production of chlorinated aliphatic hydrocarbons. The primary basis for listing K173 wastewaters was because EPA's survey showed most facilities managed these wastes as nonhazardous, in open tanks, and EPA's risk assessment showed unacceptable risk for the air exposure pathway. However, EPA failed to model wastewaters that are already defined as hazardous wastes, because the Agency assumed correctly that these wastes were being properly handled as hazardous. On-site injection of wastewaters to a permitted UIC well also was not modeled. At our Wichita facility, the proposed K173 wastewaters are managed as hazardous wastes and comply with 40 CFR 265 Subpart CC requirements, and wastewaters are injected in permitted hazardous Class I UIC wells. Therefore, EPA's primary basis for proposing to list chlorinated aliphatics wastewaters does not apply to Vulcan Chemicals Wichita facility. We are requesting EPA to consider either:

1. A complete exemption for our facility, similar to the exemption granted to wastewaters generated from the production of vinyl chloride monomer (VCM) using mercuric chloride catalyst in an acetylene-based process. The arguments made by EPA in 64 FR 46505 to exempt the VCM wastewaters also apply to our facility, or

2. A conditional-listing approach for the K173 list to exempt facilities such as ours that are already managing wastewaters from chlorinated aliphatics production in compliance with 40 CFR 265 Subpart CC. EPA's primary basis for listing K173 wastewaters is due to the risks associated with air releases of dioxins from wastewater treatment systems, specifically, aerated biological treatment tanks. EPA states in 64 FR 46500 that the emissions pathway of most concern is air emissions and that contaminant transport via air releases from tank-based systems was the most logical source of potential risk from managing these wastewaters. Our facility has eliminated the air exposure pathway, which is the primary basis of EPA's proposed rule. We are also unique in that wastewaters are disposed in a UIC well, rather than discharge to surface waters under an NPDES permit or to a POTW.

EPA should reconsider it's traditional listing approach for facilities such as ours in finalizing the K173 rule. We should be considered for either a complete exemption such as VCM wastewaters or a conditional-listing approach such as the one used to exempt EDC/VCM wastewater treatment sludges when disposed in subtitle D landfill. EPA justifies the former by stating that VCM wastewaters are already regulated under RCRA and other regulations. The latter is justified in the preamble with EPA stating that the Agency has evaluated the ways in which the wastes are likely to be managed and has determined that certain waste management activities would be protective of human health and the

environment. It is our opinion that these arguments apply to management practices employed at Vulcan's Wichita facility in managing wastewaters produced from chlorinated aliphatics production. Supporting arguments are presented next.

DETAILS

At the Wichita facility, we produce several chlorinated aliphatics at our Chloromethanes Plant. Wastewater generated from production of chlorinated aliphatics is managed as characteristic hazardous waste due to chloroform and carbon tetrachloride. The plant complies with Subpart CC requirements in that wastewaters are hard-piped to a head tank of a Class I UIC well. Air emissions from the UIC head tank are vented to an air pollution control device (APCD), a thermal oxidizer, with a >99 percent destruction efficiency. Wastewaters from the Chloromethanes plant are not comingled with other wastewaters until placement in the head tank. Our facility does not have a wastewater treatment unit exemption granted to other facilities who discharge under an NPDES permit or to a POTW.

As stated under Item 1 of the Summary section, EPA's arguments/rationale for exempting VCM wastewaters, apply to our facility. Specifically, EPA makes the following arguments in 44 FR 46505:

VCM wastestream is already identified as a hazardous waste due to the fact that the waste exhibits the toxicity characteristic. EPA notes that "the decision to not list this wastewater as hazardous is based in large part on the fact that the waste already is defined as a hazardous waste because it exhibits the toxicity characteristic. We have, accordingly, determined that there is no regulatory benefit in listing this wastewater as hazardous." This argument applies to our chlorinated aliphatics production wastewaters which exhibit the toxicty characteristic for chloroform and carbon tetrachloride.

Second argument noted by EPA is that "any risks associated with the management and disposal of the wastewaters are addressed by other environmental regulations." EPA is referring to discharge of wastewaters in compliance with an NPDES permit. EPA also cites the CAA, specifically the NESHAP requirements for vinyl chloride emissions and the Hazardous Organic NESHAP (HON) for the synthetic and organic chemical manufacturing industry sector. The chlorinated aliphatics wastewaters at our facility our regulated both under the SDWA and CAA. Under the CAA, the HON requirements apply to our facility too. The thermal oxidizer was constructed at a cost of $11MM to capture HON emissions. The UIC wells are operated under a UIC permit from the state agency and a land ban petition exemption from EPA.

Third, EPA commented on the uniqueness of the wastewater treatment system at the VCM facility. Our facility is unique in that we are one of the only two facilities that dispose wastewaters in UIC wells. Furthermore, we appear to be the only facility in the nation that manages chlorinated aliphatics wastewaters as hazardous due to characteristic, and the only facility that manages these wastewaters in closed tanks prior to disposal in a Class I hazardous UIC well. Majority of the other facilities manage these wastewaters in open tanks, aerated biological treatment tanks or tanks that are exempt from

regulation (per EPA's document "Listing Background Document for the Chlorinated Aliphatics Listing Determination" dated July 30, 1999). Even DuPont-Dow Elastomers in LA, the only other facility that disposes the proposed K173 wastewaters in UIC wells, does not manage the wastes as hazardous. In Table 4-6 of the Background Document, EPA justifies considering wastewaters injected in UIC wells to be included in risk assessment scenarios because "treatment in an open tank … was considered to be a management practice of concern and is currently in use." This statement does not apply to our facility.

As stated under Item 2 of the Summary Section, the air exposure pathway is not complete at our facility because we do not manage proposed K173 wastewaters in open tanks. Under III.E.1.a.i of 64 FR 46500, EPA lists the reasons that led the Agency to propose to list K173 wastewaters. EPA used it's 1996 survey responses and other publicly-available information in making a determination that "virtually all chlorinated aliphatic manufacturers treat these wastewaters in on-site, tank-based wastewater treatment systems prior to direct discharge of these wastewaters in accordance with facility-specific NPDES permits." The Wichita facility does not fall under this category. We do not treat proposed K173 waters onsite and we do not discharge under an NPDES permit. Discharge under an NPDES permit or to a POTW exempts wastewater management unit from regulation under RCRA. Neither of these exemptions apply to our tanks used for storage prior to disposal in Class I hazardous UIC wells.

Furthermore, EPA provides the following additional reasons for proposing listing K173 wastewaters. None of these apply to the management practices at the Wichita facility, as stated below.

"Given that wastewaters are managed in aerated biological treatment tanks, the emissions pathway of most concern is air emissions" (Wichita facility: Proposed K173 wastewaters are managed in closed tanks that are vented to an APCD)

"Given that a majority of the tanks used to treat chlorinated aliphatic wastewaters are designed to allow for aeration of the wastewater, these units may not completely control releases due to vapor emissions. Therefore, EPA determined that contaminant transport via air releases from tank-based systems was the most logical source of potential risk from managing these wastewaters." (Wichita facility: Proposed K173 wastewaters are managed in closed tanks that are vented to an APCD)

"We also centered our analysis on an evaluation of chlorinated aliphatic wastewaters not currently defined as hazardous waste, and that are managed in aerated, uncovered biological treatment tanks…this was the predominant practice observed" (Wichita facility: proposed wastewaters are managed as hazardous waste due to the toxicity characteristic and are managed in closed-top tanks)

"The risk analysis assumed that biological treatment occurs in aerated, uncovered tanks, because these conditions are typical for biological treatment in tanks…Because aeration increases air emissions, this scenario is expected to result in the highest risk estimates (compared with non-aerated and/or covered

tanks)". (Wichita facility: Proposed K173 wastewaters are managed in closed tanks that are vented to an APCD)

"the risks associated with management of wastewaters in aerated biological treatment tanks due to vapor emissions of dioxins are above the 1E-5 listing benchmark" (Wichita facility: EPA's risk assessment assumptions are overly conservative because practices employed at the facility were not modeled by EPA)

"our decision to propose to list these wastewaters and to propose technical standards to address air emissions from treatment tanks managing these wastewaters, is directly related to the fact that current regulatory programs do not appear to adequately address the type of air releases from these units that showed risk in our analysis." (Wichita facility: air emissions from proposed K173 wastewater management are regulated under CAA HON requirements and under RCRA Subpart CC)

EPA's above assumptions in estimating risks from management of proposed K173 wastewaters are overly conservative for management practices employed at the Wichita facility. Moreover, per EPA's risk assessment guidance, a "complete" air exposure pathway is not present at the facility. An exposure pathway is defined by the following four elements:

1. A source and mechanism of release of chemicals to the environment
2. A transport medium for the released chemical
3. An exposure point or point of potential contact between receptor and medium
4. An exposure route (e.g., inhalation, ingestion, etc)

An exposure pathway is considered "complete" only if all of these elements are present. If one or more elements are missing, the pathway is incomplete and no exposure is possible. Because air emissions from proposed K173 wastewater management units are controlled at the Wichita facility, element 1 above is missing. Therefore, the air exposure pathway is not complete. Moreover, EPA states in 64 FR 46501 that should the Agency determine, based upon public comment or peer review, that the wastewater risk assessment has overestimated the risks such that a decision to list this residual is not warranted, the Agency may decide against listing this waste. Considering the wastewater management practices at the Wichita facility, the air exposure pathway is insignificant and the facility should not be subjected to the same treatment as other facilities that meet EPA's listing criteria.

Agency Response:

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. As described in Section VI.A.4.a of the preamble to the final rule, this decision not to list chlorinated aliphatic wastewaters applies to all chlorinated aliphatic wastewaters, including wastewaters managed in underground injection control units.

SECTION 19
Chemical Manufacturers Association (CMA)
CALP-00019-1

Introduction:

Date: November 23, 1999

The Chemical Manufacturer's Association (CMA) is pleased to have the opportunity to comment on EPA's proposed rule concerning the Identification and Listing of Chlorinated Aliphatics Production Wastes. 64 FR 46477, August 25, 1999. CMA is a nonprofit trade association whose member companies comprise over 90 percent of the productive capacity for basic industrial chemicals in the United States. CMA member companies manage chlorinated aliphatic process wastes that may potentially be impacted by this proposed rule. Historically, CMA has commented on virtually all aspects of the hazardous waste management program, including a number of hazardous waste listing determinations.

19.1 CMA Comment:

CMA has identified several major comments and concerns in response to EPA's proposed rule to list chlorinated aliphatic process wastes as hazardous under RCRA. These comments are summarized as follows:

· EPA should not list the wastes described in their K173, K174, and K175 proposal. A properly conducted risk assessment would demonstrate that the risks from a plausible mismanagement scenario would be at least an order of magnitude lower than EPA has estimated and therefore lower than the listing limit EPA's of 1 x 10-5 that EPA has established as the threshold of concern for these wastes. In addition, EPA should exercise its discretion to not list the waste based on lack of significant risk to a plausibly affected population and excessive cost of regulation for risks avoided.

Agency Response:

Proposed K173: EPA is issuing a final decision not to list chlorinated aliphatic wastewaters for reasons described in the preamble to the final rule and relevant background documents.

Proposed K174: After reviewing and carefully considering all information provided by commenters, we re-evaluated our risk assessment results for our proposed listing determination for EDC/VCM wastewater treatment sludges. Based on information provided by commenters, we decided it was appropriate to adjust our proposed risk estimate, 2E-04, for the land treatment unit. 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 reduces the risk estimate to 1E-04. Accounting for a more reasonable pasture size would reduce this risk estimate to approximately 7E-05. Although the risk results for the land treatment unit may be lower than the risk estimates on which the proposed listing determination was based, the risk levels associated with dioxins in EDC/VCM wastewater treatment sludges for the land treatment scenario remain significant. 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 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 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.

Proposed K175: A summary of EPA's decision to list as hazardous wastewater treatment sludge from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process (VCM-A) is provided in Section VI.C.1. of the preamble to the final rule, and in Section 5 of this Response to Comment Document.

Population Risk: The Agency's response to the commenter's concerns regarding EPA's use of population risk results is provided in section 7.4 (response to American Petroleum Institute comments, CALP-00002).

19.2 CMA Comment:

· CMA identified two major flaws in EPA's risk assessment. First, EPA failed to properly account for sorption of dioxin when running its CHEMDAT8 model. Second, EPA assumed that all potentially affected individuals would be subjected to the highest predicted concentrations. Neither of these assumptions is valid and, when taken together, would result in a risk assessment that is a full order of magnitude less than currently predicted.

Agency Response:

The Agency's response to the commenter's concerns regarding CHEMDAT8 and how the model accounted for the sorption of dioxins is provided in Section 4.5 of this Response to Comments document (response to Vinyl Institute, CALP-00004).

The Agency's response to the commenter's concerns regarding the use of the highest wastewater dioxin concentration in the risk assessment for chlorinated aliphatic wastewaters is provided in section 4.9 of this Response to Comments document (response to Vinyl Institute, CALP-00004).

19.3 CMA Comment:

· Based on the Agency's analysis, no person will contract cancer based on the current management of the aliphatic wastes at issue. EPA projects the risk of excessive cancers at 0.0002 annually over the 40-year life of a land treatment unit and a predicted impacted population of 1,411. Thus, EPA's data predicts less than 0.3 excessive cancer deaths on an annual basis within that population. EPA, therefore, has not demonstrated that the waste is capable of posing substantial hazards under a plausible "mismanagement" scenario.

Agency Response:

Issues raised by commenters, and data provided in comments received in response to the proposed rule, caused the Agency to reevaluate the individual risk analyses that were the basis of our proposed risk estimates. After careful consideration of information provided by commenters, we lowered the estimated individual risk associated with the management of EDC/VCM sludges in a land treatment unit. However, given that the Agency's proposed risk estimate for the land treatment unit on which the proposed listing determination was based was at the upper end of the range of risks that the Agency considers to be of concern, the adjusted risk estimate for the land treatment unit is still above the 1E-5 individual risk level the Agency uses as guidance in making listing determinations. 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.

Based upon the Agency's findings that EDC/VCM wastewater treatment sludges pose significant risks when managed in land treatment units but pose no significant risks when managed in landfills, and based on the fact the single facility managing the waste in a land treatment unit appears to be an "outlier," 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.

With regard to the commenter's concerns related to the Agency's use of population risk in making a listing determination, the Agency's response to this issue is provided in section 7.4 of this Response to Comments document (response to American Petroleum Institute comment, CALP-00002).

19.4 CMA Comment:

· Finally, EPA estimates the cost of complying with this rule at $38.6 million, resulting in expenditures equivalent to greater than $15 billion per cancer death avoided. CMA's estimate places the cost of regulation much higher ? $108 million or expenditures approaching $ 1 trillion per cancer death avoided. Please note that we have attached the cost analysis developed by CMA's Policy, Economics and Risk Assessment Team.

Agency Response:

In contrast to some other Federal agencies, and to some authorizing statutes for other EPA programs (*e.g.,* the economic achievability criterion for effluent guidelines of Section 301(b)(2)(A) of the 1977 Clean Water Act), Congress' 1976 RCRA hazardous waste authorizing statute (with 1984 amendments) does not direct the EPA to apply economic analysis criteria, such as measures of cost-effectiveness, in either (a) promulgating RCRA Subtitle C hazardous waste regulations in general, or in (b) developing and promulgating criteria for identifying and listing hazardous wastes, in particular (see RCRA Subtitle C Sections 3001(a) & (b)(1)). For additional information about this specific aspect of RCRA, see EPA's 1980 review of the legal history of RCRA (Federal Register, Vol.45, No.98, 19 May 1980, p.33089), which arrived at the following determination:

"*Although the legislative history is sparse, it does contain sufficient indications of Congressional intent to lead the Agency to the*

conclusion that EPA may not consider cost burden upon industry in choosing the level of its standards. The Agency may, however, take cost considerations in account in order to select the most cost effective regulation among various alternatives... There is no explicit requirement in the Act directing EPA to consider costs in the development of its initial regulations. The singular focus of protecting human health and the environment distinguishes RCRA from other major pollution control statutes... The silence of the statute itself appears especially significant because earlier drafts of the legislation had contained language which either explicitly called for considerations of cost or implicitly sanctioned such consideration... Congress was aware that the hazardous waste regulation would impose substantial costs on the regulated community. Despite this recognition, Congress deliberately rejected provisions that would require consideration of cost burden on industry or to moderate the Act's environmental objectives. For these reasons, the Agency concludes that the Act prohibits it from considering such costs in the development of Subtitle C regulations as a basis for lessening the standards it considers necessary to ensure protection of human health or the environment."

As of 1999, two other Congressional statutes direct Federal regulatory agencies to conduct benefit-cost analyses in special circumstances where (a) unfunded Federal mandates may exceed $100 million in direct cost in any single year (1995 UMRA), or if (b) small entities are disproportionately affected (1980 RFA & 1996 SBREFA). Furthermore, the Executive Branch (Executive Order 12866 of 30 Sept 1993) only directs Federal regulatory agencies such as the EPA to conduct benefit-cost analyses in cases of economically "significant" rulemakings, which are defined as having adverse effects greater than $100 million on the national economy. Based on EPA's cost/impact estimates, both the proposed and final listing rules were not expected to exceed any one of these various benefit-cost analysis criteria. Consequently, the EPA did not develop a cost-effectiveness measure for either the proposed or final listing rule.

19.5 CMA Comment:

Based on the low risk, low impact, and high cost of listing these three wastes, EPA should exercise its discretion to not list these three wastes.

If EPA decides that the risks from these wastes warrant listing as a hazardous waste, CMA supports EPA using a contingent-management based approach. In particular, CMA supports not listing wastes

that are being managed in a way that does not present a substantial hazard risk to human health and the environment.

Agency Response:

See responses to comments above in section 19.1 regarding EPA's final listing decisions.

The Agency thanks the commenter for its stated support of the contingent management listing approach.

19.6 CMA Comment:

· CMA does not believe that Subpart CC controls are warranted. The risk analysis that EPA performed to support imposing Subpart CC controls is flawed, as noted above, and does not predict risks warranting regulation. The Agency, therefore, has not demonstrated that regulation is necessary to protect human health and the environment. In addition, the risks predicted are less than those used to justify the subpart CC regulations themselves. Furthermore, imposition of Subpart CC controls on these wastewater treatment units would be highly disruptive and may not be technically feasible.

Agency Response:

EPA is issuing a final decision not to list chlorinated aliphatic wastewaters for reasons described in the preamble to the final rule and relevant background documents. Because we are not finalizing the listing for chlorinated aliphatic wastewaters, 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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements.

19.7 CMA Comment:

CMA supports the Agency exempting sludges derived from treatment of K173 wastes from RCRA's "derived-from" rule. Even using EPA's overly conservative and flawed risk assessment, the risks from management of these sludges do not warrant regulation.

Agency Response:

See EPA's response to comment in Section 3.30 of this Response to Comment Document (comment from Dow Chemical, CALP-00012).

19.8 CMA Comment:

If EPA decides to list these wastes, then it should, at least, exempt the leachate collected from landfills that managed wastes meeting the listing descriptions but were not listed when placed in the unit. This action would be consistent with the recent refinery waste listing rule (63 FR 42110, August 6, 1998) and the dyes and pigments proposed rule (64 FR 40193, July 23, 1999) which avoided imposing RCRA requirements on previously disposed wastes.

Agency Response:

The Agency's response to this comment is included in Section 3.33 of this Response to Comments document (response to Dow Chemical).

19.9 CMA Comment:

In addition, EPA has not provided a valid basis for including these wastes in the F039 listing or the universal treatment standards. Thus, EPA should exempt these wastes from the F039 listings and its universal treatment standards until EPA has analyzed whether they pose a degree of risk that warrants regulation under the land disposal restrictions program.

Agency Response:

For the K174 wastes the presence of hepta and octa dioxin/furan congeners comprised a significant portion of the overall risk associated with dioxin/furan congeners, and the listing determination rational. See 64 FR 46499-46516. As detailed in the proposal, we believe an adequate basis exists for the listing of the subject wastes as hazardous. EPA makes no separate determination of a degree of risk that warrants regulation under the land disposal restrictions program. The land disposal restrictions program functions to diminish the toxicity of the waste or substantively 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 as required by statute (RCRA Section 3004(m)(1), 42U.S.C. 6924(m)(1).) EPA is in the process of evaluating what degree of removal provides adequate treatment as a aspect of its proposed Hazardous Waste Identification Rule, and may modify its treatment standards accordingly in a future rulemaking.

With regard to multisource leachate, leachate from both active and inactive land disposal units which contact a hazardous waste is considered to be the same hazardous waste as the original waste. EPA assigned the F039 designation to these multisource wastewaters to simplify waste treatment standards. Because K174 is listed for constituents in addition to those currently listed in F039, if the Agency failed to add the constituents to F039, then a condition would be created wherein the requirement to treat for the unique K174 constituents in multisource leachate would be obscured, and

a regulatory conflict would be created between application of the most stringent standards as per 40 CFR 260.40(c), and the Agency's statements in the F039 final rule that the requirements of F039 replace those of wastes resulting from multiple waste codes (55 FR 22619, June 1, 1990). It is the Agency's intent that K174 constituents be treated. Absent the addition of the hepta and octa congeners to F039, leachates that contain K174 which should be treated for their hepta- and octa- dioxin/furan content may not have the constituents even identified for treatment.

Prior listings attributed significant risks only to the presence of tetra, penta, and hexa congeners. Current regulations already require that F039 wastes be treated for the tetra-, penta-, and hexa- dioxin/furan congeners which together with the hepta and octa congeners proposed are used to determine the risk now generally expressed in reference to the 2,3,7,8-TCDD Toxicity Equivalent Quotient (TEQ) concentration. It would be highly arbitrary to protect from one isomer and not the other when each is thought to contribute to the overall cumulative toxic effect, and there exists the potential for photo conversion of the less toxic isomers to more toxic isomers. Therefore, we maintain that the proposed additions are necessary to maintain adequate treatment of all multisource leachates, and are promulgating the proposed additions.

19.10 CMA Comment:

CMA fully endorses the comments of the Chlorine Chemistry Council and the Vinyl Institute on EPA's risk assessment.

Agency Response:

EPA acknowledges CMA's support for comments submitted by the Chlorine Chemistry Council and by the Vinyl Institute. The Agency's responses to comments submitted by the Chlorine Chemistry Council are provided in section 10 of this Response to Comments document. The Agency's responses to comments submitted by the Vinyl Institute are provided in section 4 of this Response to Comments document.

19.11 CMA Comment:

CRITIQUE OF ECONOMIC ANALYSIS:
EPA RCRA PROPOSED RULE ON CHLORINATED ALIPHATICS

The CMA Waste Team asked PERA to review and critique EPA's economic analysis for the proposed rule on chlorinated aliphatic compounds. The proposal would list certain chlorinated aliphatic production wastes as hazardous and subject to RCRA requirements. PERA reviewed the *Economics Background Document* and identified flaws in EPA's analysis that have the effect of understating the potential cost of the proposed rule. Whereas EPA estimated the present value cost of the rule to be as

high as $38.6 million (Exhibit E-5, Scenario 2, 7% discount rate), PERA's changes to the EPA estimate raise the present value cost to at least $108 million. Other concerns have been identified that, if corrected, would raise the overall cost of the rule significantly.

Agency Response:

The total expected industry compliance cost for the final rule is significantly less than what may be expected for the 1999 proposed listing rule, because EPA is issuing a final decision not to list chlorinated aliphatic wastewaters for reasons described in the preamble to the final rule and relevant background documents.

19.12 CMA Comment:

EPA Methodology

EPA based its analysis on a universe of 23 facilities that produce chlorinated aliphatic compounds. From a survey of these facilities on waste practices, EPA determined how many of thee facilities would be impacted by various components of the proposed rule, and how these impacted facilities would choose to comply with the rule. EPA used cost engineering techniques to estimate the capital and operation and maintenance costs of the rule. EPA then estimated the present value of the rule under future waste generation scenarios.

Agency Response:

The comment provides a correct summary of the methodological approach taken in the 1999 economic analysis. In addition to expressing industry compliance costs on a "present value" basis, the economic analysis also expressed costs on an "average annualized" basis. The latter expression is commonly used in engineering economics, particularly in cases where multi-year effects (costs and benefits) are anticipated. Furthermore, annualization of costs also often better represents the actual financial expenditure streams associated with lump-sum amounts of economic (societal resource) costs.

19.13 CMA Comment:

Problems with EPA's Methodology

In the section of the economic analysis describing the regulated industry, EPA underestimated production of chlorinated aliphatic compounds (Exhibit 7). Published production data (Mannsville Chemical Products, *Chemical Products Synopsis*) for seven chlorinated aliphatic compounds shows that production is at least 39% greater than that estimated by the Agency, and sales revenue is at least 21% higher than EPA's estimate. See Table 1.

Table 1. U.S. Production of Selected Chlorinated Aliphatic Compounds.

Chemical	*Production (millions of pounds)*	*Average Year-End Price ($/lb.)*	*Sales Value ($)*
Ethylene dichloride	27,091	0.07	1,896,370,000
Methylene chloride	287	0.28	80,360,000
Chloroform	758	0.23	174,340,000
Perchloroethylene	347	0.27	93,690,000
Vinyl chloride*	15,875	0.22	3,492,500,000
Trichloroethylene	240	0.55	132,000,000
Methyl chloride**	1,060	0.30	318,000,000

Source: Mannsville Chemical Products, *Chemical Products Synopsis*.
Note: Unless otherwise noted, data reflect 1998 values.
* Data reflect 1997 values.
** Data reflect 1996 values.

Agency Response:

EPA greatly appreciates CMA researching for and providing this data to us. These data have been referenced and incorporated into a revised annual product sales estimate for the US chlorinated aliphatics manufacturing industry, in the "Economics Background Document" for the final listing rule. The total production displayed in CMA's data "Table 1" above is 45.658 billion pounds, and the total sales value is about $6.187 billion. In comparison, the 1999 "Economics Background Document" (Section III.B) provided an estimate of 38.8 billion pounds (which is a 15% underestimate compared to CMA's data "Table 1") based on limited data for only three types of chlorinated aliphatic chemicals (i.e. EDC, VCM, methyl chloride), and an estimate of $4.3 to $6.7 billion in annual sales (which is relatively accurate compared to CMA's data "Table 1").

19.14 CMA Comment:

EPA underestimated the number of facilities that produce chlorinated aliphatic compounds. EPA estimated that 23 facilities would be covered by the proposed rule. Published data (SRI International, *1998 Directory of Chemical Producers: United States of America*) shows at least 38 facilities that produce one or more chlorinated aliphatic compounds as of spring 1998. See Table 2.

Table 2. U.S. Producers of Selected Chlorinated Aliphatic Compounds.

Company	*Facility Location*	*Chlorinated Aliphatic Compounds Produced On-Site*
Akzo Nobel	Gallipolis Ferry, WV	n-butyl chloride
Albemarle	Magnolia, AK	Bromochloromethane
Albright & Wilson	Charleston, SC	n-butyl chloride
Allied Signal	Baton Rouge	chlorodifluoromethane, trichlorotrifluoroeethane
	El Segundo, CA	1-chloro-1,1-difluoroethane, chlorodifluoromethane, 1,1,-dichloro-1-fluoroethane
ASHTA	Ashtabula, OH	Chloropicrin
Ausimont	Thoroughfare, NJ	1-chloro-1,1-difluoroethane
Borden	Geismar, LA	ethylene dichloride
Condea Vista	Lake Charles, LA	vinyl chloride, ethylene dichloride
Dow	Freeport, TX	trichloroethylene, ethylene dichloride, chloroform, methyl chloride, 3-chloropropene, ethyl chloride, vinyl trichloride, 1,3-dichloropropene, 1,2,3-trichloropropane, vinylidene chloride
	Oyster Creek,	vinyl chloride, ethylene dichloride
	Plaquemine, LA	vinyl chloride, ethylene dichloride, methylene chloride, chloroform, perchloroethylene, methyl chloride
Dow Corning	Carollton	methyl chloride
	Midland, MI	methyl chloride
DuPont	Louisville, KY	Chlorodifluoromethane
Elf Atochem	Wichita, KA	Chlorodifluoromethane
	Calvert City, KY	1-chloro-1,1-difluoroethane, 1,1,-dichloro-1-fluoroethane
Formosa	Baton Rouge, LA	vinyl chloride, ethylene dichloride
	Point Comfort	vinyl chloride, ethylene dichloride
GE Plastics	Waterford	methyl chloride
Geon	LaPorte	vinyl chloride, ethylene dichloride

Company	*Facility Location*	*Chlorinated Aliphatic Compounds Produced On-Site*
Georgia Gulf	Plaquemine, LA	vinyl chloride, ethylene dichloride
Great Lakes Chemical	El Dorado, AK	Chlorotrifluoromethane
Halocarbon Products	North Augusta, SC	2-bromo-2-chloro-1,1,1-trifluoroethane
Holtrachem	Orrington, ME	Chloropicrin
LaRoche Industries	Gramercy, LA	1,1,-dichloro-1-fluoroethane
Niklor	Long Beach, CA	Chloropicrin
Oxychem	Convent	ethylene dichloride
	Corpus Christi,TX	ethylene dichloride
Oxychem	Deer Park, TX	vinyl chloride, ethylene dichloride
Oxymar	Ingleside	vinyl chloride, ethylene dichloride
PCR	Gainesville, FL	Chlorodifluoroethylene
PPG	Lake Charles, LA	vinyl chloride, trichloroethylene, ethylene dichloride, perchloroethylene, ethyl chloride, methyl chloroform, vinylidene chloride
Shell	Norco, LA	3-chloropropene
	Deer Park, TX	1,2,3-trichloropropane
Trinity Manufacturing	Hamlet, NC	Chloropicrin
Vulcan	Geismar,	ethylene dichloride, methylene chloride, chloroform, perchloroethylene, methyl chloride, carbon tetrachloride, methyl chloroform,
	Wichita, KA	ethylene dichloride, methylene chloride, chloroform, methyl chloride, carbon tetrachloride
Westlake	Calvert City, KY	vinyl chloride, ethylene dichloride

Source: SRI International, *1998 Directory of Chemical Producers: United States of America*.
Note: The number of chemical producers may be greater than 38. This table only includes those chemical producers identified for the chemicals listed in the third column and included in the 1998 SRI directory.

By missing several facilities, EPA runs the risk of misrepresenting how these facilities might comply with the rule. Some of these facilities may comply in ways not envisioned by EPA's analysis. For example, in order to comply with the rule, the Shell Deer Park facility would have to close several impoundments and install tanks. The cost for this one facility is greater than that for any facility identified by EPA in their analysis, which assumes that no facility will have to switch from impoundments to tanks. EPA

should ensure that it has identified the universe of facilities affected by their proposal and survey each facility to ensure that it understands how facilities would comply.

Agency Response:

EPA greatly appreciates the research and level-of-effort expended by CMA in providing this information to us. EPA agrees that the incorrect and/or incomplete identification of the universe of potentially affected industrial facilities (and other types of entities as may be applicable to a rulemaking) is a potential source of mis-representing and mis-estimating the impacts of a rulemaking. Yes, the Shell facility's surface impoundments were not discovered in the research and investigations made by EPA in preparing the 1999 proposed listing rule. However, the Shell surface impoundments are addressed in the final rule (as well as in the final economic analysis).

In both the 1992 and 1997 "Section 3007" industry surveys, EPA attempted to identify and survey each relevant facility. This effort is made difficult in part because this particular industry is rather dynamic as exhibited by annual changes in the volume and types of chlorinated aliphatic chemicals manufacturing at any single facility, as well as by facility or process closures, new facility starts, and change in company ownership. Otherwise, EPA examined CMA's list of 38 facilities, (a) for purpose of comparing it to EPA's 1999 list of 23 facilities, and (b) for purpose of determining whether other facilities on CMA's list may be subject to and affected by the proposed and final listing. The detailed findings of this examination and comparison are provided in a Chapter 5 of the *Listing Background Document for the Chlorinated Aliphatics Listing Determination (Final Rule)*. Basically, the 15 additional facilities identified by CMA are not affected by the proposed or final listing, because (a) some do not manufacture (as of 1997-1999) the specific types of chlorinated aliphatics products covered by the listing, and (b) some are duplicate listings to those identified by EPA.

19.15 CMA Comment:

EPA underestimated the historical production growth rate. Even though EPA states that chlorinated aliphatic production is driven by PVC demand (page 23), EPA does not use historical PVC production as a surrogate for future chlorinated aliphatic production. Instead, EPA assumed chlorinated aliphatic production would grow at the same rate as U.S. manufacturing output (1.5% per year). PERA took published data on production of PVC (Mannsville Chemical Products, *Chemical Products Synopsis*), ran a regression of the natural logarithm of production as a function of time, and concluded that the average annual growth rate for PVC production is 5.4%. See Table 3. The regression results are presented in Table 4. (The estimate of 5.4% is very similar to EPA's own estimate of 5.2% for global PVC growth, shown in Exhibit 5.)

Table 3. U.S. Production of Polyvinyl Chloride.

Year	*U.S. Production (millions of pounds)*
1975	3,695
1980	5,485
1985	6,668
1988	8,588
1990	9,363
1993	10,257
1994	10,607
1995	10,975
1996	12,100
1997	12,980

Source: Mannsville Chemical Products, *Chemical Products Synopsis*.

Table 4. Regression Results for the Natural Log of Production as a Function of Time.

Parameter	*Value*	*Lower 95%*	*Upper 95%*
y-intercept	8.232589	8.140849	8.324329
coefficient, *x*-variable	0.053509	0.04805	0.058967
R^2	0.984588	NA	NA
Adjusted R^2	0.982661	NA	NA

Note: Multiplying the coefficient for the x variable by 100 provides an estimate of the annual growth rate of PVC production. The 95% confidence interval for this value is between 4.8% and 5.9%.

Agency Response:

This comment reflects a mis-interpretation of the approach taken in the 1999 "Economics Background Document" (EBD), to establishing a future "growth" scenario in annual industry compliance costs. As described in Section V.E.3 of the 1999 EBD, four alternative future cost "scenarios" were presented, one of which (i.e. "Scenario #2") EPA derived based on the historical 27-year (1970-1996) historical US annual production of chlorinated aliphatic chemicals. As displayed in Exhibit 3 of the 1999 EBD, historical production grew from a total of 13,272 million pounds in 1970, to 37,675 million pounds in 1996, which represents an average annual effective growth rate of 4.1% (as displayed in the bottom right corner of Exhibit 3), computed as follows:

Annual Effective Growth Rate = [[((37,675) / (13,272)) ^ (1/26)] -1] x 100%
= (1.0409 -1) x 100%
= 0.0409 x 100%
= 4.09% (rounded up equals 4.1%)

However, rather than applying the resultant 4.1% average annual historical growth rate to the future 30-year period-of-analysis (2001-2030), the same EPA-OSW applied a statistical linear regression (least squares) analysis to the same historical production data series from Exhibit 3. The results of the regression analysis are presented in Exhibit E-2 of the 1999 EBD (regression r-squared = 0.843, regression coefficient = 1008.1, and regression constant = -1978124). Exhibit E-2 also presents the resultant regression-fit values for the historical years (i.e. 1970-1996) side-by-side to the actual historical data, and the Exhibit also presents the resultant regression-forecasted values (in annual million pounds of production) for the future period-of-analysis 2001-2030 applied in the economic analysis for the proposed listing. It is important to observe that in both time periods (i.e. historical and forecasted), the annual rate of growth actually declines from year-to-year within each period. Consequently, the average annual effective rate of growth should not be applied to represent growth in any particular year, or in any other time period. In general, the cumulative effect of continued growth in any numerical series, is that the computational base upon which to compute annual percentage change grows over time, so that an identical incremental magnitude in a future year with a larger computational base, represents a smaller percentage change, compared to a previous year with a smaller computational base. As also shown in Exhibit E-2, when expressed as an annual percentage change, the regression-forecasted future growth in production (from 39,013 to 68,246 million pounds over 2001 to 2030), represents an average annual effective growth rate of 1.95% (as displayed in the bottom right corner of Exhibit E-2). For these reasons, EPA-OSW maintains that it is inappropriate to simply apply average annual effective rates of change based on historical data series, to future periods. However, in the spirit of presenting alternative assumptions, the economic analysis for the final rule includes CMA's 5.4% average annual growth rate applied to future costs, as an alternative assumption in the sensitivity analysis of costs.

19.16 CMA Comment:

EPA overestimated equipment life. EPA used 30 years (page 55). They should have used 20 years because that is the expected lifetime of the equipment. (Experts in cost engineering recommend using the expected equipment lifetime to amortize the cost of pollution control equipment, rather than the depreciation schedule allowed by the IRS.)

EPA based its equipment costs on relatively old (pre-1991) data (see note a in Exhibits D-4 and D-5). The Agency should survey vendors of tanks to determine the current market price of such tanks. Absent such a survey of vendors, the Agency should employ publicly available indices to extrapolate the purchase price of pre-1991 pollution control equipment to the present.

Agency Response:

The 30-year annualization "period-of-analysis" (POA) applied in the 1999 economic analysis was founded on four alternative POA considerations (i.e., pollution control equipment lifespan POA, historical data series POA, medium-term POA, and accounting depreciation POA), not just on tank equipment lifespan. Of these alternative considerations, the lifespan consideration was founded primarily on wastewater tank cover/control equipment, which is no longer relevant to the final listing rule because the K173 listing is dropped from the final rule. The 30-year POA is maintained in the final rule economics analysis for other reasons described in the final rule Economics Background Document. (However, for one regulatory compliance component of the K174 final listing (installing wastewater piping), a 20-year lifespan is applied as an assumed operating lifespan, so that the initial lump-sum cost is also applied again in year 21 of the 30-year POA.

Although relevant to the 1999 proposed rule, the issue of applying index-updated 1991 tank equipment cost data in the 1999 economics analysis, is not relevant to the final rule, because the K173 wastewater listing is dropped.

19.17 CMA Comment:

Apparently, EPA's analysis is based on the presumption that, as a result of compliance with the wastewater provisions, spent carbon is not a RCRA waste (see note e, Exhibit D-5). If it were a RCRA hazardous waste, the operations and maintenance (O&M) cost would be more than that specified in the analysis. The Agency should clarify in the rule that such waste is not a RCRA hazardous waste. If the Agency believes the spent carbon to be RCRA hazardous, or if it has not yet made a determination, then the economic analysis should assume that the spent carbon is a RCRA hazardous waste, and EPA should include the additional cost in its O&M cost estimate.

Agency Response:

EPA is issuing a final decision not to list chlorinated aliphatic wastewaters for reasons described in the preamble to the final rule and relevant background documents. Therefore, spent carbon will not be a hazardous waste on the basis of it being derived-from chlorinated aliphatic wastewaters.

19.18 CMA Comment:

Revised Cost Estimate

PERA re-estimated the potential cost of the rule by replacing some, but not all, of EPA's data/assumptions with more accurate and representative data/assumptions. Specifically, PERA assumed 38 facilities would be covered by the rule, a 5.4 % growth rate for future production, and an

equipment life of 20 years. These changes alone raise EPA's "annual average equivalent" estimate from $3.109 million (Exhibit E-5, Scenario 2, 7% discount rate) to $7.673 million (7% discount rate). The present value of the total cost to regulated entities is $38.6 million in EPA's analysis (Exhibit E-5); PERA estimates the cost to be at least $108 million. EPA's total cost estimate (derived from Exhibit E-5, Scenario 2, 7% discount rate) is $95 million; the changes noted previously raise the total cost to $252 million. To generate a more accurate cost estimate, EPA should factor in the compliance cost for the Shell Deer Park facility and any other entity not represented by the facilities included in EPA's analysis. It is possible that the estimated cost in the first year of implementation would exceed $100 million, and therefore trigger analyses required by the Unfunded Mandates Reform Act.

Agency Response:

EPA appreciates CMA's level-of-effort in critiquing the 1999 economic analysis, particularly in supplying us with additional industry characterization data and working assumptions applied in cost-estimating computations. See our responses above to CMA's prior comments on number of facilities, industry production growth rate, and equipment lifespan years. The Agency notes that in the final rule, we are not listing chlorinated aliphatic wastewaters as hazardous waste. Therefore, the cost of the final rule is significantly less than the cost associated with the 1999 proposed rule. The economic analysis for the final rule includes potential impacts of the listing on the Shell facility. For reasons described in our response to Occidental Chemical Corporation (CALP-00013) in sections 14.1 and 14.2 of this Comment Response document, it is usually not appropriate to compare the total costs of a regulation to the $100 million UMRA economic review threshold, without first examining the expected annual pattern and expected annual magnitude of financial expenditures, compared to the pattern and magnitude of economic (societal) costs.

SECTION 20
Vulcan Chemicals
CALP-00020

Vulcan Chemicals, a business group of Vulcan Materials Company, appreciates this opportunity to comment on the EPA's proposed rulemaking pertaining to the Identification and Listing of Chlorinated Aliphatics Production Wastes [64 FR 46477, August 25, 1999]. Vulcan Chemicals is a producer of chlorine, caustic soda, and chlorinated organic solvents, with chloralkali manufacturing plants located in Wichita, KS, Geismar, LA, and Port Edwards, WI. Vulcan Chemicals participates as a member company of the Chemical Manufacturer's Association (CMA), the Chlorine Chemistry Council (CCC), the Chlorine Institute (CI), and the Halogenated Solvents Industry Association (HSLA). Vulcan wholly adopts CMA's principles of Responsible Care®, and is committed to the safe and responsible production, handling, and distribution of its chemical products. Vulcan's comments to this proposed rulemaking are divided in four main points.

20.1 Vulcan Chemicals (Birmingham, AL) Comment

First, removal of the exemption to manage dilute wastewaters from rulemaking under the Clean Water Act is unreasonable, and based upon unsound scientific fact. Repealing such an exemption, based upon an overestimated risk modeling scenario (e.g.: CHEMDAT8), creates undue materials management and cost requirements on the chlorinated solvent industry. This is especially true when considering the Subpart CC implications that this rule, if passed in its current form, will require.

Vulcan believes that the risks associated with the EPA's "comprehensive" multi-media risk assessments are negligible. EPA has set the high-end of its risk determination at 2×10^{-5} for wastewaters, which is above the EPA's stated threshold for the listing determination of 1×10^{-5}. Furthermore, models such as CHEMDAT8, using unrealistic predictions of constants derived from equations such as Henry's Law, overestimates dioxin emissions from dilute wastewaters and should not require the chlorinated solvent industry to incur large capital expense to install Subpart CC controls. Vulcan questions the validity of EPA's conclusions that significant risk is posed by removing these wastewaters from the CWA exemption, and managing them as if they were a listed hazardous waste.

Agency Response:

EPA is issuing a final decision not to list wastewaters from chlorinated aliphatic production processes as hazardous. As described in more detail in the final rule and accompanying background documents, the Agency has determined that these wastewaters do not pose substantial risks when managed in aerated biological treatment tanks.

Because we are not finalizing the listing for chlorinated aliphatic wastewaters as proposed, the proposed amendments to regulations for tanks managing chlorinated aliphatic wastewaters (*i.e.*, amendments to the "wastewater treatment unit exemption") 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 sections 264.1 and 265.1, as well as the proposed amendments to the 40 CFR subpart CC requirements for implementing the tank cover requirements and the waste sampling and analysis requirements.

For a detailed discussion of issues raised by this commenter regarding the risk assessment for chlorinated aliphatic wastewaters, the reader is referred to Agency responses to comments from Dow Chemical and the Vinyl Institute (Sections 3 and 4 of this Response to Comment Document, respectively).

20.2 Vulcan Chemicals (Birmingham, AL) Comment

Second, it is Vulcan's opinion that EPA has improperly concluded from a simple economic assessment, that implementation of these rules will cost the industry less than $100MM per year, annualized. EPA has failed to recognize many of the costs associated with Subpart CC controls, such as covering and piping wastewater storage tanks, closing surface impoundments and sumps, etc., will cost the combined, affected industries above $l00M, and thus, warrants an economic impact study by the Office of Management & Budget (0MB).

Agency Response:

In the proposed rule, EPA presented estimated compliance costs based upon the information available to the Agency at the time of proposal. However, based upon revised risk estimates (explained in detail in the final rule and accompanying background documents) EPA is issuing a final decision not to list wastewaters from chlorinated aliphatic production processes as hazardous. Therefore, the specific compliance costs raised by the commenter that are associated with the proposed K173 listing are no longer at issue in the final rule.

20.3 Vulcan Chemicals (Birmingham, AL) Comment

Third, if wastewaters become listed under this proposed rulemaking, Vulcan supports both the CMA and the CCC comments regarding the validity of the proposed 1 ng/L TCDD TEQ concentration in wastewater, that triggers the application of the air emissions control requirements. Again, Vulcan does not feel that the science and risk assessment determination warrants what appears to be a relatively "arbitrary" concentration limit for setting air emission controls for dioxin and dioxin-like compounds from wastewater operations.

Agency Response:

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 sections 264.1 and 265.1, as well as the proposed amendments to the Subpart CC requirements for implementing the tank covers, which also includes waste sampling and analysis requirements. Regarding this commenter's support of comments from CMA and CCC, please see Agency responses to CMA and CCC in Sections 10 and 19, respectively, of today's Response to Comment Document.

20.4 Vulcan Chemicals (Birmingham, AL) Comment

Fourth, Vulcan questions the statutory authority of the EPA to add five congeners into the existing requirements for universal treatment standards (UTS) and land disposal restrictions (LDR). EPA has a statutory requirement to consider the potential need for national capacity variances before adopting new or changed LDR rules. It has a constitutional requirement to consider the impact of new regulatory requirements before they are enacted. Vulcan does not believe that the due process requirements have been met in regards to this proposed rulemaking with respect to UTS and LDR. Based upon a review of the proposed regulations, it does not appear that the EPA has determined, what fraction of the hazardous wastes required to meet these new requirements will fail; the appropriate means of treatment (if any); and if there is sufficient national capacity to meet the newly imposed treatment burden.

Agency Response:

EPA has complied with the Administrative Procedures Act by first proposing to amend the list of constituents for F039 and UTS. There are no legal constraints to prohibit EPA from revising the LDR treatment standards to minimize short-term and long-term threats to human health and the environment (RCRA § 3004(m)(1)). As we noted in the proposal, in general, EPA requested data on the annual generation volumes and characteristics of wastes affected by this proposed rule and the current treatment or recovery capacity capable of treating the wastes (64 FR 46523).

EPA has the authority to postpone prohibitions on the land disposal of a "newly identified" hazardous waste for two years on a national basis and (potentially) two more years on a case-by-case basis from "the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available" (RCRA § 3004(h)(2)). Here, when changing the treatment requirements for wastes already subject to LDR (including F039 and characteristic wastes), EPA no longer has authority to use RCRA § 3004(h)(2) to grant a capacity variance to these wastes. However, EPA is guided by the overall objective of Section 3004(h), that treatment standards best accomplishing the objective of

Section 3004(m) to minimize threats posed by land disposal should take effect as soon as possible, consistent with the availability of treatment capacity. Therefore, we evaluated whether sufficient treatment capacity is available for these wastes and based the effective date on this estimate.

In this case, EPA does not believe that such a delay in the effective date is necessary because, according to our analysis, we do not expect a treatment capacity shortfall for these wastes as a result of the addition of the new dioxin and furan congeners to the table of UTS at 40 CFR 268.48 and to the list of regulated constituents in hazardous leachate, F039, in 40 CFR 268.40.

For details, see EPA's response to Dow Chemical's comment in Section 3 of this Response to Comment Document, and see also "Background Document for Capacity Analysis for Land Disposal Restrictions: Newly Identified Chlorinated Aliphatics Production Wastes (Final Rule)," September 2000 in the docket.