

ENVIRONMENTAL PROTECTION AGENCY**40 CFR Part 261**

[SWH-FRL-6185-3]

RIN 2050-AD84

Hazardous Waste Management System: Identification and Listing of Hazardous Waste Solvents

AGENCY: Environmental Protection Agency.

ACTION: Final decision.

SUMMARY: The U.S. Environmental Protection Agency (EPA) is issuing a final decision not to list wastes generated from the use of 14 chemicals as solvents as hazardous under the Resource Conservation and Recovery Act (RCRA). The determinations in this rule are limited to specific solvent wastes. This rule is a determination only that the solvent wastes considered will not be added to the list of hazardous wastes and is not a determination that the underlying chemicals are nontoxic in all circumstances in which they are used or discarded.

DATES: Today's final decision will become effective on December 21, 1998.

ADDRESSES: Supporting materials are available for public viewing and photocopying in the RCRA Information Center (RIC), located at Crystal Gateway I, First Floor, 1235 Jefferson Davis Highway, Arlington, VA. The Docket Identification Number is F-98-SLDF-FFFFF. The RIC is open from 9:00 a.m. to 4:00 p.m., Monday through Friday, excluding federal holidays. To review docket materials, it is recommended that the public make an appointment by calling (703) 603-9230. The public may copy a maximum of 100 pages from any regulatory docket at no charge. Additional copies cost \$0.15/page. The index and some supporting materials are available electronically. See the **FOR FURTHER INFORMATION CONTACT** section for information on accessing them.

FOR FURTHER INFORMATION CONTACT: The RCRA/Superfund Hotline, toll-free, at (800) 424-9346 or at (703) 920-9810. The TDD Hotline number is (800) 553-7672 (toll-free) or (703) 486-3323 in the Washington, DC metropolitan area.

For technical information on the RCRA hazardous waste listings, contact Ron Josephson or Robert Kayser, Office of Solid Waste (5304W), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460. The telephone number is (703) 308-8890.

SUPPLEMENTARY INFORMATION: There are no regulated entities as a result of this action.

The index and the supporting materials are available on the Internet: Follow these instructions to access the information electronically:

WWW: <http://www.epa.gov/epaoswer/hazwaste.htm#id>

FTP: <ftp://ftp.epa.gov>

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Files are located in /pub/oswer

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I. Legal Authority and Background**A. Statutory and Regulatory Authorities**

The Environmental Protection Agency (EPA) conducted this investigation and listing determination under the authority of sections 2002(a), 3001(a), (b) and (e)(2) of the Solid Waste Disposal Act (42 U.S.C. 6912(a), and 6921(b) and (e)(2)), as amended by various other laws, the most comprehensive of which was the Hazardous and Solid Waste Amendments (HSWA) of 1984. These statutes are commonly referred to as the Resource Conservation and Recovery Act (RCRA) and are codified at Volume 42 of the United States Code (U.S.C.), sections 6901 to 6992(k).

Section 3001(a) of RCRA, 42 U.S.C. 6921(a), requires EPA to promulgate criteria for identifying characteristics of hazardous wastes and for listing hazardous wastes. Section 3001(b) of RCRA requires EPA to promulgate regulations, based on these criteria, identifying and listing hazardous wastes which shall be subject to the requirements of the Act. Section 1004(5) of RCRA, 42 U.S.C. 6903(5), defines the term "hazardous waste." There are two types of hazardous waste. First, hazardous wastes are those solid wastes which may cause or significantly contribute to an increase in mortality, serious irreversible illness, or incapacitating reversible illness. Second, hazardous wastes are those solid wastes which may pose a substantial present or potential hazard to human health or the environment when improperly managed. Id.

EPA's regulations establishing criteria for listing hazardous wastes are codified at Title 40 of the Code of Federal Regulations (CFR) 261.11 (40 CFR 261.11). Section 261.11 presents three criteria by which EPA identifies wastes as hazardous.

First, solid wastes may be classified as "characteristic" wastes if they exhibit any of the characteristics of hazardous waste identified at 40 CFR 261.21-24 (i.e., ignitability, corrosivity, reactivity, or toxicity).

Second, solid wastes may be listed as acutely hazardous if they are fatal to humans at low doses, lethal in animal studies at particular doses designated in the regulation, or otherwise capable of causing or significantly contributing to an increase in serious illness.

Third, solid wastes may be listed as hazardous if they contain any of the toxic constituents identified in Appendix VIII of 40 CFR part 261 and the Agency concludes, after considering the eleven factors enumerated in 40 CFR 261.11(a)(3), that the waste is capable of

posing a substantial present or potential hazard to human health or the environment when improperly managed. A substance is listed in Appendix VIII if it has been shown in scientific studies to have toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms. Today's listing determination has been made pursuant to this third set of criteria.

As part of its regulations implementing section 3001(b) of RCRA, EPA published a list of hazardous wastes that includes hazardous wastes generated from nonspecific sources (F-wastes) and a list of hazardous wastes from specific sources (K-wastes). These lists, published at 40 CFR 261.31 and 261.32, respectively, have been amended several times.

Persons who generate, transport, treat, store, or dispose of wastes listed as hazardous must do so subject to Federal requirements under RCRA. Facilities that must meet the hazardous waste management requirements, including the need to obtain permits to manage hazardous wastes, are commonly referred to as RCRA Subtitle C facilities. EPA standards and procedural regulations implementing Subtitle C are found generally at 40 CFR parts 260 through 279.

Solid wastes that are not hazardous wastes may be disposed of at facilities that are overseen by State and local governments. These facilities are referred to as RCRA Subtitle D facilities. EPA regulations affecting Subtitle D facilities are found generally at 40 CFR parts 240 through 247, and parts 255 through 258.

Section 3001(e)(2) of RCRA requires EPA to determine whether to list as hazardous several specified wastes, including solvent wastes. The Environmental Defense Fund (EDF) and EPA entered into a consent decree to resolve issues raised in a civil action brought by EDF (*EDF v. Browner*, Civ. No. 89-0598 (D.D.C.)) in which the Agency agreed, among other things, to a schedule for making a listing determination on spent solvents. This listing determination is to consider spent solvents, still bottoms from the recovery of these solvents, and spent solvent mixtures when the following chemicals are used as solvents: cumene, phenol, isophorone, acetonitrile, furfural, epichlorohydrin, methyl chloride, ethylene dibromide, benzyl chloride, p-dichlorobenzene, 2-methoxyethanol, 2-methoxyethanol acetate, 2-ethoxyethanol acetate, and cyclohexanol.

For an additional set of seven solvents, EPA agreed to conduct a study

and issue a final report by August 30, 1996. This study, which EPA completed on August 22, 1996, discusses the wastes associated with the use of the materials as solvents, the toxicity of the wastes, and a description of the management practices for the wastes.

Solvent uses are found throughout various industries and, thus, would fall under the category of wastes from nonspecific sources (F-wastes) if listed in 40 CFR 261.31. In fact, wastes designated F001 through F005 are various wastes from solvent uses of a number of chemicals. In today's action, EPA has decided not to amend 40 CFR 261.31 to add wastes generated during the use of the 14 chemicals of concern as solvents.

EPA emphasizes that the determination not to list these wastes only means that the Agency has found it is not appropriate to list as hazardous the wastes across broad industry categories that could result from solvent uses of the 14 chemicals. As will be more fully explained below, EPA did not find that solvent uses for these chemicals, in general, produce hazardous wastes that require listing. Many of the wastes examined are hazardous already because they are characteristic wastes under 40 CFR part 261, subpart C, or contain other solvent wastes currently listed as hazardous. In addition, some of the chemicals may produce wastes that are hazardous when used in ways other than as solvents, perhaps as catalysts, feedstocks or other uses in chemical manufacturing processes. Solvents use simply does not constitute an appropriate way to designate these chemicals as a hazardous waste category under RCRA for wastes from nonspecific sources. Particular industrial wastes from these chemicals might be hazardous, but such wastes were not examined in this determination.

B. Existing Solvent Listings and the Regulatory Definition of Solvent

Five hazardous waste listings for specific solvents have been promulgated to date: F001, F002, F003, F004, and F005. These are found at 40 CFR 261.31. Today's decision applies the same criteria for defining solvent wastes as are applied to these existing solvents listings. These criteria are explained in the **Federal Register** of December 31, 1985 (50 FR 53316) and are also consistent with the requirements of the EDF Consent Decree.

The December 1985 document amended the solvent listings to include spent solvent mixtures when the solvent, before it is used, contains 10 percent or more of total listed solvents.

The original listing included only the technical grade, practical grade or pure form of the solvents when used. This threshold level was considered by the Agency to be well below the minimum solvent concentration typically used in solvent formulations and was designed to bring the majority of listed solvent mixtures used in commerce into the hazardous waste management system, while excluding dilute mixtures or *de minimis* concentrations.

In addition, the document issued several clarifications to the original listings. First, the listings apply to "spent" solvents—those that are no longer fit for use without being regenerated, reclaimed, or otherwise processed. (See 40 CFR 261.1(c) (1) and (4); 261.2(c) (3) and (e)). Second, the listings cover only those solvents used for their solvent properties—"to solubilize (dissolve) or mobilize other constituents." These include solvents used in degreasing, cleaning, fabric scouring, as diluents, extractants, reaction and synthesis media. The document stated that the listings do not cover wastes from the processing of products where a chemical that might be used as a solvent is, instead, used as a reactant or where a chemical is used as a solvent only as an ingredient in the formulation of a commercial chemical. This latter category would include chemicals used as a solvent in paint formulations to dissolve the paint itself. These uses do not generate "spent solvent" wastes. The wastes of concern for these products would be the production process wastes or wastes from the use of the product, not the solvent itself.

This approach is also consistent with the requirements of the EDF Consent Decree. This is because the consent decree identifies a subset of solvent wastes that are potential candidates for listing and specifies that the listing determination applies to "spent solvents," a term that tracks the language of the existing listings. Moreover, this approach had been the longstanding approach of the Agency to dealing with solvent listings at the time the Consent Decree was negotiated and should be interpreted as representing the understanding of the parties.

This approach, whereby EPA has limited the scope of this rulemaking through this focused definition of solvents subject to the listing, is a reasonable interpretation of RCRA and is consistent with EPA's historical treatment of solvent listing descriptions. Use of the definition has allowed the Agency to place reasonable limits on the scope of its listing investigation for this rulemaking. RCRA 3001(e)(2) directs

EPA to make a listing determination on "solvents," but provides no further direction on the meaning of that term. EPA, therefore, has the discretion to reasonably define the scope of the listing determination. Given the ubiquity of solvents, the great variety of uses and the huge differences in the composition of the waste streams, EPA could not gather the evidence to list "solvent wastes" as a general category. Under the Agency's regulations at 40 CFR 261.11(b), wastes may be listed as a category if they are "typically or frequently" hazardous. EPA could make no such findings for "solvent" wastes in general and, therefore, has reasonably focused its investigation and listing decision.

As noted above, the existing solvent listings are limited to spent solvent mixtures when the solvent, before it is used, contains 10 percent or more of total listed solvents. While wastes from this use threshold were the primary focus of today's listing determination, EPA also considered in its evaluations the few solvent uses that were reported to be below the 10 percent threshold.

In a previous proposed hazardous waste listing for wastes from the production of dyes and pigments (59 FR 66072, December 22, 1994) EPA presented the general approach the Agency uses for determining whether to list a waste as hazardous pursuant to 40 CFR 261.11(a)(3). The discussion focused on the selection of waste management scenarios used in assessing risk and the use of information on risk levels in making listing determinations. This approach was further developed in EPA's listing for petroleum refining process wastes (proposed rule published at 60 FR 57747, November 20, 1995; final rule published at 63 FR 42110, August 6, 1998). EPA is employing the same general approach in this final rulemaking. Readers are referred to these documents for a description of EPA's listing policy. Also, section II.C.2. of the proposed rule, "Risk Assessment," contains a discussion of how elements of EPA's listing policy were applied in today's listing determination.

The following section contains a summary of the methodology used to arrive at the no-list determinations in today's document. For more details on this methodology, see the proposed rule, background document, and the response to comments document in the docket.

II. Summary of Proposed Rule

A. Determinations Not To List Solvent Wastes as Hazardous Waste

EPA proposed the decision not to list the spent solvent wastes from the 14 chemicals noted above on August 14, 1996 (61 FR 42318). The Agency determined that these wastes did not meet the criteria for listing set out in 40 CFR 261.11. The proposed rule presented the waste characterization, waste management, mobility, persistence, and risk assessment data that were the bases for the Agency's proposed decision not to list these wastes as hazardous. Further details of EPA's approach are presented in the Hazardous Waste Listing Determination Background Document for Solvents (hereafter known as "Listing Background Document") in the docket for the proposal to today's rule.

As explained in section II.B of the proposed rule, spent solvents differ from other listed wastes among EPA's waste listings in that the solvents are used in manufacturing and allied processes rather than being the principal waste streams generated by manufacturing processes. In order to characterize industrial solvent use, the Agency sent out almost 1,500 preliminary questionnaires to cover the 21 total chemicals (14 from the listing determination and seven from the study). An additional 60 facilities were surveyed on their use of these chemicals as solvents through the chlorinated aliphatics industry survey. EPA then sent out a full RCRA section 3007 survey to facilities using greater than a combined total of 1,200 kilograms of all the chemicals of concern.

The Agency consulted various literature and reference sources, such as Chemical Abstracts, general reference books, the Agency's Toxic Release Inventory (TRI) compiled under section 313 of the Emergency Planning and the Right-to-Know Act (EPCRA), databases compiled for various EPA programs dealing with air and water pollution, and information available from trade associations. Of the 14 chemicals involved in the listing determination, 11 were on the TRI. Use of the literature, Chemical Abstracts, TRI, and other EPA databases allowed the Agency to focus on the industries that actually use these chemicals as solvents. In addition, many of these sources gave strong indications as to when major uses of a chemical were not as a solvent.

Once the Agency narrowed down the potential solvent-using industries, the Agency developed a list of facilities to survey about their solvent use. These facility names and addresses were

obtained again from a variety of sources, including TRI, trade associations, and other Agency media program sources. The Agency sent a short ("preliminary") questionnaire to approximately 1,500 facilities inquiring about uses of any of the 14 listing determination chemicals as solvents and the quantities used.

The Agency used the preliminary questionnaire data to develop the large questionnaire mailing list and to organize site visits. The Agency also made several hundred confirmatory telephone calls to determine that reported information was correct. The data from the preliminary questionnaire showed the Agency several distinct patterns of solvent use: facilities that use large amounts of any of these chemicals as solvent, those that use small quantities as solvents, and those that use none of the chemicals as solvents. The Agency found that a solvent use quantity of 100 kg per month, or 1,200 kg per year, provided a mathematically convenient separation of those facilities who use large amounts of solvent and those who use very little and provided an indication as to which facilities were likely to be large quantity generators of hazardous waste based on use of these chemicals as solvents. Based on careful analysis of the data, the Agency identified likely large-scale users of these chemicals as solvents.

The Agency then developed the large questionnaire. This questionnaire reconfirmed data on solvent use and requested detailed information on a facility's solvent-using processes, waste generation, waste management, and waste minimization activities. The Agency sent this questionnaire to approximately 150 facilities that indicated to the Agency through the preliminary questionnaire that significant solvent uses of these chemicals exist. The data obtained from the questionnaire were applied to the risk assessment process described in today's document as well as the preparation of the background document.

To summarize the results, 4 of the 14 chemicals showed no use as a solvent. The remaining 10 chemicals were analyzed in the Agency's risk assessment based on solvent uses found by the Agency. For the 10 chemicals of the required listing determination for which there were solvent uses (acetonitrile, 2-ethoxyethanol acetate, 2-methoxyethanol, 2-methoxyethanol acetate, cyclohexanol, cumene, phenol, furfural, isophorone, and methyl chloride), EPA found that the management of residuals from the use of these chemicals as solvents did not pose a risk to human health or the

environment under the plausible management scenarios assessed. The data used as the bases for these determinations were presented in sections II.D through II.M of the proposed rule (61 FR 42327). Detailed information is also presented in the background documents supporting the proposed rule (RCRA Docket number F-96-SLDP-FFFFF).

Specifically, none of the solvents satisfy the criteria for listing in 40 CFR 261.11 (a)(3). For acetonitrile, 2-methoxyethanol, and methyl chloride, while risk analyses indicated some potential risk from air releases of these chemicals from onsite accumulation in open tanks, EPA believes this risk would not be significant because most, or in some cases all, of the nonwastewater residuals are already regulated as hazardous waste. For phenol, 2-ethoxyethanol acetate, furfural, cumene, cyclohexanol, isophorone, and 2-methoxyethanol acetate, the risk estimates indicated that spent solvent residuals from the use of these chemicals as solvents do not pose a substantial risk or potential hazard to human health or the environment through the plausible management scenarios and pathways assessed.

For the remaining four chemicals subject to the required listing determination in the EDF Consent Decree (1,4-dichlorobenzene, benzyl chloride, epichlorohydrin, and ethylene dibromide), EPA proposed not to list residuals from their use as solvents, because the data collected by EPA showed that these chemicals are extremely unlikely to be used as solvents. One of the chemicals (p-dichlorobenzene) is a solid at room temperature, and the other three (benzyl chloride, epichlorohydrin, and ethylene dibromide) are relatively reactive chemicals not well suited to solvent use. EPA's information showed that the very limited solvent use reported for these four chemicals is linked to bench-scale or experimental laboratory settings, and no significant solvent uses were found. For more detail see sections II.N through II.Q of the proposed rule (61 FR 42347) and background documents supporting the proposed rule (RCRA Docket number F-96-SLDP-FFFFF).

B. Summary of Risk Assessment Supporting the Proposed Rule

As described in detail in the proposed rule (see 61 FR 42322-42327), EPA carried out various analyses to determine the potential risk that might arise from the disposal of the spent solvent wastes under study. In carrying out the modeling for these assessments, EPA used available data it collected from industries using these solvents.

The Agency used information gathered in the RCRA 3007 Questionnaires and site visits related to the waste characteristics, waste management practices, and potential pathways for release and exposure. EPA used other generic input parameters to fate and transport models to estimate the risk a waste might present under management scenarios known to occur. The data used in the modeling efforts included the concentrations and toxicity of the solvent constituents in the waste, the mobility and fate of such constituents in different disposal scenarios, likely exposure routes under these scenarios, and the location of receptors that might be exposed.

The levels of receptor exposure estimated from modeling were compared with toxicological benchmarks to evaluate the potential health impacts. For noncarcinogenic constituents, EPA used reference doses for ingestion exposure (RfDs) and reference concentrations for inhalation exposure (RfCs); these are measures of acceptable daily intakes for a specific chemical. To assess the hazard to a hypothetical individual, EPA used hazard quotients (HQs). An HQ is the ratio of the modeled exposure (or dose) received compared with the acceptable daily dose (the RfC or RfD). An HQ above one indicates that exposures may occur above acceptable levels. For carcinogenic constituents, EPA compared exposure levels to carcinogenic potency estimates (carcinogenic slope factors, or CSFs) to calculate specific risk levels. The carcinogenic risks results are expressed in terms of individual risk, reflecting the additional incidence of cancer that may occur in an exposed population. For example, a risk of 1×10^{-5} (which will be presented in this document as 1E-05) corresponds to a probability of one additional case of cancer for every 100,000 people exposed.

EPA used verified RfDs, RfCs, or CSFs when available in EPA's Integrated Risk Assessment Information System (IRIS). IRIS, which represents a consensus opinion of EPA health scientists, is a database of human health effects that may result from exposure to various substances found in the environment. For the chemicals that did not have complete verified IRIS data available (2-methoxyethanol acetate, cyclohexanol, phenol, and isophorone), EPA calculated provisional values when needed for use in the listing determinations.

EPA performed a number of different types of risk analyses. First the Agency completed a "bounding analysis" to screen out solvent wastes from further consideration. In this analysis, the key

input parameters were set to their "high-end" values (typically the 90th percentile point on the distribution of values available for each parameter). For solvent wastes that did not "bound out," EPA then ran a high-end "deterministic" sensitivity analysis to determine which high-end input parameters result in the greatest risk. EPA calculated risks for all combinations when the most sensitive parameters were set at high-end values and then used the highest "high-end" risk. In this way, EPA attempted to estimate "high-end" risks that were somewhere above the 90th percentile, i.e., the risks would be below this level for at least 90% of the population at risk. EPA also calculated "central tendency" risks, which correspond to the risk when all input parameters were set at their median value.

Critical decisions for risk assessment include EPA's determination regarding which waste management scenarios to model and how to use the information on waste volumes and solvent concentrations disposed as modeling input. The Agency's modeling focused primarily on potential releases from wastes managed in aerated tanks, stored in open tanks, undergoing thermal treatment, and managed in surface impoundments. Modeling was based on the information EPA collected from facilities, including quantities of wastes managed. For each management scenario, EPA evaluated the full range of direct and indirect pathways through which the solvents could affect human health or the environment. Based on the physical and chemical properties of the constituents of concern and plausible management practices, certain routes of exposure for some scenarios were not considered to pose threats and were not further evaluated.

In general, solvent wastes fell in several major categories. Wastewaters were typically diluted aqueous wastes that are managed in a biological treatment system (usually in tanks). Nonwastewaters includes two subcategories. These include: (1) wastes with high levels of solvents or other organic chemicals, which were sent for thermal treatment in incinerators, industrial boilers, or fuel blenders, and (2) treatment residuals, such as wastewater treatment sludges or incinerator ash, which contained negligible levels of solvents.

EPA modeled storage in an open tank and thermal treatment for nonwastewater spent solvent residuals from use of all of the ten solvents. EPA modeled wastewater treatment in

aerated tanks for wastewater residuals resulting from the use of acetonitrile, 2-methoxyethanol, 2-ethoxyethanol acetate, phenol, furfural, and cumene as solvents.

The surface impoundment scenario was assessed for five of the solvents; acetonitrile, phenol, cumene, furfural, and methyl chloride. For acetonitrile and cumene, the headworks concentrations (i.e., the concentrations after the spent solvent was mixed with other wastewaters at the headworks of the wastewater treatment system) potentially discharged to surface impoundment were below the health-based levels for these constituents, and thus were not evaluated further. For phenol, three wastewaters with spent phenol were reported to be managed in surface impoundments that are part of a wastewater treatment train. In two of these cases, the phenol concentration was below the drinking water health-based level after mixing at the headworks, prior to reaching the surface impoundment. In the third case the stream had levels ranging above the health-based level; however this level is expected to be efficiently treated by the activated sludge, such that little phenol would be available for release to groundwater. For methyl chloride, EPA modeled air releases from treatment in a surface impoundment, but not the groundwater pathway because the impoundment was a permitted hazardous waste management unit. (As

described below, the unit treating methyl chloride wastes was unique due to the highly specialized nature of this solvent use). EPA modeled treatment in a surface impoundment for furfural; however, bounding analyses showed no significant risks via air or groundwater pathways. The solvent use of the chemicals modeled in surface impoundments are very specialized. This means that they have properties that only allow very particular solvent uses in a very narrow set of circumstances and only for some industries, or even for only one. For example, methyl chloride is a gas at room temperature, which severely limits its utility as a solvent. The only significant solvent use for this chemical is as a solvent in the polymerization of butyl rubber, during which methyl chloride is passed through aluminum chloride to form and solubilize the catalyst used. The chemical's special ability to generate such a catalyst solution is why it is used. Similarly, by far the largest solvent uses of furfural and phenol are in the extraction of a high molecular weight oil (lubrication oil) during petroleum refining; these chemicals have very limited solvent uses outside the petroleum industry. Therefore, EPA has a high degree of confidence that the concentrations of chemicals in the streams flowing into surface impoundments studied in this listing determination are representative

of the universe of such uses and possible exposure scenarios.

The landfill scenario was initially assessed for acetonitrile, methyl chloride, cumene, and cyclohexanol, but not modeled for spent solvent residuals from any of these solvents because the concentrations in the wastes were "trace" or "negligible." Further general background for the risk assessment is provided in the preamble to the proposed rule (see 61 FR 42318).

III. Peer Review of Calculated Toxicological Benchmarks

Standard inhalation toxicological benchmarks were not available to EPA for four of the solvents when the Agency was conducting the risk assessment for the proposed rule. The Agency therefore calculated values specifically for the rule. EPA has labeled these toxicological benchmarks "provisional RfCs" to clearly differentiate them from the Agency consensus values listed on IRIS. During the comment period, EPA solicited peer review of these calculated risk values. The peer review reports and the complete Agency response to the reports are in the docket for this rulemaking.

In response to comments received in the peer review reports, EPA adjusted three of the provisional toxicological benchmarks used for this risk assessment. The changes are shown in Table 1.

TABLE 1.—CHANGES IN TOXICOLOGICAL BENCHMARKS FOR AIR PATHWAY

Solvent	NOAEL ¹ (mg/m ³)	Previous provisional toxicological benchmark (mg/m ³)	New provisional toxicological benchmark (mg/m ³)
Cyclohexanol	0.06	0.00006	0.00002
Phenol	19	0.019	0.006
Isophorone	37 (LOAEL) ²	0.0037	0.012

¹ No observed adverse effect level.
² Lowest observed adverse effect level.

The new benchmarks for cyclohexanol and phenol reflect additional uncertainty factors to account for insufficient toxicity databases. The benchmark for isophorone reflects a reduction in overall uncertainty factors to reflect Agency guidance limiting such factors to a total of 3,000. Full documentation of the methodology for developing these benchmarks is in the docket for this rulemaking.

In addition, the toxicological values for cumene were changed on IRIS during the comment period. The RfD (for noncancer ingestion risks) was changed from 0.04 mg/kg/day to 0.1 mg/

kg/day. The RfC (for noncancer inhalation risks) was changed from 0.009 mg/m³ to 0.4 mg/m³. These changes both reflect greater tolerance for cumene than the previous benchmarks and thus have no impact on EPA's decision not to list wastes derived from the use of this chemical as a solvent.

The Agency has employed these revised "provisional RfCs" for all the updated risk assessments involving these solvents for the final rule. In addition, the Agency has re-estimated risks assessed for the proposed rule using these new benchmarks. Documentation of these re-estimations

appears in the supplemental risk assessment background document to this final rule. The final risk estimates for all the solvents are shown in Table 3 of this preamble.

In all cases the changes to the toxicological values do not have any significant impact on EPA's risk results, nor do the changes affect any listing decisions. The solvent wastes for the chemicals examined still do not pose significant risks, and thus, these analyses confirm the proposed decisions not to list these wastes.

IV. Summary of Response to Comments and Rationale for Final Rule

The Agency is responding in this preamble to the most significant comments received in response to the document of August 14, 1996, 61 FR 42318. Other comments received by the Agency are addressed in the document entitled Hazardous Waste Listing Determination: Spent Solvents, Response to Comments (hereafter known as Response to Comments Document) that is available in the docket associated with this rulemaking.

The Agency is responding to a variety of comments concerning data collection, methodology, risk assessment scenarios, and issues specific to each chemical in this listing determination. The responses, while touching many specific aspects of the listing determination effort, involve three major themes:

- The Agency used a very thorough survey, which characterized the risks of the spent solvents. The Agency researched various potential applications of these chemicals as solvents and found that solvent uses are confined to a limited set of industrial applications. Data collected from the questionnaires confirmed the general lack of wide solvent use, and are consistent with EPA's search of the literature. These findings allowed the Agency to consider the applicable waste generation and management practices, and define plausible management scenarios for use in evaluating potential risks associated with these solvent wastes.

- Facilities use the solvents for specific purposes that vary by the desired process. Some of the solvents in this listing determination have different applications over certain industries (i.e., acetonitrile). Even within one industry, the primary commonality among the processes is the solvent constituent itself. Other solvents were used in very limited ways and their primary uses were highly specialized (e.g., furfural). However, even for solvents with specialized uses, other minor uses were typically reported for different industries and processes. The resulting potential variability in waste compositions led the Agency to focus its efforts on evaluating the solvent constituent itself. The Agency believes it has captured the risks that arise from the solvents themselves, and that this is a reasonable approach to fulfilling its listing determination obligations.

- Little to no benefit would accrue from regulating these wastes because many are already regulated and treated as hazardous wastes. These solvent wastes, particularly nonwastewaters

with a high organic content, are characteristically hazardous or mixed with other listed wastes, and are generally thermally treated. Other nonwastewaters, such as wastewater treatment sludges or filter media, do not contain measurable levels of the solvent constituents, and thus present no significant risks.

A. Data Collection

1. Representativeness of Industry Characterization

One comment argues that EPA cannot fully characterize industry solvent management practices because the facilities that may be affected are too numerous to predict and specifically identify. Therefore, the Agency should project standard mismanagement scenarios in order to examine the full range of actual and potential waste management practices applicable to the wastes. This is the only way the Agency can discharge its mandate to protect human health and the environment.

In response, EPA disagrees that it is not possible to predict and identify, as a practical matter, the facilities that may be affected. It is possible and appropriate to do so and EPA has, in fact, accomplished that purpose, as summarized below and explained more fully in the Response to Comments Document. The Agency outlined the general approach to the data collection process in the proposal (61 FR 42321–42322). To summarize, the Agency began collecting data on all 14 chemicals involved in the listing determination (plus the seven in the Solvents Study) as a means of collecting background information on these chemicals. The Agency identified solvent uses through cross-referencing SIC codes in known and suspected process industries with data found in the TRI, Office of Water facility lists, and many other data sources. The Agency used many different facility address lists to create a list of potential solvent-using facilities.

The sources used by the Agency provide a comprehensive view of the types of uses of these chemicals as solvents and the quantities used. The Agency identified industries using the 14 chemicals as solvents by conducting literature searches including Chemical Abstracts, the Chemical Engineering Handbook, the Industrial Solvents Handbook, and the SRI Chemical Economics Handbook. As today's document and the associated background documents explain, the process was a logical, iterative, step-by-step process. The chemicals in question are not likely to be widely used as

solvents (with the exception of acetonitrile and, to a more limited extent, 2-methoxyethanol, which have significant solvent uses in some industries), because they have properties that limit their use to specific situations, and are generally noncompetitive in price. In addition, the Agency's data collection methodology combined a comprehensive view not only of the chemical's solvent use, but also of nonsolvent uses to confirm use data. The specificity of applications for these solvents, while sometimes cutting across more than one industry, is still limited enough that the listing determination could stay focused on the actual management scenarios found through questionnaires and site visits. The Agency is confident that the waste management practice data found in this investigation are adequate for risk assessment modeling, and that using other modeling practices not found would only lead to using hypothetical waste data that do not represent any activities that resemble reality. To engage in this kind of hypothesis would be likely to result in forcing significant additional costs on the public with no incremental risk reduction from regulating the wastes in question. The Agency notes that no commenter identified any specific solvent users of these chemicals not already found by the Agency. Also, the commenter could not suggest any alternative to the Agency's methodology other than a listing based on hypothetical uncertainties—an approach not justified by the data.

The Agency sent almost 1,500 preliminary questionnaires asking facilities how much of each chemical was used as a solvent in 1991 and 1992. The data showed that the Agency was successful in identifying many solvent users, although more than 900 facilities were eliminated from further consideration because they did not use any of the chemicals as a solvent. The Agency was also able to eliminate another 400 facilities from consideration to receive the final questionnaires due to reporting errors, discontinued use, or reported use of small quantities of the solvents. The fact that the vast majority of facilities that received the preliminary questionnaire reported no solvent use supports EPA's view that many potential solvent users, in fact, do not use these chemicals this way. The Agency found that reported uses of very small quantities of the chemicals as solvents were often inaccurate, but facilities reported these quantities to err on the side of caution. The remaining

156 facilities received a large, detailed questionnaire requesting information on solvent uses and waste generation and management practices. The listing determination is based on these data.

The details of the data collection effort also brought another point to the Agency's attention. While other solvents are used in countless industries and facilities and would be difficult to characterize, the particular set of solvents in this listing determination has much more limited applicability. EPA's literature search found these chemicals to have many and varied "nonsolvent" uses. Data collected from the questionnaires confirmed the general lack of wide solvent use, as discussed below.

While reference sources (e.g., SRI Chemical Economics Handbook) indicated many of these chemicals are produced in fairly high quantities, these references reported significant quantities used as solvent for only four of the fourteen chemicals studied: acetonitrile, 2-methoxyethanol, furfural, and methyl chloride. This is consistent with what EPA found in its 3007 Survey for these four chemicals. Furthermore, as described in the Listing Background Document and the proposed rule, the solvent uses of furfural and methyl chloride were limited to a single specialized use in each case, and these users were fully surveyed. Solvent use quantities were not reported in reference sources for the other ten chemicals. Four of the ten were those for which EPA also found no solvent uses (benzyl chloride, epichlorohydrin, ethylene dibromide, and p-dichlorobenzene). For an additional four, EPA's Survey found that the amounts of the production quantities used as a solvent were small compared to total production (cumene-0.026%; cyclohexanol-<0.1%; 2-ethoxyethanol acetate-1.2%; isophorone-1.7%); this is also consistent with the lack of significant quantities of solvent use reported in reference sources.

The remaining two chemicals are special cases. The domestic production of 2-methoxyethanol acetate is reported to have ceased, and the small volume of total solvent use found by EPA in its Survey (1,673 kg/year) confirms the lack of significant solvent use. EPA did find significant solvent use of the final chemical, phenol, which was not reported in most other reference sources. However, nearly all (>99%) of the solvent use quantity found in the Survey was from one facility that produces phenol for its own captive use. This "native" phenol is produced as a byproduct of other processes, and would not be reported in production or

use data in reference sources. Leaving out this volume from one facility, EPA's Survey shows that the fraction of phenol production that is used as a solvent is low (<0.2%), which is consistent with the lack of any significant solvent use quantities reported in reference sources. In any case, the vast majority of phenol solvent use reported in the 3007 Survey was a very specialized use; the petroleum industry uses phenol to extract lube oil from residual oil. EPA surveyed all petroleum refiners in its Survey; thus EPA is confident the Survey captured all major solvent users for this chemical.

The Agency disagrees that it should project standard mismanagement scenarios not indicated by the data, because the rationales for selection of a particular set of plausible management scenarios are specific to each solvent. Based on the general rationale just discussed and the data for each of the chemicals as given in detailed discussion in the Response to Comments Document for each of the chemicals, the Agency has confidence in the data set as the best available effort to assess the chemical use universe and actual waste generation and management scenarios. Merely developing hypothetical waste generation and management scenarios, as suggested by the comment, has no sound basis in fact. This would lead to the danger of over regulating risks that do not exist and siphoning off scarce resources to deal with those non-risks, rather than risks that may be more worthy of the public's attention.

For these solvents, the Agency has no reason to project management scenarios beyond what was found through questionnaires and site visits. The Agency found the vast majority of wastes managed in tanks and incinerators. Where a waste was managed in a surface impoundment, the Agency performed that modeling under high-end exposure assumptions. The Background Document to the proposal and the Response to Comments Document both present more detailed assessments of how each individual chemical is used, what wastes are generated, and what management scenarios were selected. For example, no management scenarios were selected for p-dichlorobenzene, epichlorohydrin, ethylene dibromide, and benzyl chloride because none of these chemicals are used as solvents. For most other chemicals, the uses are extremely limited and specific. See the sections devoted to the individual chemicals for specific rationales, and the discussion of management scenarios in section IV.B.4.

Below, EPA responds to the specific issues raised in comments that the Agency's survey was inadequate to characterize the solvent uses and mismanagement scenarios.

One commenter pointed out that EPA surveyed only a small percentage of facilities within very few SIC codes. The commenter stated that for several solvents, the quantity of sectors potentially affected outnumbers the quantity of facilities forming the basis for EPA's plausible mismanagement conclusions. As an example, the commenter stated that for 2-methoxyethanol acetate, EPA identified seven industrial sectors potentially affected by this chemical, but sent only the questionnaire to three facilities using the solvent.

The Agency disagrees with this comment. As previously mentioned, this listing determination covers 14 chemicals used as solvents. In order for the Agency to determine the universe of facilities potentially affected by this listing determination, it sent out preliminary information surveys to obtain basic solvent use information. The Agency sent this survey to nearly 1500 facilities based on an evaluation of chemical usage. Given this large universe of facilities and the potential to obtain useful information on solvent use in this mailing, the Agency also decided to include in this preliminary questionnaire questions concerning seven other chemicals (in addition to the 14 already included in this listing determination) which it was also investigating under a Solvent Study mandated by the court.

The prequestionnaires showed that about 600 facilities reported any possible use of one or more of the chemicals as solvents. The Agency conducted further evaluations and screening and identified 156 facilities to which it sent the more detailed "full" questionnaire concerning the use of the 21 chemicals as solvents (14 for this listing determination and 7 for a separate Solvents Study). Thus, only about 10% of the facilities that were sent preliminary questionnaires used significant amounts of these chemicals as solvents. As described in today's document in response to other comments, this screening removed facilities that did not use the chemical as a solvent (as defined by EPA), and small volume users. For a more detailed description of this screening and evaluation see, please refer to section III.A in the Response to Comment Document for this rulemaking.

The results of this final questionnaire showed that 4 out of the 14 chemicals in this listing determination were not

used as solvents and that 10 of the 14 chemicals were used as solvents to varying degrees. The industry sectors listed by SIC code by the commenter are ones which typically do not use any of the 14 chemicals as solvents and, thus, did not yield data to be considered in evaluating plausible management scenarios. Further, as discussed earlier in this section, all other indications from the Agency's survey show that the amounts of solvent use EPA found were generally comparable to the solvent use found in other references. The volume of solvent use found by the Agency is also consistent with what the Agency knows about the likely technical usefulness of these chemicals as solvents. A limited set of industries exists in which these chemicals are used as solvents, as discovered through standard reference sources.

The commenter presented a plethora of small companies on the SIC code list that operate on lower margins. The Agency believes that these companies are not likely to use these higher cost chemicals for generic solvent use processes. The Agency believes that if any of these chemicals had been used as solvents in other industries, as the commenter postulates, the Agency would have found this information during its data collection. The facilities surveyed by the Agency share many processes with the large number of smaller facilities in the lists presented by the commenters (equipment cleaning, electroplating, etc.). However, the chemicals at issue are rarely, if ever, used as solvents in those processes in the facilities found by the Agency.

Also, the Agency recognizes that the commenter cites a greater number of facilities within each SIC code than the number to which EPA has sent questionnaires. These facility numbers are obtained from a data base (Dun & Bradstreet) that is not linked to chemical use. Many of the addresses represent corporate headquarters, not facilities that use or generate hazardous waste, and a single facility may have more than one Dun & Bradstreet number. Therefore, EPA believes that the number of facilities reported within each SIC code based on this data is exaggerated.

The commenter cites 2-methoxyethanol acetate and methyl chloride as examples, stating that "EPA identified seven industrial sectors potentially using 2-MEA, but only three facilities using the solvent received the final questionnaire." As presented in the background document, 14 facilities received the full questionnaire based on their response to the preliminary questionnaire. However, based on their

response to the full Survey, 11 of these 14 facilities discontinued use of 2-MEA or did not use it in a manner that met the regulatory definition of solvent use. Only two industries reported using 2-MEA in 1994 that met the definition of solvent use. The commenter further states "In the case of methyl chloride, EPA identified eight SIC codes potentially using the solvent, while only seven facilities received the final questionnaire." As presented in the background document, 32 facilities received the full questionnaire based on their response to the preliminary questionnaire. However, based on their response to the preliminary questionnaire, 24 facilities were TSDs, and as a result the chemical consumption reported could not be linked to solvent use. Other facilities did not use methyl chloride in a manner that met the definition of solvent use, or used extremely small volumes (less than 1 kg) that generated wastes with no methyl chloride. Thus, this left only four facilities that reported solvent use of methyl chloride in two industries, and essentially all of this use was in the synthetic rubber manufacturing.

One commenter stated that EPA chose to review chemical abstracts for only a four-year period, and for other solvents limited the search to a 10-year period. Therefore, older uses of the solvents would not have been identified through the literature search. The commenter also states that newer or less studied solvent uses would not appear in the public literature. The commenter disagrees with the Agency's assertion that few, if any, solvent uses were missed using this method.

In response, the Agency does not believe that searching Chemical Abstracts for an unlimited time period for all 14 solvents is justified. If a process was developed more than ten years ago and is still in use today, it would appear in more recent Chemical Abstracts or be reflected in alternative data sources, such as Effluent Limitations Guidelines or the SRI Chemical Engineering Handbook. Furthermore, the further back the search is conducted, the more unlikely that the use identified will still be employed today. Newer solvent uses, if confined to small scale laboratory use, would not change the solvent use universe significantly and would be reported as laboratory waste (and managed accordingly, most likely as a hazardous waste because spent solvents exhibit a Characteristic or contain listed wastes). Once such a process enters large-scale commercial use, reporting generally appears on some standard database or literature source that the Agency would

find. The probability that a solvent use would, in one year, not exist and then appear in large scale is extremely low. Small volume solvent uses of these chemicals are not critical to EPA's evaluation, because any risks from larger volumes usage (and corresponding larger loadings in wastes) are likely to be of greater concern. Most of the companies that would conduct the types of research and development to find new uses are generally reporters to databases like the TRI, and as such, would report any significant uses of these solvents.

The commenter also stated that some chemicals, such as cyclohexanol, furfural, and isophorone, are not reported under TRI. For the remaining solvents, TRI reporting is not required when chemicals are "otherwise used" in quantities of 10,000 pounds or less (equivalent to 4,540 kg or less). The commenter argued that substantial quantities of the solvents can be used and not reported under TRI.

In response, in cases of the three chemicals for which the TRI data base was inadequate, the Agency relied on other sources more heavily. In fact, the TRI was only one source for all chemicals in the listing determination, even those covered by TRI. Because the Agency was aware that these chemicals were not required to be reported pursuant to TRI at the time of the solvent use industry characterization, the Agency relied on additional sources cited in the Listing Background Document. Through literature searches, potential solvent uses were identified in several SIC codes for cyclohexanol, furfural and isophorone.

Moreover, since the questionnaire data were collected, the Agency added cyclohexanol to the TRI. Analysis of TRI chemical use data on cyclohexanol confirms the Agency's literature search and determination of the universe of users of this chemical as a solvent. While 24 facilities reported cyclohexanol manufacturing processes in the TRI, only one facility reported the "otherwise use" category of cyclohexanol that could potentially be solvent use. Thus, the TRI data show that the Agency might have sent out only one additional preliminary questionnaire (EPA received 37 responses to preliminary questionnaires for cyclohexanol). Further investigation by EPA revealed that cyclohexanol was not used as a solvent at this one site. This new information substantiates EPA's original findings that there are no other large users of cyclohexanol as a solvent. See section III of the Response to Comments Document in the docket for details of the new TRI information.

The commenter argued that many of the solvent uses EPA did identify involve extremely high concentrations of the chemicals, up to and including pure solvent. These pure solvent uses can generate wastes in quantities 100 times larger with concentrations of 1%, still significantly in excess of concentrations that may pose a substantial risk to human health or the environment.

The Agency disagrees with the commenter that the risks of concern were not analyzed. In fact, the Agency's modeling considered environmental loadings of these chemicals resulting from solvent uses ranging from 100 percent to the part-per-million (ppm) level. The Agency evaluated potential releases of high percentage solvent uses that lead to greater loadings than would result from a one percent level in the waste. Modeling of these chemical releases under high end exposure conditions did not result in risks of concern.

In response to the commenter's concerns that small volume users might generate wastes of concern, perhaps due to different management practices, the Agency examined the data in hand from the Survey for such users. Facilities that received Surveys due to significant use of some solvents (>1,200 kg/yr), also used other solvents in lower volumes in some cases. Thus, the Agency has data on wastes from facilities that used small volumes of solvents, (see Listing Background Document, Appendix I). EPA reviewed the management practices for wastes generated by these smaller volume uses to see if any differences were evident. For all 10 solvents, EPA found a total of 73 wastes that were generated from solvent uses below 1,200 kg. The Survey data show that these were managed in ways that were very similar to practices reported for larger volume uses. Of these 73 wastes, 69 were incinerated or otherwise thermally treated (nearly all were classified as hazardous because they exhibited a hazardous Characteristic, or due to the presence of other listed hazardous waste), three wastewaters were treated in tanks, and one wastewater was treated in a surface impoundment (the chemical in the impoundment, acetonitrile, was evaluated through modeling). Furthermore, 67 of the 73 wastes reflected solvent use at concentrations of 50–100%, i.e., many of these wastes were generated from use of solvents at high concentration. None of these wastes from small volume users present any special risk, because risk analyses using larger loadings going to these management practices found no

significant risks. Therefore, the existing data support EPA's belief that wastes from small volume users are not of any special concern. Furthermore, these wastes are nearly all handled as hazardous, which is also consistent with the general pattern found for other larger volume wastes.

Two commenters stated that they agreed with EPA's decision to limit the solvents listing investigation to facilities that use a combined total of 1,200 kilograms or more per year of all chemicals of concern used as solvents because the commenters feel that this level represents a reasonable characterization of the universe of solvent users. One of these commenters requested clarification to ensure this approach would not be misconstrued by hazardous waste generators when determining their generator category. In response, the Agency is confirming that the cutoff categories used by the Agency in this listing determination are not to be construed by any actual or potential hazardous waste generators to be a means of determining waste generator categories. Furthermore, EPA did consider solvent uses below the 1,200 kg threshold as noted above, however, the Agency found that such small quantity use is highly unlikely to present risks of concern when compared to the risks from larger users.

However, another commenter stated that EPA's rationale for deleting facilities using 1,200 kg or less of solvent in 1992 was that only large quantity solvent users could be expected to have treatment, storage, and disposal (TSD) units on-site, and that many of the solvent uses are peculiar to large companies. The commenter stated that this limitation in the data collection introduces bias against solvent generators relying upon commercial services, including offsite nonhazardous landfills, for their waste management needs. The commenter then argued that the Agency cannot assume offsite disposal in a nonhazardous waste landfill is rarely practiced when EPA intentionally excluded those facilities most likely to use such facilities by not surveying smaller volume users.

The reasoning cited by the commenter is taken out of context and does not reflect EPA's rationale. EPA did not decide to eliminate small volume users because they would not have on-site treatment capabilities. Rather, EPA determined that the burden of completing a complex, 100-plus page questionnaire would not be commensurate with the value of the information EPA would receive. EPA would not gain useful information from small users because many of these

facilities, if they use these chemicals as solvents at all, would present low risks compared to larger solvent users. Furthermore, as noted above, EPA did, in fact, capture small users of solvents in the full Survey, and found no special management or risk concerns that were not reflected in its evaluation of larger solvent users.

Facilities are likely to use on-site as well as off-site waste management practices, and sometimes a combination of the two. This is evidenced in responses to the 3007 Survey, wherein respondents indicated that both on-site and off-site practices were employed. The 3007 Survey has captured numerous facilities that use commercial services. Based on the results of the Survey, 62 percent of the wastestreams are managed in commercial offsite treatment or disposal units. As such, the Agency does not believe there is any significant bias in its Survey.

In addition, EPA points out that the vast majority of small solvent users eliminated by EPA reported using amounts well below the 1,200 kg threshold. In fact more than 90% of those eliminated reported used less than 120 kg total for all of the solvents studied. EPA found that uses of such small volumes typically were reported for laboratory uses, are difficult to verify, and may be reported as solvent use if laboratory uses are not known. The 1,200 kg/yr cutoff is an appropriate surrogate for identifying facilities that may potentially generate large amounts of hazardous waste or waste with high solvent loadings. EPA believes the facilities with larger solvent uses would be most likely to provide useful data through the questionnaire, i.e., data based on verifiable solvent use that could then be used in developing risk assessments.

One commenter argued that solvent use fluctuates from year to year, thus uses below 1,200 kg could increase dramatically in the future due to process changes, increases in production, or solvent substitutions. The commenter went on to state that use volumes for some solvents reported in the final questionnaire for 1993 were higher than the rates reported for the same facilities in the preliminary questionnaire for the prior year. The commenter stated that EPA fails to appreciate the consequence of these fluctuations and substantial changes can be expected from year to year, e.g., a facility using less than 1,200 kg of solvent one year may use more than that amount the next year. The commenter concludes that EPA lacks an objective basis for simply assuming the data it collected is fully dispositive with

respect to future solvent uses and management practices.

EPA believes that the data collected provides a reasonable bases for decision-making. The purpose of the preliminary questionnaire was to capture what occurs at the facilities surveyed during a typical year. As was expected, some facilities' solvent use consumption decreased between the two years and other facilities' solvent consumption increased between the two years. The Agency does not expect solvent consumptions to be identical from year-to-year, but has no data to indicate that 1993 is an atypical year. Even if the specific facilities meeting the cutoff varied from year to year, EPA believes the data gathered from facilities studied provide a representative database. The Agency used the most recent data when determining the 1,200 kg cutoff for those facilities receiving the full questionnaire.

EPA considered whether or not solvent management practices were likely to change in the future from those reported in the 3007 Survey. The Agency determined that there was no reason to believe that they would, regardless of the volume fluctuation. In the case of wastewaters, EPA has no reason to believe that a facility would convert from a tank-based system to a surface impoundment given the capital investment and liability issues associated with land-based treatment, particularly when facilities do not have the physical space for a surface impoundment or have closed surface impoundments in favor of tank-based systems. For nonwastewaters, EPA has no reason to believe that a facility would switch from the thermal treatment of high organic wastes to disposal in a nonhazardous landfill due to the BTU value and the liability issues associated with land-based disposal.

The Agency cannot accurately predict with specificity future uses of the fourteen chemicals, nor is it reasonable for EPA to regulate solvent waste based on some purely hypothetical future use. While the solvent consumption may change over time for some facilities, such fluctuations are unlikely to significantly affect EPA's current risk conclusions for several reasons. First, in its risk analyses EPA used high-end or maximum solvent loadings to project potential risks. Thus, EPA's evaluation is not likely to change due to some volume use fluctuations. In addition, for most of these solvents (and specifically for three noted by the commenter, acetonitrile, 2-methoxyethanol acetate, and isophorone), the vast majority of wastes are regulated as hazardous due to the hazardous waste characteristics (see

40 CFR 261.20–261.24) or mixing with other listed wastes. Thus, any increase in volume use would result perhaps in somewhat higher solvent quantities reaching wastes that would be already regulated and thus unlikely to pose significant risk. Therefore, while EPA agrees that its Survey is more-or-less a "snapshot" of waste generation data, the Agency continues to believe that such an approach has yielded data that are representative, and is a reasonable way to assess potential risks.

The commenter also stated that EPA excluded any laboratory uses of the solvents from the universe of facilities receiving the preliminary questionnaire, notwithstanding the Agency's observation that "lab use" of chemicals was not restricted to small volumes.

The Agency did not exclude laboratory uses of solvent from the universe of facilities. The Agency was precluded from sending a 3007 Survey to all laboratories due to the sheer number of labs that exist in the United States, approximately 183,000 according to an estimate by EPA. (For details please refer to the Response to Comments Document). Many of these laboratories are small, comprising research labs (12,500), medical laboratories (22,700), and university labs (108,000), as well as small analytical labs (40,000). The resources necessary to complete a RCRA 3007 questionnaire would be beyond the means of many of these small businesses as organizations. Nonetheless, the Agency captured the solvent uses and management practices of numerous (32) captive on-site laboratories of facilities who received the 3007 Survey. In doing so, the Agency captured large research, QA/QC, and analytical laboratories that operate at the same or larger scale as the small labs not surveyed. Approximately 38% of the laboratories captured were small laboratories (i.e., using <1,200 kg of solvent use).

The Agency found that in industrial facilities, the proportion of laboratory use of a solvent compared with the chemical process use is about 1% or less. After consulting with the American Chemical Society, college and university hazardous waste managers, standard references, and OSHA guidelines, the Agency determined that laboratory wastes are managed as hazardous because they are usually mixed with other hazardous wastes, often with acutely hazardous wastes. In addition, with the exception of acetonitrile (which has specialized uses in laboratories as a solvent for high pressure liquid chromatography, or HPLC), the reported use of any of these

chemicals is suspect, and is attributable to facilities reporting "solvent use" in the questionnaires as a precautionary measure. Few of the chemicals under examination are likely to find extensive use as solvents in the laboratory. For example, very few of the standard laboratory test methods specified by EPA call for use of these chemicals as solvents. For a complete summary of the laboratory use of solvents please refer to the Response to Comments Document.

2. Engineering Site Visit Reports

One commenter stated that the engineering site visits were superficial and did not encompass a thorough review of waste management, solvent waste characteristics, and potential environmental releases or damage from waste handling. The commenter acknowledged that EPA's objective for the site visits was simply to determine if a facility should be sent a full questionnaire, and to educate the facility on the solvent listing process, but stated that this seems like a waste of effort, given that more valuable information could have been obtained from the site visits regarding waste properties, handling and environmental damages.

The commenter also noted that none of the visits involved any sampling efforts. No analytical or characterization data are presented on the concentrations of solvent constituents in the waste streams observed at the industrial sites visited. The visits were typically two hours, with anywhere from 0–60 minutes spent actually touring the facility. One site visit was conducted from a tour van and was strictly a "windshield audit," and two were strictly conference room audits. The reports did not investigate, evaluate, or address any historical spills, releases to groundwater or surface water, or any other environmental damage from use of the solvent or handling of the wastes.

These comments misconstrue the reasons EPA conducted the site visits and the information that could practically be developed from them. The purpose of the site visits was to familiarize the Agency with the multitude of processes and industries potentially subject to the investigation through "first person" experience rather than "textbook" learning. The Agency disagrees that the Engineering Site Visits were superficial given their purpose of site familiarity, not data collection. The Agency points the commenter to the engineering site visits reports that each state EPA's objectives in undertaking the site visit—of which those cited by the commenter are but two. The site visits were performed to

obtain a first hand understanding of solvent utilization and also to develop a working relationship with the industries. Moreover, the site visits served as an outreach mechanism for EPA to interact with industry and inform potentially affected industries of the investigation. Site visits afforded EPA staff an opportunity to become familiar with processes used in specific industries, field test the questionnaire, and assess ongoing pollution prevention activities.

EPA obtained the "valuable information" cited by the commenter in a more comprehensive way through the questionnaires. EPA collected data on waste properties and management practices through the 3007 Survey, which contains detailed, site-specific information from 156 facilities. It would not be practical for EPA to visit all sites to gather detailed information on solvent use. Therefore, EPA's reliance on the 3007 Survey is eminently reasonable for collecting information on waste characterization data, release, and waste management practices. Visits conducted following the receipt of RCRA 3007 Questionnaires helped EPA to better understand the type of processes used in target industries and the data provided by respondents, and also provided confirmation of the data provided. The Agency was able to focus on larger scale users and specific processes up-close, based on the information reported in the 3007 Survey.

As discussed in detail in the Response to Comments Document, tours of the facilities lasted as little as 1.5 hours and as much as 3.5 hours, with a minimum of 30 minutes and a maximum of more than 2 hours spent on tour and/or on the plant floor. Information related to spills, releases and other environmental damage was requested in the 3007 questionnaire and collection of this type of information was not the focus of these visits. The Agency takes issue with the commenter's characterization of the visits as "windshield audits." None of the site visits were mere tours from a van. The Agency personnel witnessed many operations on a site and were able to walk around the facility. The commenter also mischaracterized several other details of individual site visit reports. The Agency has corrected these misconceptions in the Response to Comments document and provided clarification to clear up any confusion, as necessary. For more detail on the sampling issue, please refer to section IV.B.2 of today's document.

B. Methodology

1. Definition of "Solvent"

One commenter objected to the Agency's characterization of solvent use as too limiting, stating that solvents contained in paints, coatings, dyes, fuels, etc. are still mobilizing agents, and that they unleash the same environmental impact when these products are spilled or released. The commenter also points out that being able to solubilize or mobilize other constituents in a formulation still meets the Agency's definition of solvent use.

The Agency disagrees, and notes a long-standing policy of treating these cases differently. The discussion of the scope of the solvent listings and the applicable definitions appears in section I.B, above. As noted there, process wastes where solvents were used as reactants or ingredients in the formulation of commercial chemical products are not covered by the listing. The products themselves also are not covered. The commercial formulations in which solvents are often ingredients are generally products that are not wastes under RCRA. Where these products are not in some way already regulated, the Agency could examine these materials if they become wastes and if deemed necessary. However, with a backlog of listing determinations to complete under court-ordered deadlines, the Agency has focused its current efforts on those determinations required by law. The Agency is under direction from Congress to consider listing wastes from "solvents" and that direction has been incorporated into the Consent Decree. Thus, the Agency has focused its resources on the rather narrow set of risks described in this **Federal Register** document and the rulemaking record for this decision.

2. Lack of Sampling and Analysis

Two commenters objected that EPA performed no sampling and analysis of these waste streams. One commenter stated it is impossible for EPA to come to any listing determination without some independent sampling and characterization of these wastes. Useful characterization data could have been obtained by sampling wastes from a subset of the 156 respondents representative of all the SIC codes using the wastes, according to this commenter.

EPA does not agree that it would obtain useful information from independent sampling of the solvent wastes. The solvents listing determination covers a number of industries using different solvents for different purposes and in different

ways. The greatest challenge would be in collecting a sufficient number of samples to characterize each of these uses. Assuming that EPA were to sample all 10 solvents, obtain both a wastewater and a nonwastewater sample, and gather samples from the industries using the solvents (at an estimate of three industries on average per solvent), the baseline number of samples required would be 60. In addition to baseline samples, to conduct a valid sampling exercise the Agency also would need to sample for variability, that is, the Agency would take samples at several locations within a single facility and would take samples at several facilities within an industry group using the same solvent. Assuming that an additional two samples are taken within the same facility, and then an additional two facilities are visited, the total number of required samples reaches 540. This number still might not allow EPA to fully characterize solvent wastes. Thus, the Agency would be spending scarce resources on a massive sampling effort, when the data need could be more efficiently obtained by methods other than independent sampling. While EPA could attempt a more limited sampling approach, the result would not be likely to provide a sound basis for making listing decisions.

By definition, the concentration of the solvent must be relatively high before use, and this would allow use of mass loadings in calculating maximum waste levels, as needed. The Agency felt that it could rely on the questionnaire data, and no information has been submitted in comments to show that sampling and analysis was needed to confirm the concentrations in the solvent wastes reported. The facilities provided ranges of concentration where concentrations within a waste stream varied. When data were reported as ranges, the Agency used the high end of concentration ranges as a conservative approach in its risk assessment.

The Agency does not have reason to believe that the solvent concentrations reported are underestimated. In many instances copies of laboratory data showing the solvent concentration(s) in a sampled residual were provided with the respondents' 3007 survey. The reported data seem reasonable and correspond with observations of residual streams during Engineering Site Visits. The solvent concentrations and residual volumes were further substantiated through mass balances performed on the solvent use processes by reviewing the 3007 survey responses (see section III.B of the Response to Comments Document). EPA evaluated the data contained in the 3007 Survey

responses for any inconsistencies or missing residuals. If any inconsistencies or missing residuals were found, a follow up phone call was made to the appropriate facility for additional information. Where applicable, this additional information can be found in the docket along with the 3007 Survey Responses. Therefore, the Agency feels comfortable that it can rely on the reported data to adequately characterize risk.

EPA has used 3007 Survey data extensively in the past in making listing determinations. In this case, each survey was signed by the responsible party to indicate that the information reported is accurate. The Agency does not have reason to believe that the facilities would falsify or omit any of their data in light of the substantial penalties for submitting false information. In instances where concentrations were unclear or unreported, telephone contact was made with the facility.

Two commenters stated that EPA is required to consider the presence of any hazardous constituents, not just the solvent itself, because other hazardous constituents may be present in the waste due to impurities, other chemicals used in the same processes or managed in the same equipment as the solvents, and chemical reactions occurring in such processes or equipment.

EPA does not agree that the Agency is required to consider other constituents present in the wastes examined. Indeed, due to the extreme variability of these other constituents in the solvent wastes across industries, EPA would undoubtedly find it impossible to categorize these wastes under 40 CFR 261.11(b) if it considered the other constituents. The solvent uses found for acetonitrile illustrate this problem graphically. Acetonitrile is used as a solvent in various industries, including pharmaceuticals, petrochemicals, photographic chemicals, and other chemical manufacturers (see the Listing Background Document, section 4.0). The actual uses of acetonitrile also are variable, and include uses as a reaction medium for the synthesis of numerous different chemicals, and as chromatographic eluent for analytical or preparative separation of various chemicals from different impurities. Wastes resulting from such widely varying processes across different industries cannot be expected to have consistent waste constituents, except for the solvent itself.

As the commenter pointed out, other constituents could originate from various sources in the use of a solvent. Thus, other constituents are dependent on other solvents used, the specific

solvent use, other processes carried out at a facility, other wastes that may be generated from other processes onsite, etc. Because of the wide variability in waste constituents that might arise in wastes from use of the solvents, the Agency focused on the solvent chemical itself. Other constituents may vary widely for different industries and solvent uses; thus, the Agency believes the only practical approach to evaluating such wastes for potential listing is to consider the risk posed by the solvent chemicals under examination.

The language in the existing F-listed solvents illustrates EPA's special concern with the solvents themselves in defining the scope of the listings; the listings are applicable only to wastes derived from the use of the solvents at levels of ten percent or more. In the case of the current solvents rulemaking, the Agency evaluated the common set of chemicals, i.e., the 14 solvents of concern. The Agency's assessment of these 14 solvents shows no risk to human health or the environment from these wastes, as discussed in detail elsewhere in this document.

3. Consistency of Methodology With Other Listing Determinations

One commenter asserted that, contrary to EPA's claim, the listing determinations in today's rule were based on scenarios that are different from those EPA used in both the proposed Dyes and Pigments listing determination (59 FR 66072, Dec. 22, 1994) and the proposed Petroleum Refining Process waste listing determination (60 FR 57747, Nov. 20, 1995). The commenter stated that in the Dyes and Pigments proposal, EPA used plausible mismanagement scenarios of disposal in unlined municipal landfills and on-site monofills, in addition to other plausible scenarios (wastewater treatment tanks, industrial boilers). The commenter stated that in the Petroleum Refining Waste determination EPA also considered plausible mismanagement scenarios, including disposal in on-site and off-site Subtitle D landfills. The commenter argued that EPA did not follow the policy used in the Dyes and Pigments and Petroleum Refining rules in the proposed solvent listing because EPA did not consider mismanagement scenarios that reasonably could be employed, particularly land disposal in unlined landfills. The commenter stated that there is nothing that prevents a solvent waste generator from land disposing the solvent waste, and substantial evidence of land disposal practices was found in the docket to the proposed solvent rule.

In response, EPA disagrees that the methods for determining plausible management scenarios in this rule is inconsistent with either the proposed Dyes and Pigments listing or the Petroleum listing. In both cases, EPA used appropriate evidence to evaluate current conditions and to project plausible future scenarios. The Agency does not presume unlikely worst cases or hypothesize scenarios that are not likely in the interests of avoiding listing decisions that would not result in incremental benefits to public health or the environment. See *Dithiocarbamate Task Force v. EPA*, 98 F.3d 1394, 1401 (D.C. Cir. 1996).

With respect to the Dyes and Pigments proposal, management in unlined municipal landfills and on-site monofills was reported in the 3007 Survey for certain wastes. EPA found that nearly all dye and pigment waste sludges/solids studied had, in fact, been disposed in unlined municipal landfills. Thus, the Agency determined that placement in an unlined landfill was plausible for most dye and pigment wastestreams.

However, EPA did not consider disposal in landfills plausible for all Dyes and Pigment wastes, and considered the specific facts for each waste. For example, EPA proposed not to list one category of waste, wastewater treatment sludges from the production of triarylmethane pigments using aniline as a feedstock, despite risks that might arise if the waste were sent to a landfill. For this waste category, EPA determined a landfill was *not* plausible management (see 59 FR 66096). This was because the current management practice was blending with fuel for combustion, and EPA decided that the high organic content and fuel value of the waste made it implausible that landfill disposal would occur. This is entirely consistent with EPA's approach in today's rule for a similar waste derived from use of acetonitrile as a solvent. As described in the specific section on acetonitrile (section IV.D3), EPA does not view risks that might arise from landfill disposal as significant because such disposal is unlikely given the current practice of fuel blending and the confirmed fuel value of the material.

The commenter is also incorrect in asserting that the approach used in today's rule is inconsistent with that used in the Petroleum Refining proposal. In that proposal the Agency evaluated landfill disposal for many of the wastes examined, because, in fact, this practice was reported to occur for those wastes. Contrary to what the commenter implied, EPA did not project landfill disposal in the Petroleum

Refining proposal as plausible for wastes that had no evidence of such disposal.

The commenter also stated that the Agency violated its own risk assessment criteria as presented in the listing determination for the proposed Dyes and Pigments wastes (see 59 FR 66076). The commenter pointed out that EPA states in the preamble that it is the Agency policy that a high-end hazard quotient above 1 represents a risk level for presumptive listing, and a high-end hazard quotient above 2 is a definite basis to list. The commenter argued that, if EPA applies this policy to the solvent listing determination, at a minimum both acetonitrile and 2-methoxyethanol have hazard quotients exceeding this criteria (HQ of 200 and 16, respectively), and should have been listed.

EPA disagrees that its decisions in today's listing are inconsistent with its listing policy. As the Agency explained in the proposed rule, EPA's risk assessment for acetonitrile indicated HQs below one at the bounding level for incineration and at the high-end for wastewater treatment tanks and for open storage tanks. EPA's risk assessment for 2-methoxyethanol indicated HQs below one in bounding analyses for wastewater treatment tanks and incineration and no risk for the storage tank scenario. The HQs cited by the commenter were reported as part of an intermediate stage of the analysis, as reported in the background document for the proposed rule, specifically, § 5.7 of the Assessment of Risks from the Management of Used Solvents. This intermediate stage was used to decide if further evaluation was necessary. Because possible risks of concern were found, EPA proceeded to a third phase of assessment. After consideration of the fact that nearly all of the wastes evaluated in the intermediate analyses were already hazardous, EPA's assessments for these scenarios indicated risks below levels of concern for the remaining nonhazardous waste streams (see Supplemental Risk Assessment). These multi-phase assessments are discussed further in response to specific comments on acetonitrile in section IV.D.3 of today's document.

4. Plausible Mismanagement Scenarios

Two commenters stated that EPA relied on incomplete data provided in the RCRA 3007 Questionnaires to identify actual management, and disregarded standard potential mismanagement scenarios based on an incorrect assumption that solvent waste management will not change over time. According to these two commenters, a

valid solvent listing determination must also consider improper disposal in unlined landfills, impoundments, waste piles, land treatment units, and long term accumulation, which EPA overlooked. One of the commenters went on to state that the Agency's listing policy requires the presumption of land disposal in unlined landfills and surface impoundments, particularly in the case of solvents, where EPA's questionnaire data present a partial and misleading snapshot of solvent use due to limitations in the data collection methodology. This commenter also argued that due to the limitations of the data collection, EPA cannot claim that the specialized or limited uses of the solvents lead to a complete characterization of solvent users or solvent waste management practices. The commenter concluded that EPA's decision not to list these solvents is invalid and contrary to the criteria enumerated in 40 CFR 261.11.

The Agency disagrees with the two commenters. The data collected show that the management practices of most concern to the commenters (landfills and surface impoundments) are not widely used. Where land-based disposal was reported in the 3007 Survey, the Agency considered whether the waste is capable of posing a substantial present or potential hazard to human health or the environment. For landfills, EPA found that modeling was not necessary because solvent loadings were very low. The few cases of surface impoundment use were fully evaluated via modeling and were found to present no significant risk.

EPA relied on management practices reported in response to the 3007 Surveys, and EPA evaluated the potential risks associated with those management practices that are used or likely to be used. As the Agency has explained in prior responses, EPA could and did target the facilities and industries actually using these chemicals as solvents. As a result, the Agency identified the largest users of these chemicals as solvents. EPA has responded in detail to comments regarding the adequacy of the characterization of solvent waste generators earlier in today's document (see section IV.A.1).

The solvent wastes reported from the Survey fell into several classes: high concentration organic liquids or solids, treatment residuals (wastewater treatment sludge, incinerator ash), and wastewaters. The high content organic nonwastewaters were sent to thermal treatment in incinerators, boilers, or fuel blenders, and in some cases recovered via distillation for reuse. The vast

majority of these wastes were managed as hazardous waste, because they exhibit a characteristic (primarily ignitability), or they are generated as a waste mixture with solvents that are already listed as hazardous.

From the data available, EPA evaluated the potential for risks to arise from disposal of solids in landfills and the treatment of wastewaters in surface impoundment. Wastes reported to go to landfills were typically treatment residuals that contained negligible amounts of solvents. For the 10 solvents examined (the remaining 4 on the original list of 14 had essentially no solvent use), no landfill disposal was reported for six of these solvents. In fact, of the total 435 solvent wastes reported for the 10 chemicals, only 5 were reported to go to nonhazardous waste landfills. In the proposed rule and the Listing Background Document, EPA discussed why the few cases of landfill disposal reported for specific solvents (acetonitrile waste, methyl chloride, cumene, and cyclohexanol) were not of concern. This was principally because the solvent loadings in these wastes were very low. In response to comments, EPA further considered one waste that was reported to be disposed in a hazardous landfill. However as discussed in the specific section in today's rule on acetonitrile, the waste is no longer going to any type of landfill due to its thermal value.

The Survey data show that wastes sent to landfills contained negligible amounts of solvent; landfilling of wastes with high solvent concentration was not reported. Thus, given these results, and the fact that nonwastewaters with high solvent content are generally hazardous and could not be placed in even a Subtitle C landfill without further treatment, EPA had no reasonable basis to conclude that disposal of spent solvent wastes in landfills poses a risk of concern.

Similarly, treatment of wastewaters in surface impoundments was rare for the solvent wastes examined (the vast majority were treated in tanks). Of all the wastes reported (435), only 10 were reported to undergo treatment in surface impoundments. The solvent loadings for six of these (from solvent use of acetonitrile and cumene) were low and clearly present no risk after dilution/treatment in a wastewater treatment system. The others were larger volume wastewaters that arose from the specialized use of three different solvents: methyl chloride, phenol, and furfural. With the reported solvent loadings available, EPA examined these special cases closely, and completed further modeling in response to

comments (see section IV.C.1 on surface impoundment modeling).

Concerning storage in waste piles and land treatment, EPA found no cases where such management practices were reported for any of the wastes examined. The lack of waste pile storage is not surprising given the nature of most wastes that are accumulated, i.e., organic liquids and aqueous wastewaters, which are stored in tanks. Further, many of these wastes are already hazardous, and are therefore kept in storage containers that meet stringent RCRA regulations. Other solids were either relatively low volume wastes, for which a pile is not needed, or wastewater treatment residuals, which have no appreciable solvent content, as noted above. The practice of land treatment is a special practice that is relatively rare, and as EPA has noted in the past (see Dyes and Pigments rule, 59 FR 66074), such practices would be considered plausible only when information indicates that the practice is in use, or likely to be used in the future.

The Agency determined that the actual management practices represent the plausible management practices for the specific solvent wastes that are the subject of today's rule, because the Agency found no reason to believe that the current management practices would change significantly. In the case of wastewaters, EPA has no reason to believe that a facility would convert from a tank-based system to a surface impoundment given the capital investment and liability issues associated with constructing and operating land-based treatment units. The ongoing operating costs of managing wastewaters in an already installed tank are quite small relative to the costs of constructing a surface impoundment, or the costs of other alternatives such as sending the wastewaters offsite. Clearly, a large majority of facilities perceive a benefit from managing the waters in tanks, rather than impoundments, and EPA finds no reasons to project that those facilities would change their practices. For nonwastewaters, EPA has no reason to believe that a facility would switch from the thermal treatment of high organic wastes to disposal in a nonhazardous landfill due to the BTU value and the liability issues associated with land-based disposal. In fact, the data collected from the Survey clearly show that the use of impoundments and landfills is rare, and such practices are not common for these wastes. Also, as noted previously, the vast majority of nonwastewaters are already classified as hazardous waste, and cannot be land

disposed without meeting treatment standards.

EPA believes the Survey did, in fact, collect sufficient data from the significant solvent users, to allow a reasonable assessment of plausible mismanagement scenarios. However, even assuming the data do not reflect all management practices for whatever reason, the Agency still maintains that the data available support EPA's decisions on what constitutes plausible mismanagement. The data collected show that the management practices of most concern to the commenters (landfills and surface impoundments) are rarely used for these solvent wastes. Furthermore, when these practices are used they are used for only very dilute concentration (and low risk) solvent wastes, except for a few special cases that were specifically considered by the Agency. The existing data do not support the commenters' argument that other practices must be assumed to be generally plausible for all the wastes evaluated. Creating hypothetical waste management scenarios would have no apparent benefit, and may lead to regulating wastes which do not present risks.

C. Risk Assessment

This section deals with comments on the hazard and exposure assessments conducted for the rulemaking. In response to comments, the Agency revised the risk assessment for some management scenarios. These updated results are presented in the following sections, along with responses to the comments. Full details of the updated analyses are presented in the background document for the risk assessment (Assessment of Risks from the Management of Used Solvents: Supplemental Risk Assessment Background Document, hereafter known as Supplemental Risk Assessment) provided in the docket to this rule. A summary of risk assessment results for all solvents are shown in Table 3. Comments dealing with the volumes and concentrations of wastes used as inputs for the risk assessment are dealt with in sections IV.A and IV.B.

1. Surface Impoundments

EPA received a variety of comments relating to the assessment of risks from management of solvent wastewaters in surface impoundments. One comment focused on the routes of exposure that were assessed from the groundwater pathway from surface impoundments. The commenter indicated that EPA's consideration of direct ingestion alone was insufficient for assessing the risk from this pathway, and suggested that

the Agency evaluate other routes of exposure from groundwater. EPA agrees that these additional routes of exposure should be evaluated, and conducted additional analysis as described below.

In addition, two commenters suggested that the risk assessment should have assumed a higher concentration level for the solvents in these management units. The Agency used the headworks concentration (at the beginning of the wastewater treatment process), which represents a dilution of the solvent with other wastewaters. The high-end data on concentrations were taken from the section 3007 survey of all facilities, as noted in section IV.B.2, above.

EPA does not agree that higher concentrations of solvents should be used, but rather believes that its approach described below is more appropriate. To respond to these comments, the Agency conducted further modeling of surface impoundments to reevaluate the risks from solvents managed in these units. The risk reevaluation is summarized below; see the Supplemental Risk Assessment document for a full description of the methodology and results.

In the risk assessment for the proposed rule, EPA reviewed the high-end waste streams going to surface impoundments. The process of iterative risk screening rests on assessing high-end values, based on the premise that low-end values represent lower risk. Since the high-end waste streams did not show significant risk, EPA did not review the impoundments further. For the current effort, EPA ensured that all relevant factors were accounted for by modeling *all* the surface impoundments receiving wastewaters with these solvents. EPA used a standard Agency model (CHEMDAT8) to assess the steady state concentration of solvent in these units; EPA used the precursor (CHEMDAT7) in modeling for the proposed rule. To the extent possible, EPA attempted to use actual influent concentrations into the impoundments; this information was only available for one of the impoundments (at the Exxon Baytown facility). For the other surface impoundments, EPA used the headworks concentrations again. EPA believes that these concentrations represent a conservative estimate of the concentration of solvent entering the impoundment, since they do not account for the significant pretreatment occurring (in all cases) after the headworks, before entering the impoundment. Because of this pretreatment, the actual solvent concentration of influent to the

impoundment will be much lower than the headworks concentrations that were assumed for the modeling.

Using CHEMDAT8, EPA then modeled the resulting steady state concentrations of the solvents in each impoundment, as well as estimated quantities and concentrations of solvents that would be emitted to the air. EPA assessed direct inhalation risks using these airborne emissions from the solvent.

Risks from the groundwater pathway were assessed for all impoundments where the groundwater was considered at risk. To assess the risks from the groundwater pathway, EPA assumed no attenuation from the impoundment to the leachate. EPA estimated groundwater concentrations at a high-end receptor, and from that groundwater

pathway assessed risks of direct ingestion of the groundwater, as well as inhalation and dermal contact risks from use of the groundwater. This assessment used the same methodology employed by the Agency in a recent listing (Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Petroleum Refining Process Wastes; 63 FR 42109, August 6, 1998) to estimate non-ingestion risks from the groundwater pathway.

The results of the assessment for the impoundments are summarized in Table 2. All hazard quotients represent cumulative figures for all pathways and routes of exposure. The assessment of cumulative risk from these routes of exposure is very conservative, in that it assumes that receptor locations were at the maximum exposure point for direct

inhalation of airborne solvents, as well as for exposure to solvents in groundwater. EPA also added HQs from different chemicals in the same unit, making the highly conservative assumption that all of the noncarcinogens threatened similar health endpoints (i.e., cause the same type of damage to the same organs). This latter assumption is not likely to be true, but there was no need to refine the risk analysis to ascertain what the different endpoints might actually be, because the summed HQs were less than one. Because those multiple conservative assumptions were used in the analysis, the true high-end risk estimates would actually be lower than the numbers listed under the "High-End" column.

TABLE 2.—RISK ASSESSMENT RESULTS FOR MANAGEMENT OF SOLVENTS IN SURFACE IMPOUNDMENTS ¹

Facility	Solvents in unit	Bounding HQ ²	"High-end" HQ ²
Tennessee Eastman	Acetonitrile, Phenol	3.30e-02	N/A ³ .
Exxon Baytown	Methyl Chloride ²	[4.60e-06]	[3.50e-06].
Mobil Beaumont	Furfural, Phenol	1.20e+00	8.00e-01.
Lyondell	Cumene	4.10e-02	N/A.
Rhone-Poulenc	Acetonitrile	6.52e-02	N/A.
Citgo	Phenol, Furfural	7.40e-01	N/A.

¹ Risks presented represent the total risk from concurrent exposure to air and groundwater releases, and also the sum of risks from all solvents in the unit. The "high-end" risks are above a high-end due to these and other conservative assumptions.

² Risks for methyl chloride represent excess lifetime individual cancer risk .

³ N/A indicates high-end analysis was not done because the bounding analysis showed no risk of concern.

2. Tank-Based Management of Wastes

In the process of responding to comments comparing EPA's evaluation of the solvent wastes in question with the results of a recent EPA study on potential air risks (see comment below related to the Air Characteristic Study), EPA reviewed the risk analyses conducted in the proposed rule for management of wastes in tanks. EPA discovered that an arithmetic error was made in the calculation of solvent emissions from tanks. This error resulted in an underestimation of emissions for all tank scenarios by a factor of 1,000.

EPA has therefore revised the risk estimates for tank-based management of wastes. The analytical approach was to update the analyses that were completed for the proposed rule, using corrected emissions, the latest version of the emissions model (CHEMDAT8), and current chemical and toxicological benchmark data available for some chemicals. The analysis also refined parameter values to more closely approach high-end analyses; nevertheless, because of multiple high-end assumptions, all of the revised analyses are still characterized as more conservative than true high-ends. In

addition, EPA conducted a second analysis to verify these results. This second analysis used air dispersion data and receptor distances from EPA's Air Characteristic Study (May, 1998). Both analyses, using the corrected source term data, indicated that risks for all tank-based scenarios were below levels of significant concern (see section IV.C for further discussion of listing decisions). More details of the analyses are presented in the Supplemental Risk Assessment Background document. The results of these analyses are presented in Table 3.

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Table 3. Summary of Risk Assessment Results for All Solvents Examined

Solvent	Management Scenario	Exposure Route	HQ ^{1,2}		Verification Analysis (Air Characteristic Study methodology)
			Bounding	High-End	
Furfural	Surface impoundment	Inhalation	5.7E-01	1.1E-01	--
		Groundwater ingestion	3.3E-01	3.3E-01	--
		Groundwater non-ingestion	1.3E-01	1.3E-01	--
	Aerated WWT tank	Inhalation	--	9.0E-01	6.0E-01
	On-site accumul.	Inhalation	--	1.0E-05	5.0E-07
	Incineration	Inhalation	1.2E-14	--	--
2-Methoxy-ethanol acetate	On-site accumul.	Inhalation	--	9.0E-05	9.0E-05
	Incineration	Inhalation	7.3E-13	--	--
Cumene	Surface impoundment	Inhalation	3.1E-03	--	--
		Groundwater ingestion	1.3E-06	--	--
		Groundwater non-ingestion	1.4E-04	--	--
	Aerated WWT tank	Inhalation	--	2.4E-04	1.9E-04
	On-site accumul.	Inhalation	--	1.0E-02	6.0E-03
	Incineration	Inhalation	6.4E-09	--	--
Cyclohexanol	On-site accumul.	Inhalation	--	8.0E-01	9.0E-01
	Incineration	Inhalation	1.3E-08	--	--
2-Ethoxy-ethanol acetate	Aerated WWT tank	Inhalation	--	1.4E-04	6.1E-05
	On-site accumul.	Inhalation	--	2.0E-01	5.0E-01
	Incineration	Inhalation	2.2E-08	--	--
Isophorone	On-site accumul.	Inhalation	--	1.0E-02	2.0E-01
	Incineration	Inhalation	2.3E-08	--	--

Methyl chloride ²	Surface impoundment	Inhalation	4.6E-06 ²	3.5E-06 ²	3.5E-06 ²
	Aerated WWT tank	Inhalation	--	[1.3E-06]	[4.8E-07]
	On-site accumul.	Inhalation	--	[4.0E-06]	[2.0E-06]
	Incineration	Inhalation	[3.3E-14]	--	--
2-Methoxyethanol	Aerated WWT tank	Inhalation	--	3.0E-02	1.3E-02
	On-site accumul.	Inhalation	N/A ³	--	--
	Incineration	Inhalation	3.6E-08	--	--
Phenol	Surface impoundment	Inhalation	1.7E-01	--	--
		Groundwater ingestion	1.4E-03	--	--
		Groundwater non-ingestion	2.4E-02	--	--
	Aerated WWT tank	Inhalation	--	4.6E-03	1.9E-03
	On-site accumul.	Inhalation	--	4.0E-01	4.0E-02
	Incineration	Inhalation	7.4E-03	--	--
Acetonitrile	Surface impoundment	Inhalation	1.1E-02	--	--
		Groundwater ingestion	1.1E-02	--	--
		Groundwater non-ingestion	7.0E-02	--	--
	Aerated WWT tank	Inhalation	--	1.8E+0	7.3E-01
	On-site accumul.	Inhalation	--	4.0E-01	7.0E-01
	Incineration	Inhalation	6.1E-07	--	--

¹ The "high-end" risks are above true high-end values, because multiple high-end assumptions make the analyses more conservative than true high-ends. ² Risk numbers for Methyl Chloride represent excess lifetime individual cancer risk ³ All wastestreams being accumulated are already regulated as hazardous wastes.

3. Multiple Solvents

A commenter noted that EPA failed to consider the cumulative impacts of multiple solvents and other hazardous constituents released via the same exposure pathways in the risk assessment. In order to fully respond to this comment, EPA conducted an assessment of the cumulative risks posed by exposure to multiple solvents. Inasmuch as the listing determination is based on the solvent constituents of these wastes, other constituents of the wastestreams were not assessed. These risk assessment results, therefore, only apply to the solvents themselves. In this analysis (see the Supplemental Risk Assessment for details) EPA assessed all cumulative solvents risks where multiple solvents were managed in one unit or in different units at a facility.

This analysis used the same assumptions as EPA's prior assessments for the proposed rule. Wastestreams which were already classified and managed as hazardous were not assessed, since there is little likelihood of risk reduction through a listing determination. EPA focused its effort on currently unregulated wastes. The characterizations of waste management included the same conservative parameters as in the proposed rule, modified as described above, including the construction and operation of surface impoundments, meteorological conditions, and the proximity of hypothetical receptors. One particularly conservative assumption was storage of solvents in open-topped tanks permitting maximum volatilization.

This assumption of extensive volatilization out of open-topped tanks is highly unlikely, because the wastes were being stored pending incineration or other thermal treatment. In addition to those factors, EPA included highly unrealistic assumptions in assessing cumulative risk from exposure to multiple solvents. Environmental receptors were considered to be located at maximum exposure points relative to all management units. EPA also added HQs from different chemicals, making the highly conservative assumption that all of the non-carcinogens threatened similar health endpoints (i.e., cause the same type of damage to the same organs). This latter assumption is not likely to be true, and overestimates risks, but there was no need to refine the risk analysis to ascertain what the different endpoints might actually be.

Despite these assumptions, which suggested unrealistic conditions to maximize the probability of showing risk to human health, none of the assessed scenarios showed combined

hazard indices over one. In one facility (Exxon, Baytown), a surface impoundment showed an increased cancer risk of $4E-06$ in the high-end analysis, however, this risk was entirely due to the single solvent methyl chloride, as shown in the preceding section. As discussed in section IV.D, EPA has concluded that this does not represent a significant risk, especially in light of existing air regulations that apply to this unit.

The scientific evidence represented by this risk analysis leads EPA to the clear conclusion that management of multiple solvents does not pose significant incremental risk to human health in any populations.

4. Comparison With HWIR Exit Levels

A commenter argued that EPA should reconsider the risks from acetonitrile, phenol, methyl chloride, and isophorone based on the risk analysis presented by EPA in the proposed Hazardous Waste Identification Rule (HWIR; 60 FR 66344, December 21, 1995). For each of these chemicals, the HWIR analysis produced an "exit level" concentration, suggesting that concentrations of waste higher than the exit level might pose unacceptable risks. The commenter notes that the § 3007 survey showed solvent wastes for each of these chemicals being generated at higher concentrations than the HWIR exit levels. The commenter noted that wastewaters of acetonitrile, phenol, methyl chloride, and isophorone are generated in concentrations higher than the HWIR exit levels for these chemicals.

The commenter's comparison between HWIR exit levels and the solvent waste concentrations does not indicate that the solvent risks are of concern. The purpose of the HWIR exit levels is not to assess risk from a particular set of chemicals or a specific set of wastes. Unlike listings, where the Agency makes a decision based on actual information about how specific wastes are generated and managed, the HWIR levels are intended as broad risk screens, covering a large number of possible waste streams and waste management methods. The listing decisions for the chemicals examined in today's rule are limited to consideration of potential risks that arise only from the wastes generated after the chemicals are used as solvents. Therefore, these decisions are limited to considerations of waste characteristics and waste management practices specific to these uses.

Because HWIR had a different purpose than this risk assessment, it used different methodologies. HWIR

evaluated five management scenarios: aerated treatment tanks, quiescent surface impoundments, land application units, ash monofills, and wastepiles. Only two of these scenarios aerated treatment tanks and quiescent surface impoundments are similar to the management scenarios modeled for the used solvents risk assessment. Another obstacle to comparison is the waste volume modeled. HWIR modeled a range of waste volumes, bounded by the capacity of the waste management unit. From these volumes, HWIR calculated levels for specific chemicals on a nationwide basis, for any use in any industry, and made various assumptions for waste generations and management, as noted above. In contrast, the wastestream volumes (and constituent loadings) modeled for the solvents risk assessment were based on actual data from the industry survey.

The Agency has not issued the HWIR in final form and is continuing to refine the analysis; therefore, the HWIR exit levels are currently being reviewed and revised. However, even the revised numbers, as a screening tool, cannot be automatically used in assessing the validity of other regulatory actions by EPA. Together, the differences in management units and wastes modeled mean that a simple comparison of HWIR exit level concentrations to the concentrations in modeled solvent wastes is not meaningful.

5. Environmental Damage Incidents

Several commenters stated that the Agency screened out and ignored damage cases prior to 1980. EPA believes that the commenters have apparently misunderstood how the Agency evaluated the damage cases. The Agency did not screen out and ignore damage cases prior to 1980. All damage cases available were considered including those prior to 1980. However, most of the damage cases found for the 14 chemicals resulted from disposal well before 1980, before RCRA regulations were in place. Damage cases were reviewed to direct the analysis to industries and conditions that might show evidence of environmental damage from improper management of used solvents that might be occurring now or may occur in the future; the cases did not provide an exclusive or restrictive guide. EPA evaluated a variety of legal and financial factors that might affect plausible management, and technological factors affecting fate and transport of hazardous constituents.

These other factors are especially important when examining the solvent wastestreams, since almost 90% of the non-wastewaters are already required to

be managed as hazardous under Subtitle C. Although these constituents may have been found at Superfund sites, it is not reasonable to suggest that RCRA-regulated hazardous wastes could be managed today in the same way they were managed at industrial facilities in the past. The damage cases that were found reflect mismanagement in the past, not the Subtitle C management (or even the likely Subtitle D management) of these chemicals which is the norm today.

Furthermore, as described in the proposed rule, there were many other reasons why the damage cases were not useful (see 61 FR 42326). These reasons include: (1) EPA could not determine that any of the contaminants of concern were used as a solvent prior to disposal; (2) wastes at these sites were poorly defined, and the term "solvent wastes" likely referred to the more widely used solvents that are already listed; (3) many of the chemicals under study have other uses that are more likely to be the reason for contamination; and (4) EPA found no damage cases at sites within the industries that reported using the solvents under study.

6. Spills, Leaks, and Overflows

One commenter stated that EPA's risk assessment did not include an evaluation of human health and environmental risks posed by leaking tank systems. According to this commenter, EPA argues the concentration of solvents is "very low" in wastewaters, and thus assessing the risks posed by tank leaks is not warranted. However, the commenter argued the database identifies solvent wastewaters containing 9% 2-methoxyethanol, 8% phenol, 200 ppm 2-EEA, 169 ppm methyl chloride, and 5,000 ppm furfural. The commenter concluded, given that no time limit would be placed on storage if the wastes are not regulated as hazardous, defective leaking containers and tanks are highly possible.

EPA has examined the possibility of spills from management units such as tanks or surface impoundments. The Agency does not have the data or the means available to accurately assess the likelihood of such releases, the magnitude of releases, or other data that would be necessary to assess the risk of such spills. Based on the characteristics of these solvent waste streams, however, the Agency has concluded that to the extent that such releases would pose risks, a decision to list any of these wastes would not provide significant reduction in the potential hazards from such events. The Agency bases that conclusion on the following facts.

The vast majority (over 98%) of the volume of solvent wastes are wastewaters in wastewater treatment units. These wastewaters are diluted to very low concentrations of solvents, and are treated further to even lower levels. When necessary, EPA has modeled the effects of release of some of these solvents from impoundments and found no significant risk to human health or the environment (see section IV.C.1 for further discussion on potential risks from impoundments). For the specific wastewaters identified by the commenter, EPA notes that surface impoundment scenarios were modeled for phenol, methyl chloride, and furfural at the same or similar concentrations to those cited, and no significant risks were found. The wastewater mentioned that contains 2-methoxyethanol is managed as hazardous in an off-site biological treatment system, so that any releases or risks are unlikely. Similarly, the 2-EEA waste cited is scrubber water that is classified as hazardous, and furthermore corresponds to a total of only 0.58 kg of EEA. Therefore, EPA does not agree that these wastes are likely to present significant risk even under a spill scenario.

Of the nonwastewaters, almost 90% are already regulated under Subtitle C of RCRA. Spills from the RCRA units are already covered under contingency planning and corrective action requirements. Subpart CC includes additional requirements for spill protection during transfer of wastes (see 40 CFR 264.1084(j)). Therefore, EPA concludes that spills of these wastes from tanks, which would generally be episodic in any case and unlikely to produce long-term exposures comparable to those considered in listing determinations, are not of significant concern.

7. Non-Aqueous Phase Liquids (NAPLs)

In the proposed rule, even though EPA could not find scenarios that could lead to significant releases to ground water, the Agency also considered whether the spent solvent wastes had the potential to form non-aqueous phase liquids (NAPLs) that might move as a separate phase either above or below the ground water table. These NAPLs may present special problems, especially in assessing their transport and potential impact. However, EPA found that nearly all solvents under consideration are miscible or very soluble in water and are not likely to form NAPLs in groundwater. One commenter suggested that EPA re-examine the possibility of formation of NAPLs from these solvents.

To respond to this concern, EPA has conducted further analysis on the subject of this final rulemaking. Full details of this analysis are in the Supplemental Risk Assessment document for this rulemaking. Only four of the solvents are land disposed and pose a threat to the groundwater pathway: acetonitrile, phenol, furfural, and cumene. EPA assessed the possibility of formation of NAPLs from land disposal of these solvents.

The first three are all highly soluble, which indicates that NAPL formation is unlikely. EPA then assessed the likelihood of NAPL formation from cumene, using the methodology which has been developed for assessing NAPL probabilities at Superfund sites. Conservative estimations of the concentrations of cumene in groundwater still fell an order of magnitude below the threshold at which NAPL formation is a serious possibility. Therefore, EPA concludes that there is little likelihood of these solvents contributing to formation of NAPLs.

8. Risk Modeling Parameters

One commenter stated that the accumulation scenario modeled must assume long term storage, not a period of under 90 days. The commenter argued that extended on-site accumulation is a highly plausible mismanagement scenario, given that absent RCRA controls, a generator can accumulate such waste indefinitely. Thus, the commenter stated that EPA's risk model should not assume a finite storage time of 90 days, but should assume the more likely scenario of at least a two year period of storage.

This comment is based on an incorrect assumption. The accumulation scenario was not modeled for a period of 90 days as stated by the commenter. For each scenario, EPA used a storage duration designed to maximize the total risk. Modeling a longer storage time does not necessarily increase the risk, because it implies less frequent refilling of the tanks with new wastes. As described in the risk assessment documentation, this storage duration time was calculated by first generating a tank profile to yield the largest downwind concentration at the nearest residence based on data in Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)—Background Information for Proposed RCRA Air Emission Standards (referenced in the proposal risk documentation as U.S. EPA, 1991c; p. 29, July 1996). (This high-end tank also happened to be the most common. Therefore, this model tank was used for all three types of estimates: bounding, high-end, and

central tendency.) The throughput and other parameters of this model tank were used in combination with solvent throughputs and high-end and central tendency concentrations to obtain solvent-specific emissions rates. The storage duration times were then back-calculated to fit this maximum release profile. For the bounding analysis, the modeling was so conservative that it resulted in greater than 95 percent release of the solvent in seven out of ten cases. Thus, a longer accumulation time, as suggested by the commenter, would have led to lower emissions, lower concentrations at the receptor, and thus a less conservative analysis.

9. Comparison With Results of Air Characteristic Study

EPA received a late comment suggesting that the risk analysis in the Air Characteristic Study recently released by the Agency (May, 1998) indicated that air pathway releases from these solvents were riskier than EPA's initial analysis had indicated. The commenter compared concentration levels of potential concern developed for some chemicals in the Air Characteristic Study to concentrations of the solvents reported in the listing determination. The commenter argued that the study showed significant inhalation risks for some of the solvents when managed in tanks at concentrations significantly lower than those found in the solvents data collection.

In response, EPA first notes that the purpose of the Air Characteristic Study was to evaluate the possible need for an air characteristic to address potential risks due to emissions from certain waste management units. The concentrations of concern estimated in the Study are screening values for the purpose of determining whether new regulatory controls are needed to fill potential gaps in existing regulations, and should be viewed in this context. The concentrations developed in the Study cannot be automatically used in assessing the validity of other regulatory actions by EPA, because the study uses waste data and certain modeling assumptions in its methodology that are different in a number of ways from the modeling assumptions and data used in other regulatory programs, such as listing determinations. In addition, the Study methodology is currently undergoing outside peer review. Therefore, the screening concentrations themselves could change pending the results of the review.

In any event, a comparison of the results reached in the Air Characteristic Study with the results of this risk

assessment confirms that the concentrations present in these solvent wastes do not pose a significant inhalation risk. As noted above, EPA found an error in the risk analyses for tanks, and revised these analyses accordingly. This was the principal reason for the apparent difference in risk estimates between the risk assessment for the proposed analysis and the Air Characteristic Study (see section IV.C.2). However, even with these revisions, some apparent differences in concentration levels of concern would remain.

These differences in concentration, however, do not necessarily mean differences in risk. In this case, the source terms being compared are different. The Air Characteristic Study back-calculated to determine what loading of constituent could be safely managed in a given management scenario. For every management scenario, the loadings of constituent that the Air Characteristic Study concluded could be managed safely are *larger* than the loadings used in this risk assessment. The solvent constituent loading that the Air Characteristic Study determined could be safely managed in tanks ranged from twice the amount to millions of times the amount modeled for the solvents risk assessment. The analyses for today's listing determination used the solvent waste generation data (and subsequent loadings in management units) from the § 3007 Survey. The purpose of this listing is to determine the risks that may be posed by current and plausible future management of these specific chemicals when used as solvents, therefore, the EPA feels that the solvents waste generation data submitted from the 3007 survey is appropriate to use in the analysis.

To better understand the differences in risk assessment methodology used in the Air Characteristic Study, the Agency conducted a re-analysis of the risk from the solvent wastestreams using a modified methodology from the Air Characteristic Study, but still using the waste generation data and solvent loadings from the listing Survey. The methodology was virtually the same as that used in the Air Characteristic Study, except for some inputs that the study derived through Monte Carlo analysis. The results of this verification analysis showed no significant risk for any of the solvent management scenarios, and confirm the previous results. These results appear in Table 3. More details on these comparisons appears in the response to comments document accompanying this rulemaking.

D. Listing Determinations

EPA received comments on various aspects of the proposed listing determinations. Many comments on the determinations were raised repeatedly for various wastes, and are discussed in preceding sections, or in sections IV.D.1 and IV.D.2 below. Comments that are more specific for individual solvent wastes are addressed in the section IV.D.3. For complete responses to comments on these and other issues, see the Response to Comments Document in the docket to today's rule.

1. General Comments

Six commenters support EPA's decision not to list as hazardous waste the solvents at issue. However, one commenter disagreed with the decision not to list these compounds because they are similar in toxicity to the other solvents already listed as hazardous. The commenter stated that the solvents considered in this rule may be used by themselves, and their wastes, therefore, would not be mixed with the wastes from the other F-listed wastes, or the manufacturer can modify their processes to avoid using other F-listed solvents, so that their wastes would no longer be hazardous. The commenter went on to wonder if EPA's decision not to list these wastes was due to its "anti-combustion" strategy, because the wastes would "then be readily excluded from combustion as a logical disposal option."

EPA does not agree with the commenter's assertions regarding the decisions not to list. While some of the chemicals examined in today's rule may have toxicity similar to the solvents already listed as F-wastes, the toxicity of a chemical alone is not a sufficient basis for listing. EPA considers a variety of factors, including waste management practices and all the other factors listed in 40 CFR 261.11(a)(3). After evaluation of all factors, EPA determined that listing for these solvent wastes was not warranted. When appropriate, EPA also evaluated wastes that resulted from use of the solvent by itself and found no significant risks.

Further, EPA disagrees that in the absence of a listing decision a manufacturer would change its processes to segregate out the solvents considered in this rule. They had that incentive from the time the other solvents were listed in 1980 and 1986 and have either been mixing the wastes ever since or made decisions to make new mixtures with listed solvents. If a waste is hazardous under current regulations, due to mixture with other listed wastes or a characteristic, the

manufacturer already has ample incentive to modify its process to avoid the cost of generating more hazardous waste. These manufacturers apparently weighed the risks and benefits of mixing, or not mixing the wastes and still pursued their mixing practices. As the Agency has stated in today's document and in the Response to Comments Document, many of these decisions are driven by specific process parameters, cost effectiveness, chemical compatibility, and regulations of other Agencies. EPA has no reason to believe they will change these practices in the event of a final no-listing decision, considering that this decision does not change the status quo. Thus, EPA does not agree that a non-list decision would alter this behavior. Finally, EPA points out that many of the wastes examined in today's rule are, in fact, treated by combustion, typically in hazardous waste incinerators. Therefore, the wastes are not "readily excluded" from combustion as result of the no-list decisions.

2. Sufficient Regulation of Solvents

One commenter stated that EPA assigned appropriate weight to the fact that many solvents already are hazardous, a determination that is relevant to the Agency's assessment of plausible mismanagement scenarios, its determination in the risk assessment that no further risk reduction could be achieved through listing the solvents of concern as hazardous, and its determinations regarding the relevance and applicability of damage incidents identified. This commenter further stated that EPA gave due consideration to the benefits accorded by other regulatory programs. Another commenter, however, stated that the Agency should carefully consider the benefits associated with listing the solvent wastes that may exhibit a hazardous waste characteristic or are sometimes co-managed with presently listed solvent wastes. This commenter stated that there are important legal and policy reasons for listing the solvent wastes at issue in this rulemaking. The commenter noted that in the case of characteristic solvent wastes, listing the respective wastes obviates the need for testing to determine whether the waste is hazardous and could facilitate enforcement because inspectors need only compare the waste to the listing description to verify the applicability of hazardous waste requirements.

In response, the Agency notes that it did carefully consider the impact listing might have for solvent wastes that are already hazardous due to the characteristics, or mixture with

hazardous waste. For the wastes under consideration in this rulemaking, EPA believes that the characteristics provide adequate regulatory control. EPA initially evaluated potential risks from all wastes and found risks of possible concern due to air releases from some wastes (for acetonitrile and 2-methoxyethanol; see proposed rule 61 FR 42327-42332). However, the wastes with the apparent risks were already regulated as hazardous. After considering the regulatory controls required, the residual risks were found to be below levels of concern. Based on assessments of risks posed by these wastes, in conjunction with the existing regulatory controls afforded by the existing characteristics and listings, the Agency determined that the solvent wastes as they are generated and managed do not pose a threat to human health or the environment. Therefore, the Agency has decided that listing is not warranted. While listing would obviate the need for testing (for those wastes not already listed or mixed with a listed waste), this is not a compelling reason by itself to list. A listing may assist enforcement to some extent; however, EPA has no indication that there is any problem in the implementation of the characteristic regulations for these wastes. On the contrary, the data collected indicate that generators are, in fact, managing the wastes of concern as hazardous when they are subject to such regulations.

The commenter states that EPA never addresses the actual or potential reclamation of characteristic solvent sludges and byproducts (See 40 CFR 261.2, Table 1). The commenter also argued that the regulatory status of residuals from the recovery of spent solvent wastes are different for listed wastes; if listed, the residuals are hazardous, but if not listed the residuals would be unregulated, unless they exhibit a hazardous characteristic.

The Agency disagrees with the statement that EPA did not consider reclamation. The Agency examined all residuals generated, including those generated from on-site recycling operations. Through the Survey, the Agency collected data on actual or potential solvent recycling and reclamation possibilities. Among the residuals evaluated are heavy ends, filtrates/decantates/distillates, organic/ aqueous treated residuals, and filter related media; these were, in part, generated from the recovery of spent solvents or the treatment on-site of spent solvent residuals. Some facilities have the means and the financial incentive to perform reclamation of used solvents (often in-process). Other

facilities are prevented from performing any sort of reclamation due to process purity requirements and product quality needs (e.g., pharmaceutical drugs, semiconductors), which may include regulatory requirements (e.g., purity requirements for drugs under the Food, Drug and Cosmetic Act). Aside from value to fuel blenders and incinerators, very little market seems to exist for many spent solvents or their sludges. While it is true that the regulatory status of recovery residuals is different for listed, as opposed to characteristic hazardous waste, EPA does not believe that this would, by itself, provide a strong reason for listing, unless risks can be demonstrated for such wastes. EPA has no data on the characteristics of such off-site residuals, and in fact has no indication that many of the spent solvents at issue are sent for off-site reclamation, beyond thermal treatment. Furthermore, in making a listing determination, EPA's primary focus is the wastes generated on-site, and not treatment residuals that may be generated off-site. To fully consider these derivative wastes would expand the scope of a listing into a much larger effort. EPA has chosen to examine wastes for which it can reasonably expect to collect sufficient data to support a listing evaluation.

The commenter goes on to state that in the HWIR rulemaking, EPA has not set exit levels for most of the solvents covered by the instant rulemaking. Therefore, wastes may meet the HWIR exit levels but still contain substantial concentrations of non-listed solvents. The commenter stated that by listing as hazardous the solvents in this rulemaking, EPA would then develop exit levels for the solvents, thus ensuring the concentrations of these solvents in waste mixtures are reduced to protective levels prior to leaving the Subtitle C regulatory system.

The commenter is premature in assuming the content or effect of the HWIR rulemaking, and an assessment of the effect of that potential rule on residuals addressed in today's final rule is speculative. The Agency points out, however, that the concentrated waste mixtures reported for the solvents at issue are unlikely to be realistic candidates for exemption under HWIR. Due to the high levels of other constituents, these wastes most certainly have to be treated, such that the wastes that might ultimately exit the RCRA system would be treatment residuals. Concentrated organic wastes are invariably treated through incineration or other thermal treatment, and such treatment would likely destroy the solvents in question, as well as the

other hazardous constituents. Furthermore, wastes that are characteristic must be treated for underlying constituents under the Land disposal restrictions (LDR) regulations. Thus, residuals that are exempted under HWIR are not likely to have solvent levels of any concern.

The commenter also stated that by listing the wastes as hazardous, EPA can encourage pollution prevention activities associated with solvent uses and waste management, including but not limited to solvent substitution, process changes and less reliance on combustion. The commenter noted that, through the listing process, EPA could ensure that the wastes will always be managed as hazardous, recognizing that attempts to identify solvent uses and users in the proposal are at best, substantially incomplete and subject to change. The commenter stated that it is entirely plausible that pollution prevention programs emphasizing hazardous waste generation reductions, the increasing cost of disposal associated with the upcoming hazardous waste combustion rules, and other factors will encourage hazardous solvent waste generators to reduce or eliminate the use of listed hazardous waste solvents. Under these circumstances, current codisposal practices are not indicative of future mismanagement scenarios.

The Agency believes that the existing regulatory requirements for these wastes, many of which are hazardous already, provide ample incentives for pollution prevention, both because of liability concerns and disposal costs associated with hazardous wastes. In addition, as noted above, under the LDR regulations, characteristically hazardous wastes must be treated for underlying hazardous constituents. The Agency has reason to believe that industry voluntarily assesses opportunities for pollution prevention. As stated in the Listing Background Document (page 17), all but four of these chemicals are reportable in TRI Form R. Part of that reporting package includes pollution prevention and waste minimization. As an example, use of the three glycol ether chemicals under consideration in this rulemaking (2-methoxyethanol, 2-methoxyethanol acetate, and 2-ethoxyethanol acetate) has diminished significantly, and production of 2-methoxyethanol acetate has been eliminated. Further, the cost of these chemicals is high in comparison with other comparable chemicals. These chemicals are used in industry only when their application is considered so suitable as to overcome any price disadvantages. As a result, for the

solvents under consideration in this rulemaking, both regulatory requirements (e.g., characteristics, TRI) and economic factors play a role in encouraging companies to undertake pollution prevention assessments and institute changes where possible. Thus, EPA finds no reasonable basis to project changes in management practices reported in the 3007 Survey, as suggested by the commenter.

The Agency has no reason to suspect that current management practices would be likely to change in the future to a practice that would pose a substantial risk to human health or the environment (e.g., from thermal treatment to land disposal or from a tank-based system to a surface impoundment) due to the regulatory prohibitions, heating value of the waste and/or requirements of the facility's wastewater treatment systems.

The commenter also stated that EPA's assumption that analogous waste streams generated by all industry sectors using any of the solvents always generate an ignitable hazardous waste (based on the fact that some of the wastes reported to the Agency in the questionnaires are ignitable hazardous wastes), and will continue to do so, is not sustainable given the limitations associated with the preliminary and final questionnaires.

EPA disagrees. Nowhere does the Agency assume that analogous wastestreams generated by all industry sectors using a particular solvent always generate an ignitable waste. The Agency has determined, based on reported management practices, that additional management practices for high solvent concentration/high organic containing wastes other than those considered in the risk assessment are not likely to exist. While some solvents may exist in mixtures at levels that do not exhibit the ignitability characteristic, EPA assessed risks from such mixtures as reported in the 3007 Survey. In fact, the initial risk analyses for all solvents did assess the risks from the wastes reported to be hazardous. Except for the cases of acetonitrile and 2-methoxyethanol, EPA did not pursue the impact of the hazardous waste designations, because the risk results for the other solvents were below levels of concern. In the next phase of risk analyses for acetonitrile and 2-methoxyethanol, the Agency did not find significant risks from any remaining nonhazardous wastes. (See Supplemental Risk Assessment document for more details.)

The Agency found that process and other limitations are a technical and regulatory bar to using the 14 chemicals alone or in combination with non-listed

solvent wastes. For example, FDA regulations preclude solvent substitution in the pharmaceutical industry. Similarly, chemical purity concerns and final product quality requirements often specify the chemicals to be used.

Another commenter stated that EPA had wrongly assumed that the 10 solvent wastes are already captured as hazardous by the characteristics. The commenter states that four of the ten solvents of concern have flash points that do not meet the characteristic of ignitability: phenol, isophorone, furfural and cyclohexanol. Wastes from these four chemicals could never exhibit the characteristic of ignitability, unless generated in mixtures with some other component that has a low enough flash point. Two commenters provided calculations, using Raoult's Law and the lower flammability limit, of the potential concentration of solvents in a mixture that would result in an ignitable waste. These commenters contend that the solvent concentration in the mixtures must be very high to produce a mixture that is ignitable.

As noted above, EPA did not need to rely on the fact that all waste mixtures would be ignitable. Certainly for the four solvents mentioned by the commenter, EPA did not rely only on the hazardous waste designations, but rather presented risk results for all wastes reported. In addition, the amount of solvent in nonwastewaters for two of the chemicals cited were extremely small (cyclohexanol-16 kg; furfural-<1 kg). Thus it is highly unlikely that these wastes could present any significant risk, regardless of whether or not the wastes were designated as hazardous.

Furthermore, the commenters' calculations are based on the lowest solvent concentration waste being mixed with an organic chemical and the highest solvent concentration waste being mixed with water. However, most of the lower concentration solvent wastes reported are mixed with water (at concentrations of solvent much lower than those presented by the commenter), are managed in a tank-based wastewater treatment system, and undergo biological treatment. Most of the higher concentration solvent wastes reported are mixed with other organics and are managed by some type of thermal treatment due to the heating value of the waste.

3. Waste-Specific Rationales and Response to Specific Comments

Acetonitrile. Decision. EPA is not listing wastes from the solvent use of acetonitrile as hazardous waste under 40 CFR 261.31. As described in the

proposed rule and as modified by subsequent analysis in response to comments, EPA finds no significant risks from treatment in aerated tanks or combustion in a boiler. EPA concludes that potential risks from air releases of acetonitrile stored in open accumulation tanks (i.e., on-site storage tanks) are also not significant, because the vast majority of the nonwastewater residuals stored are already regulated as hazardous waste. In the latter case regulatory controls afforded by the existing solvent listings and the characteristics (primarily ignitability) are protective of human health and the environment.

EPA's final determination not to list this solvent is also based on the analysis in the proposed rule (see 61 FR 42328), as modified by subsequent analysis in response to comment, that potential risks from land-based management of acetonitrile wastes are not significant. All wastewaters found in EPA's 3007 Survey were treated in tanks, except for several wastes that were reported to enter impoundments as part of a wastewater treatment train in volumes that would not present significant risk. In response to comments, EPA conducted further analysis of the potential risks that might arise from treatment of acetonitrile wastewaters in a surface impoundment. This analysis included consideration of any additional risk resulting from noningestion exposure from groundwater (e.g., inhalation). As described in section IV.C, these analyses further confirmed this management practice presents no significant risks (see Table 3).

The proposal also found that the few wastes reported to go to landfills typically contained negligible levels of acetonitrile solvents, and were not of concern. In response to comments, EPA further examined the potential for risks that might arise if more concentrated wastes were placed in an unlined Subtitle D landfill, but continues to believe such risks are not of concern (see specific comments below).

As described in section IV.B, EPA updated its risk analysis for acetonitrile for some management scenarios. While the updated analyses confirmed the evaluation in the proposed rule, the updated analysis for aerated wastewater treatment tanks showed an HQ of two, which is slightly above the Agency's presumptive no-list HQ level of one. EPA does not believe this marginal risk is significant for the following reasons. First and foremost, as noted earlier in section IV.B, the analysis that resulted in the HQ of two is actually more conservative than a true double-high

end analysis. The dispersion modeling used in calculating the HQ of two incorporates a high-end receptor distance, in addition to two other high-end parameters used (solvent loading and tank scenario). Furthermore, the solvent loading used for this analysis was the maximum reported for acetonitrile in wastewaters, rather than the 90th percentile value that EPA typically uses to estimate high-end risks (see for example the risk analyses in the recent Petroleum Listing, 63 FR at 42117). In the 3007 Survey for solvent use, facilities reported the treatment of 26 acetonitrile wastewaters in tanks (see the Listing Background Document, App. I), and the maximum was above the 90th% value for the mass loadings from this distribution. EPA used the second highest loading, which was an order of magnitude below the maximum, to see the impact of using this value in the updated analysis. When using the 2nd highest loading, EPA calculated an HQ of 0.02, or well below one. Thus, the HQ of two is an overestimate and does not reflect a significant risk. As further confirmation, EPA also estimated risks for acetonitrile wastes using the methodology from the Air Characteristic Study. This methodology allowed receptor distance to be varied and was thus closer to a true high-end analysis. Using either the maximum acetonitrile loading or the second highest loading, the estimated HQ's were below 1.0 (0.7 and 0.08 respectively). Finally, EPA has recently promulgated regulations under the Clean Air Act (CAA) to control air releases from the industry represented by the one facility with the maximum loading (September 11, 1998, 63 FR 50280). These standards control releases of hazardous air pollutants, such as acetonitrile, from wastewater treatment systems at pharmaceutical producers. Therefore, for these reasons the Agency does not believe that the risks from acetonitrile in wastewater treatment tanks are likely to be significant.

Given that nearly all of the nonwastewater acetonitrile residuals are either already being handled as hazardous, and those that are not handled that way contain negligible amounts of the solvent, these spent solvent residuals are not likely to pose a significant hazard to human health or the environment. Furthermore, treatment of wastewaters in tanks, or in rare cases in impoundments, presents no significant risks. Therefore, the Agency continues to believe that a no-list decision is warranted.

Specific comments. Several commenters support EPA's no list decision on Acetonitrile. The commenters confirmed that the

management practices and characterization of wastewater and nonwastewater residuals from the use of acetonitrile as a solvent have been properly identified. One commenter also noted that the risk assessment conducted by the Agency supports the determination not to list acetonitrile spent solvents. However, another commenter disagreed with the Agency's findings, stating that, despite shortcomings in EPA's risk assessment, the high-end analysis for tank storage resulted in an estimated HQ of 200, orders of magnitude higher than the HQ of 1 typically warranting a hazardous waste listing. This commenter noted that only by performing the Phase III assessment was the Agency able to rationalize a no-list decision.

In response, EPA wishes to clarify the meaning of the different phases of the risk assessment. The iterative process of risk assessment began with bounding analyses as the first phase. This type of analysis (by definition) involves conditions so unlikely as to be virtually impossible. Many scenarios did not show significant risk. Those scenarios which showed significant risk under bounding conditions were assessed under "high-end" conditions in Phase II. This was a more realistic assessment, but still reflected close to a "worst-case" set of conditions.

Of all scenarios evaluated for acetonitrile, only one showed significant risk when modeled under high-end conditions, an uncovered storage tank (also called on-site accumulation in the proposal). The commenter refers to the hazard quotient of 200 calculated for this scenario. However, this result was reported as an intermediate step in the risk assessment process. EPA had significant concerns about this result for two basic reasons. First, this scenario involved storage of solvent wastes pending incineration. Modeling limitations required the Agency to estimate risks based on solvent storage in tanks without covers of any kind. In fact, the scenario assumed that essentially all of the stored acetonitrile would volatilize from the tanks before incineration could take place. The Agency judged this scenario highly unlikely because the waste is being stored for thermal treatment, and it is irrational to assume valuable fuels would be allowed to escape in such a manner. Further, as explained in the proposed rule, the vast majority of the wastes are already classified as hazardous waste because they are either characteristically hazardous, or co-managed with listed hazardous wastes. As such, the storage units would have to comply with RCRA regulations

promulgated to control such air releases (see 40 CFR part 264, subpart CC). Thus, the HQ of 200 is clearly an overestimate, because it was based on modeling releases for wastes that are already hazardous.

In order to assess potential risks from the nonhazardous wastes that were not already subject to Subtitle C controls, the Agency refocused the assessment on the nonregulated waste streams in this scenario (acetonitrile in storage tanks). This third phase of the risk assessment, is a normal and logical step in the iterative risk assessment process. Phase III of the assessment showed that a bounding analysis of these wastes resulted in an HQ below one. Therefore, EPA concluded that the risks from the nonhazardous portion of the acetonitrile wastes are not significant, and that listing of solvent wastes from the use of acetonitrile is not warranted.

One commenter states that large quantities of acetonitrile wastes are generated in concentrations well in excess of levels capable of posing a substantial risk to human health or the environment, and are managed in ways inconsistent with the Congressional directive to minimize the toxicity of mobility of wastes destined for land disposal. The commenter stated that large quantities of solids containing 10,000 ppm solvent are disposed in hazardous waste landfills, while the Universal Treatment Standard (UTS) applicable to acetonitrile is 1.8 ppm.

EPA disagrees that large quantities are generated that present substantial risks. The Agency evaluated risks based on potential exposures arising from plausible management. The highest concentration of acetonitrile going into a surface impoundment is no higher than 0.04 mg/L (see Listing Background Document, Table 3-2). In fact, it would likely be much lower, since those wastewaters are pretreated before entering the impoundment. As described in section IV.C.1, further modeling done for surface impoundments confirmed that risks from such levels were not significant.

The commenter is incorrect in stating that large quantities of solids containing 10,000 ppm acetonitrile are disposed in hazardous waste landfills. First, as noted previously, very few acetonitrile wastes were sent to landfills, i.e., four out of the 254 wastes reported in the Survey. The commenter singled out the one waste with appreciable acetonitrile loading (454 kg/yr.). In EPA's view, this one waste is not reflective of "large quantities" going to landfills. Furthermore, as described further in the following response, the practice is no longer occurring, and the facility in

question is currently sending this waste stream for fuel blending, in recognition of its fuel value.

The Agency disagrees with the commenter's conclusion that current management practices are inconsistent with the Congressional directive to minimize the toxicity and mobility of wastes destined for land disposal. The vast majority of the acetonitrile waste (nonwastewater), both by volume (99%) and by acetonitrile loading (99%), is not managed in land-based units.

Furthermore, as noted above, the vast majority of acetonitrile wastes are already hazardous, and as such, must meet the Land Disposal Treatment standards prior to land disposal.

Finally, as described earlier in today's document, some commenters argued that EPA should examine more land disposal scenarios, such as landfills. In response, the Agency examined groundwater ingestion risks from the disposal of acetonitrile solids in an unlined landfill. The Agency still believes that landfill disposal of acetonitrile is not a plausible management scenario, and there is no evidence that such waste has ever been disposed in Subtitle D landfills. To the contrary, the only facility that had been sending a significant acetonitrile loading to a landfill (454 kg/yr) sent the waste to a Subtitle C landfill. Furthermore the facility indicated that it had ceased this practice during 1993 and started sending the waste for thermal treatment because of the waste's fuel value. (EPA has received confirmation from the generator of this waste that the material has fuel value on the order of 14,800 BTU per pound.¹) Thus, EPA believes that such wastes will be sent for thermal treatment under the current regulatory structure. The Agency decided, however, to examine the resulting risks if such disposal were to occur in an unlined Subtitle D landfill. As described in more detail in the Supplemental Risk Assessment, the resulting analysis suggested hazard quotients in the range of 11-22 for a high-end scenario.

EPA does not view these risks as significant, however, for several reasons. First, as noted above, landfill disposal is unlikely given the fuel value of the material, thus EPA does not view disposal in a D landfill plausible. In any event, the elevated HQs were projected for only one waste out of the 254 acetonitrile wastes identified in the 3007 Survey. Even if EPA found that the

elevated HQs reflected a plausible management scenario, the Agency might well decide that the potential risk posed by this one waste does not merit listing of all acetonitrile residuals generated. Given the widely varying nature of the industries and wastes involved, and the very small percentage of management activities that even arguably could present a risk of concern, the Agency believes that a broad listing for solvent use would result in over regulation. In any case, EPA concludes that wastes such as these are not likely to be disposed in landfills, and are therefore unlikely to pose significant risks.

Phenol. Decision. EPA is not listing wastes from the solvent use of phenol as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA finds no significant risks from treatment in aerated tanks, storage in tanks, or combustion in a boiler. Furthermore, EPA does not believe that potential risks from land-based management of phenol wastes are significant. None of the wastes containing phenol were reported to go to landfills. Wastes with high organic content that contain any appreciable levels of phenol were classified as hazardous waste, and were sent for fuel blending or incineration as hazardous. Wastewaters were generated from the specialized use of phenol as a solvent in the extraction of materials from crude oil, and the resulting spent phenol wastes were sent to wastewater treatment systems for treatment in tanks or surface impoundments. EPA found risks from impoundments would be low given the dilution and treatment that occurs in these wastewater treatment systems, and the specific facts associated with the impoundment of potential concern (see 61 FR 42337).

In response to comments, EPA conducted further analyses of the potential risks that might arise from treatment of phenol wastewaters in a surface impoundment. In these analyses EPA also included consideration of any additional risk resulting from noningestion exposure from groundwater (e.g., inhalation), as well as codisposal with other solvent wastes under evaluation. As described in section IV.C, these analyses further confirmed this management practice presents no significant risks. EPA used the updated toxicological benchmark discussed in section III of today's rule for all additional analyses. The Agency also used the updated toxicological benchmark to revise the risk assessment results for other practices, i.e., storage and treatment in tanks, and found this

¹ See contact report dated June 10, 1998 documenting a telephone conversation with Dave Giffen, B.F. Goodrich, which is located in the docket accompanying today's rule.

had no significant impact on the risks (see Table 3).

Based on the results of the risk analyses in the proposal, as well as the updated evaluations, these spent solvent residuals are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that a no-list decision is warranted.

Specific comments. One commenter supported EPA's decision not to list wastes from solvent uses of phenol as hazardous wastes. The commenter agrees with EPA that phenol does not satisfy the criteria for listing in 40 CFR 261.11(a)(3). However, another commenter stated that there are cases where phenol is currently used by itself (without being mixed with other F-listed wastes) as an industrial solvent and with this decision "not to list" phenol as a hazardous waste, EPA would seem to provide disposal option "carte blanche" for current users. Manufacturers can modify their processes to use these solvents, which would no longer be considered hazardous wastes, according to this commenter.

In response, the Agency believes it unlikely that facilities would change their management practices based on the information collected in the Survey. The Survey indicated that all nonwastewater residuals containing phenol were managed as hazardous except one, which is managed by incineration. Thus, the solvent users managed their wastes as hazardous under the existing regulatory framework. There is no evidence that any facility that has not modified their process to use these solvents to date will do so after a no-list decision. Except for the facilities that use phenol for extracting lube oil, most facilities that use phenol as a solvent use it in laboratories or other specialty uses, and the waste solvents are sent for offsite treatment via incineration as hazardous waste. EPA has no indication that such generators could easily modify their use and accumulation practices in an attempt to generate nonhazardous material, nor is there any indication that facilities would do so.

A third commenter stated that EPA's decisions regarding plausible mismanagement scenarios are especially suspect in the case of phenol, because phenol is the 33rd highest volume chemical produced in the United States, is already widely used, and its use is projected to increase. The commenter stated that EPA did not adequately evaluate groundwater risks posed by phenol.

EPA disagrees with the commenter's inference that projected production increases in phenol are destined for solvent use. In fact, more than 96% of the phenol consumed in the U.S. is for nonsolvent uses (see SRI Chemical Economics Handbook, 1996). Increasing demand for products produced from phenol is due to increases for production of caprolactam, aniline, and bisphenol-A, (e.g., see http://www.chemicalweek.com/marketplace/prod_focus.html). Nearly all of the solvent use of this chemical (>99.9%) was attributed to the petroleum industry, of which the Agency conducted a complete survey. Given that the major uses of this solvent were very specialized (i.e., extraction of lube oil), the Agency is confident that no other significant uses are likely to exist. Contrary to the comment, damage from groundwater contamination was evaluated for the proposed rule, and a refined assessment was conducted for the final rule, and noted in section IV.B. These analyses did not find significant groundwater risks (see Table 2), and details are given in the Supplemental Risk Assessment document in the docket.

The commenter also noted that EPA's Hazardous Waste Characteristic Scoping Study (November 1996) showed that phenol releases originated from nonhazardous waste management units, principally landfills and surface impoundments. The Scoping Study, which expressly excluded product spills and accident releases, presents clear evidence of the potential risks posed by the improper management of phenol wastes, and the use of nonhazardous surface impoundments and landfills as plausible mismanagement scenarios for phenol and other solvent wastes. The commenter went on to state that EPA assumed tanks never leak, and landfills would never be used, because none were reported by the 31 facilities receiving the final questionnaire.

The Agency disagrees that this aspect of the Characteristic Scoping Study is relevant to the Solvents Listing Determination. As EPA noted in the proposed rule, damage cases reviewed did not show evidence linking the phenol contamination at damage sites, including nonhazardous landfills and surface impoundments, to phenol use as a solvent. Without evidence that the mismanagement of phenol wastes resulting in contamination is linked to solvent use, the damage incidents are not an adequate basis for listing phenol as a spent solvent. As noted above, the vast majority of phenol is used for nonsolvent uses. Therefore simply pointing to damage case analyses is not

compelling evidence for listing phenol wastes that result only from its use as a solvent. If EPA were to determine that certain industries that use phenol for nonsolvent uses are mismanaging wastes and causing significant environmental problems, then the Agency would consider other regulatory approaches. However, EPA's examination of the limited solvent use of this chemical indicates that such uses are not likely to generate wastes of concern. Thus, a listing of spent solvent wastes for this chemical would not be a practical way to address the types of environmental concerns raised by the commenter.

EPA responded to the general issues of tanks and landfill disposal elsewhere in today's document. In the case of phenol, the Agency did not consider the disposal of phenol-containing wastestreams in a landfill to be a plausible management scenario for several reasons. None of the 38 wastestreams containing spent phenol reported in the 3007 Survey are managed in a landfill. One reason for this is that very few phenol wastes are solids (most are organic or aqueous liquids). Only one solid wastestream, spent carbon, contained significant levels of phenol. This was sent offsite for regeneration or incineration. EPA has no reason to conclude that the practice of landfilling will increase. Wastes with higher organic content are thermally treated, and 92% of the thermal treatment was conducted in hazardous waste units or through fuel blending for future burning. Therefore, EPA has no basis to project that wastes with significant phenol concentration are likely to be placed in a landfill.

Methyl Chloride. Decision. EPA is not listing wastes from the solvent use of methyl chloride as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA finds treatment in aerated tanks and surface impoundments, storage in tanks, or combustion in a boiler do not present significant risk. The vast majority of methyl chloride produced is used as an intermediate in chemical manufacturing, and very few uses as a solvent were identified. Essentially all of the wastes reported from the solvent uses of methyl chloride were limited to two facilities that produce butyl rubber. While some of the updated lifetime individual excess cancer risks in Table 3 for storage in tanks and wastewater treatment in tanks/surface impoundments were above 1E-06, the risks are below the 1E-05 level typically used by the Agency for identifying

candidate wastes for listing. Furthermore, as described below, the consideration of other factors indicate these risks are not significant.

The high-end risks for storage tanks (4E-06 from the updated analysis and 2E-06 from the Air Characteristic approach) are highly likely to be overestimates, because the analyses assumed that all of the methyl chloride in the stored solvent waste would be released. This assumption is unlikely for materials being stored expressly to send for thermal treatment. Furthermore, these wastes were reported to be already regulated as hazardous, and would be subject to RCRA regulations limiting air releases under 40 CFR part 264, subpart CC.

The risks found for wastewater treatment tanks (1E-06 from the updated analysis, and 1E-07 from the Air Characteristic approach) are at or below EPA's presumptive no-list level of 1E-06, and do not appear of concern. In addition, these are likely to be overestimates, because the concentration modeled for this scenario was 10 ppm, even though the value was actually reported as less than 10 ppm. EPA's updated assessment of the one wastewater reported to be treated in a surface impoundment showed a high-end risk of 4E-06. However the one impoundment that managed this waste is already a permitted Subtitle C hazardous waste unit, and is therefore subject to regulations limiting air releases (see 40 CFR part 264, subpart CC) and groundwater release (40 CFR part 264, subparts F and K).

In addition, potential air releases from this industry are being addressed by other regulations promulgated under the Clean Air Act (see 61 FR 46906, September 5, 1996). These regulations control releases of hazardous air pollutants from process units, storage tanks and wastewater treatment systems. EPA believes that these air regulations provide a more integrated approach to controlling air risks than would be possible under the limited controls available for air releases under the RCRA listing program.

Based on the analysis in the proposal, the updated evaluations, and the other factors discussed in this document and the proposal, the methyl chloride solvent wastes are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that a no-list decision is warranted.

Specific Comments. One commenter supported the Agency's decision not to list methyl chloride. However, another commenter stated that the Agency left potential risks posed by the

groundwater exposure pathway unevaluated by assuming methyl chloride was managed only in a permitted surface impoundment, that tanks never leak, and that landfills would never be used.

As discussed more detail in the proposed rule (see 61 FR at 42334-42335), the Agency did evaluate the groundwater exposure pathway through management scenarios where groundwater exposure was plausible. Wastes with high organic content were regulated as hazardous and incinerated. Waste solids were rarely sent to landfills, and in these cases the concentrations of methyl chloride were negligible. The only wastes sent to landfills were a small volume of spent desiccant that contained <5 kg of methyl chloride, and a larger volume sludge/ash from a sludge treatment unit which was reported to have a "trace" amount of methyl chloride. Given that this chemical is readily treated by biodegradation and volatilization in an aerated biological treatment system, it is unlikely that any significant levels of methyl chloride remain in this residual. EPA believes that these very low concentration wastes reflect the types of waste solids that are likely to be sent to landfills. EPA also notes that other nonwastewaters containing any reported levels of methyl chloride (a total loading of 1.6 kg) were regulated as hazardous waste, making disposal in an unlined Subtitle D landfill illegal. Thus, significant groundwater risks from landfills are unlikely to occur.

The very limited solvent use of this chemical, and its unique characteristics (a gas at room temperature) lead EPA to conclude that it is unlikely that other solvent wastes would be generated that are managed in other surface impoundments beyond the example documented in the 3007 survey. As noted above, this impoundment is a hazardous waste unit, and is therefore subject to RCRA regulations limiting groundwater releases. Furthermore, as noted in the proposed rule, methyl chloride is readily treated by biodegradation and volatilization in waste water treatment systems, and thus is unlikely to migrate to the groundwater. Also, the tendency of methyl chloride to hydrolyze in water to methanol suggests that transport to receptors by groundwater is not likely to be significant.

One commenter argued that EPA failed to adequately consider the formation of products of incomplete combustion (PICs) for methyl chloride. The commenter stated that EPA claimed PIC emissions were not cause for concern because the reported waste in

question happened to be managed in a hazardous waste combustor, and disagreed with EPA's presumption that this one waste management practice reported represents current and future combustion activities.

As noted above, the solvent uses of methyl chloride are very specialized, and the number of wastes sent for incineration are limited. The three wastes with reported concentrations that went to thermal treatment were all classified as hazardous waste and were treated as such under RCRA regulations. (Two wastes incinerated were treatment sludges that were reported to contain no significant levels of methyl chloride). Given these reported practices, and the very limited solvent uses for this chemical, EPA believes that combustion of solvent wastes with appreciable methyl chloride is likely to occur in RCRA regulated units. Therefore, the Agency believes its presumption for management is valid in this case. In addition, EPA is not aware of any precise way of predicting the kinds or levels of PICs that might be generated in a nonhazardous boiler, especially because the wastes in question would make up only a very small fraction of the wastes being treated.

Nevertheless, EPA did consider the possibility of PIC formation for incineration of methyl chloride wastes. As discussed in the preamble to the proposed rule (61 FR 42334), the amount of methyl chloride in the wastes that are incinerated is extremely small (i.e., 2 kg). The loading of methyl chloride sent to a boiler or industrial furnace (BIF), although larger (i.e., at 2,250 kg) than the amount sent to an incinerator, is in a waste that is hazardous due to ignitability and toxicity characteristics, and therefore must be treated as hazardous wastes. This latter waste is generated from the use of methyl chloride in butyl rubber manufacturing, and it is unlikely that such a complex process could (or would) be modified to avoid generating waste methyl chloride in association with high levels of ignitable hydrocarbons. Thus, combustion in a RCRA-regulated unit seems likely to occur for this waste due to the specialized nature of this solvent use. These combustion units are operated according to stringent air emission standards that limit PIC formation (e.g., see 40 CFR part 264, subpart O, for incinerators and part 266, subpart H, for Boilers and Industrial Furnaces). EPA has also proposed revisions to these standards (see 61FR1538, April 19, 1996 and 62FR24212, May 2, 1997). Given these facts, as well as the results of the risk assessment for these wastes, EPA

does not believe that combustion of these wastes poses a significant risk.

2-Methoxyethanol (2-ME). Decision EPA is not listing wastes from the solvent use of 2-methoxyethanol (2-ME) as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from treatment in aerated tanks or combustion in a boiler. EPA also concluded that potential risks from air releases of 2-ME stored in open accumulation tanks are also not significant, because all of the nonwastewater residuals stored under this scenario are already regulated as hazardous waste, either because the wastes exhibit a characteristic, or because the 2-ME waste is commingled with listed wastes. EPA believes that regulatory controls afforded by the existing solvent listings and the characteristics (primarily ignitability) are sufficiently protective of human health and the environment.

None of the wastes examined were sent to land disposal in a landfill or impoundment. Spent solvent solids are thermally treated, and wastewaters are all treated in tanks. In the face of the existing practices, EPA finds it implausible that high organic wastes currently sent to thermal treatment would be sent to landfills. Essentially all of the nonwastewater residuals that contain spent 2-ME are thermally treated or recovered, and nearly all (96%) are treated as hazardous waste. Because all wastewaters are treated in tanks, EPA also does not expect risks from surface impoundment management for these wastes.

Given that nearly all of the nonwastewater 2-ME residuals are already being handled as hazardous, or contain negligible amounts of the solvent, these spent solvent residuals are not likely to pose a significant hazard to human health or the environment. Furthermore, treatment of wastewaters in tanks presents no significant risks. Therefore, the Agency continues to believe that a no-list decision is warranted.

More general comments on EPA's methodology and approach that relate to 2-ME are discussed elsewhere in today's document. The few comments specific to 2-ME are discussed below.

Specific comments. One commenter stated that EPA completely failed to evaluate potential risks from groundwater contamination, notwithstanding three groundwater contamination incidents involving this solvent identified by EPA from damage incidents.

EPA described in the proposed rule why the damage cases cited by the commenter were not useful (see 61 FR at 42332). Of the three problem site identified, two were old landfills that received a wide variety of industrial and municipal wastes, and the use of 2-ME prior to disposal was impossible to ascertain. The chemical is widely used as a fuel additive and as a chemical intermediate. Thus, the damage could not be tied to wastes generated from the use of this chemical as a solvent. Damage at the third site also could not be linked to a specific use of 2-ME. However, this site was a used oil recycling site, and the contamination found may be related to the use of 2-ME as a fuel additive. Furthermore, none of the reports examined by the Agency provided any concentration of 2-ME in the groundwater. Thus, the limited data from the damage incidents provide no reliable support for listing wastes from the use of 2-ME as a solvent. In addition, the industries EPA identified as solvent users of 2-ME are not represented in the damage incidents. Finally, the vast majority of nonwastewater solvent wastes identified in the Survey were reported to be hazardous waste, and could not be placed in nonhazardous landfills. Thus, the damage incidents did not provide useful information on current or likely future waste management practices.

One commenter argued that EPA's high-end risk analysis of onsite accumulation tank storage resulted in a HQ of 16, well above the HQ of 1 that typically warrants a hazardous waste listing. Only by performing the completely misguided Phase III assessment was EPA able to arguably rationalize a no-list decision.

EPA's response to this comment is similar to the response above to essentially the same comment raised for acetonitrile. The apparent risks cited by the commenter were from an intermediate stage of the risk assessment, and did not reflect the fact that all nonwastewaters were managed as hazardous waste. EPA concluded that the management scenario referred to in the comment (on-site accumulation of nonwastewaters in unregulated tanks) does not apply to any 2-methoxyethanol waste streams.

2-Ethoxyethanol Acetate (2-EEA). Decision. EPA is not listing wastes from the solvent use of 2-ethoxyethanol acetate (2-EEA) as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from treatment in aerated tanks, storage in tanks, or combustion in a

boiler. Furthermore, essentially all (99.8%) of the nonwastewaters were reported to be hazardous and were managed as hazardous waste through some form of thermal treatment.

None of the wastes were reported to go to land disposal in landfills or impoundments, and these scenarios were not modeled. Given the existing waste management practices, EPA finds it implausible that high organic waste solids currently sent to thermal treatment would be sent to a landfill. The high percentage of wastes that are hazardous are precluded from disposal in an unlined Subtitle D landfill, and EPA has no evidence to indicate that spent 2-EEA wastes would be placed in a landfill. Due to the nature of the primary industries using 2-EEA as a solvent (e.g., the semiconductor and electronics industries), very few wastewaters are generated. Nearly all of the wastestreams generated are spent solvent wastes that undergo some type of thermal treatment. None of the wastestreams that were reported in the 3007 Survey go to a surface impoundment. Any change from the current treatment in tanks to treatment in impoundments seems unlikely given the capital investment associated with tanks and the liability issues associated with treatment in a surface impoundment. These facilities made an investment in tank-based systems in the absence of any listing, and EPA sees no reason why this would change if the status quo is not changed, i.e., if the wastes are not listed. In addition to cost considerations, some facilities may perceive other benefits from managing the waters in tanks, such as the current exemption from RCRA permitting requirement for such units (see 40 CFR 264.1(g)(6)). If hazardous waste were to be treated in a wastewater treatment system, impoundments in the system would require permitting as a Subtitle C unit. In addition, the use of 2-EEA has been decreasing in recent years, thus other new generators of this spent solvent are unlikely.

Given that nearly all of the nonwastewater 2-EEA residuals are already being handled as hazardous, or contain negligible amounts of the solvent, these spent solvent residuals are not likely to pose a significant hazard to human health or the environment. Furthermore, treatment of wastewaters in tanks presents no significant risks. Therefore, the Agency continues to believe that a no-list decision is warranted.

More general comments on EPA's methodology and approach that relate to 2-EEA are discussed elsewhere in today's document. The few comments

related specifically to 2-EEA are discussed below.

Specific comments. Two commenters stated that EPA failed to consider in its risk assessment, that many of the generators manage 2-EEA with other solvents associated with this proposed rule. EPA calculated an HQ for 2-EEA for on-site accumulation of 0.7. Thus, additional risk from other solvents would cause the HQ level to exceed the threshold of one. One of the commenters went on to cite examples of facilities in several industries (e.g., printed circuit board manufacturers) at which multiple solvents were reported.

EPA disagrees with the commenters' concerns about multiple solvent risks. First, the comment cited examples where the hazard quotient would exceed one at facilities that use more than one solvent in combination. However, the use of the chemicals at the facilities cited by the commenter are not solvent use, within the Agency's definition. These facilities used 2-EEA and other chemicals as components in formulations. Thus, no spent solvent is generated and was not included in the risk assessment.

Furthermore, the HQ value of 0.7 cited by the commenter for on-site accumulation is likely to be unrealistically high for the reasons cited for the Phase II results for acetonitrile. The key reason is that essentially all residuals stored prior to thermal treatment were, in fact, already hazardous waste. Thus, air emissions from these wastes are already regulated under RCRA subpart CC to 40 CFR part 264, making the scenario of storage in an open tank unrealistic. EPA did not pursue a third phase of analysis for 2-EEA because the HQ was below one in the Phase II evaluation. Furthermore, the only wastes reported that were not hazardous consisted of one insignificant loading (<1 kg), and one waste characterized as "containers/rags" which contained very low levels of the solvent (<6 kg). Thus, EPA decided further analysis was not needed. As described in the Risk Assessment section, EPA addressed the general comment of the impact of multiple solvents in some wastes by conducting an assessment of the potential for cumulative risks.

One commenter stated that the concentrations of 2-EEA in solvent nonwastewaters range from 0.1% to 100%. These ranges are not consistent with the Agency's position that nonwastewaters would always be managed as a hazardous waste due to ignitability, particularly where the solvent is not co-managed with listed solvent wastes. The commenter was also

concerned because the concentration of 2-EEA in wastewaters ranges from 200-20,000 ppm.

While the levels of 2-EEA in solvent nonwastewaters are variable, the reported data clearly indicate that essentially all 2-EEA solvent wastes generated were hazardous, and that these were all incinerated. Concerning the wastewaters, EPA believes the commenter's concern is unfounded. EPA's risk assessment included an analysis of potential risks from air releases from an aerated wastewater treatment tank, and found risks to be well below levels of concern.

Furfural. Decision. EPA is not listing wastes from the solvent use of furfural as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from treatment in aerated tanks or surface impoundments, storage in tanks, or combustion in boilers. Essentially all of the solvent use of this chemical (greater than 99.99%) is in the petroleum industry as an extractant for lube oil. Thus, solvent use of furfural is limited, and the Agency identified only a handful of wastes derived from this use.

The furfural solvent wastes are virtually all wastewaters (greater than 99.99%), which were managed in wastewater treatment systems. One of the three facility's wastewater treatment systems uses a surface impoundment, and EPA's bounding analysis for the proposed rule showed no risks of concern from ingestion of groundwater, or inhalation of possible air releases (HQ <1; see 61 FR at 42341).

In response to comments, EPA conducted further analyses of the potential risks that might arise from treatment of furfural wastewaters in a surface impoundment. In these analyses EPA also included consideration of any additional risk resulting from non-ingestion exposure from groundwater (e.g., inhalation). As shown in Table 3, the high-end risk analyses showed that these wastewaters do not present significant risks via either groundwater releases (HQ = 0.46), or air releases (HQ = 0.11).

Based the results of the risk analyses in the proposal, the updated evaluations, and the other factors discussed in this document and the proposal, the furfural solvent wastes are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that a no-list decision is warranted.

General comments on EPA's methodology and approach that relate to

furfural are discussed elsewhere in today's document. EPA did not receive any other specific comments on EPA's decision not to list furfural solvent wastes.

Cumene. Decision. EPA is not listing wastes from the solvent use of cumene as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from treatment in aerated tanks, storage in tanks, or combustion in boilers. While cumene is used in large volumes in the production of other chemicals, such as phenol, its use as a solvent is limited. Essentially all of the wastes containing cumene are thermally treated as hazardous or recovered. Small amounts of wastewaters are sent to treatment systems, and one resulting sludge was reported to be landfilled. However, the amount of cumene in this sludge would be well below the maximum of 28 kg that was used in the original solvent mixture (which contained only 1.7 % of cumene to start with). Thus, after treatment, any risks from cumene would be negligible. Similarly, one wastewater was reported to undergo treatment in a surface impoundment, however, as EPA noted in the proposal, the amount of cumene in the wastewater was small (<47 kg), and would be further reduced by treatment.

In response to comments, EPA conducted further analyses of the potential risks that might arise from treatment of cumene wastewaters in a surface impoundment. In these analyses EPA also included consideration of any additional risk resulting from non-ingestion exposure from groundwater (e.g., inhalation during showering). As shown in Table 2, the revised bounding analyses showed that these wastewaters in impoundments do not present significant risks via either groundwater releases (HQ = 0.0001), or air releases (HQ = 0.003). As noted earlier in today's document, the toxicological values for cumene were updated during the comment period. The new benchmarks were used in the revised analyses, and were also used to recalculate risks derived in the proposed rule (see Table 1). The changes reflect greater tolerance for cumene than the previous benchmarks, and thus have no impact on EPA's decision not to list cumene solvent wastes.

EPA also considered the potential for cumene to form NAPLs, which might present special problems in assessing potential risks. EPA noted in the proposed rule that cumene's water solubility is relatively low, such that NAPLs are theoretically possible.

However, EPA considered the potential risks from NAPLs to be very low, because cumene loading in wastes sent to land-based disposal was minimal. In response to comments, EPA provided further analysis showing that NAPL formation for these wastes is unlikely (see section IV.B).

Based the results of the risk analyses in the proposal, the updated evaluations, and the other factors discussed in this document and the proposal, the cumene solvent wastes are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that a no-list decision is warranted.

General comments on EPA's methodology and approach that relate to cumene are discussed elsewhere in today's document.

Cyclohexanol. Decision. EPA is not listing wastes from the solvent use of cyclohexanol as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from accumulation in storage in tanks or combustion in boilers. The solvent uses of cyclohexanol are limited, and few wastes containing cyclohexanol were reported. All wastes but one are hazardous waste due to other waste constituents or properties of the waste material. The incinerated material contains low levels of cyclohexanol (16 kg total loading per year). The one other waste generated was reported to go to a nonhazardous landfill, however, this waste is a small volume (750 kg) of filter material that contains negligible level of cyclohexanol. Given the limited solvent uses of this chemical, and the management practices reported, EPA believes other wastes or management practices are not likely to be significant.

As noted earlier in today's document, the toxicological inhalation benchmark ("provisional RfC") for cyclohexanol was adjusted somewhat based on peer review comments. Thus, EPA used the new benchmark to recalculate risks derived in the proposed rule (see Table 3). The revised HQs remain below one, and thus the updated health-based number has no material effect on EPA's decision not to list cyclohexanol solvent wastes.

Based the results of the risk analyses in the proposal, the updated evaluations, and the other factors discussed in this document and the proposal, the cyclohexanol solvent wastes are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency

continues to believe that a no-list decision is warranted.

More general comments on EPA's methodology and approach that relate to cyclohexanol are discussed elsewhere in today's document.

Isophorone. Decision. EPA is not listing wastes from the solvent use of isophorone as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from accumulation in storage in tanks or combustion in boilers. The solvent uses of isophorone are limited, and few wastes containing isophorone were reported. All wastes but one were hazardous waste due to mixture with other listed wastes or the ignitability characteristic of the waste material. All wastes were reported to undergo some form of thermal treatment as a hazardous waste. Given the limited solvent uses of this chemical, and the management practices reported, EPA believes other wastes or management practices are likely to be significant.

As noted earlier in today's document, the toxicological value ("provisional RfC") for isophorone was adjusted somewhat based on peer review comments. Thus, EPA used the new benchmark to recalculate risks derived in the proposed rule (see Table 1). The revised HQs remain below one, and thus the updated health-based number has no material effect on EPA's decision not to list isophorone solvent wastes.

Based on the results of the risk analyses in the proposal, the updated evaluations, and the other factors discussed in this document and the proposal, the isophorone solvent wastes are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that a no-list decision is warranted.

More general comments on EPA's methodology and approach that relate to isophorone are discussed elsewhere in today's document.

2-Methoxyethanol Acetate (2-MEA). Decision. EPA is not listing wastes from the solvent use of 2-methoxyethanol acetate (2-MEA) as hazardous waste under 40 CFR 261.31. As described in the proposed rule and as modified by subsequent analysis in response to comments, EPA found no significant risks from storage in tanks or combustion in a boiler. 2-MEA is reportedly no longer produced domestically, and solvent use of this chemical is limited. The few wastes generated were classified as hazardous and were all thermally treated as hazardous waste. Given the limited and

decreasing use as a solvent, and the waste information reported, EPA believes that other wastes and management practices are unlikely. None of the wastes were reported to be disposed of in landfills or impoundments, and these scenarios were not modeled.

Given the existing practice, EPA finds it implausible that high organic waste solids currently sent to thermal treatment would be sent to a landfill. The wastes are hazardous and thus precluded from disposal in an unlined Subtitle D landfill. EPA has no evidence to indicate that spent 2-MEA wastes would be placed in a landfill. Due to the nature of the solvent uses reported for 2-MEA (diluent in coating and reaction media), no wastewaters are generated, nor were they expected.

Based on the results of the risk analyses in the proposal, the updated risk analysis, and other factors noted above and in the proposed rule, these spent solvent residuals are not likely to pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that a no-list decision is warranted.

More general comments on EPA's methodology and approach that relate to isophorone are discussed elsewhere in today's document. EPA did not receive any specific comments on EPA's decision not to list 2-MEA solvent wastes.

Chemicals with no significant solvent use. As described in the proposed rule and reaffirmed in this final decision, EPA did not find any significant solvent use for four chemicals: p-dichlorobenzene, benzyl chloride, epichlorohydrin, and ethylene dibromide. All but one are relatively reactive chemicals, which makes them unsuitable for most solvent applications. The other substance, p-dichlorobenzene, is a solid at room temperature, limiting its utility as a solvent. In all cases, the data collected by the Agency showed that any solvent use of these chemicals is extremely limited. Some may perhaps have specialty applications in laboratories, but no significant solvent uses were identified. Any residuals reported from the 3007 Survey were primarily from possible solvent use by laboratories and contain low levels of the chemicals under study. All were coded as hazardous, except one dilute wastewater, and were thermally treated as hazardous waste.

The Agency received no new information during the comment period indicating that these four chemicals, (benzyl chloride, epichlorohydrin, ethylene dibromide, and p-

dichlorobenzene) were used as solvents. Comments received by EPA on this issue concurred with the Agency's decision that these four chemicals are not used as solvents, and that they would not fit the description for such a listing. Based on the analyses and factors noted above and in the proposed rule, these spent solvent residuals do not pose a significant hazard to human health or the environment. Therefore, the Agency continues to believe that no-list decisions for these four chemicals are warranted.

V. Regulatory Requirements

A. Regulatory Impact Analysis Pursuant to Executive Order 12866

Executive Order No. 12866 requires agencies to determine whether a regulatory action is "significant." The Order defines a "significant" regulatory action as one that "is likely to result in a rule that may: (1) have an annual effect on the economy of \$100 million or more or adversely affect, in a material way, the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) create serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients; or (4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order."

The Agency estimated the costs of today's final rule to determine if it is a significant regulation as defined by the Executive Order. Because the Agency has decided not to list as hazardous the wastes generated from the use of the solvents evaluated in this rulemaking, no specific action is required under this action. As a result, there are no costs associated with this final rule. This rule was deemed significant for novel policy reasons by the Office of Management and Budget (OMB) and was submitted to OMB for review.

B. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996) whenever an agency is required to publish a document of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the

rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities.

SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. The following discussion explains EPA's determination. This rule has no effect as the Agency is issuing this final decision not to list wastes generated from the use of 14 chemicals as solvents as hazardous under the Resource Conservation and Recovery Act (RCRA). The determinations in this rule are limited to specific solvent wastes. The rule does not impose new burdens on small entities. Therefore, I hereby certify that this rule will not have a significant economic impact on a substantial number of small entities. This rule, therefore, does not require a regulatory flexibility analysis.

C. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law No. 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with Federal mandates that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of \$100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal

governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that this rule does not include a Federal mandate that may result in estimated costs of \$100 million or more to either State, local, or tribal governments in the aggregate. The rule would not impose any federal intergovernmental mandate because it imposes no enforceable duty upon State, tribal or local governments. States, tribes and local governments have no compliance costs under this rule. For the same reasons, EPA also has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. In addition, as discussed above, the private sector is not expected to incur costs exceeding \$100 million. By these findings, EPA has fulfilled the requirement for analysis under the Unfunded Mandates Reform Act.

D. Executive Order 12875: Enhancing the Intergovernmental Partnership

Under Executive Order 12875, EPA may not issue a regulation that is not required by statute and that creates a mandate upon a State, local or tribal government, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by those governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 12875 requires EPA to provide to the Office of Management and Budget a description of the extent of EPA's prior consultation with representatives of affected State, local and tribal governments, the nature of their concerns, copies of any written communications from the governments, and a statement supporting the need to issue the regulation. In addition, Executive Order 12875 requires EPA to develop an effective process permitting elected officials and other representatives of State, local and tribal governments "to provide meaningful and timely input in the development of regulatory proposals containing significant unfunded mandates."

Today's rule does not create a mandate on State, local or tribal governments. The rule does not impose any enforceable duties on these entities.

It issues a final decision not to list wastes generated from the use of 14 chemicals as solvents as hazardous under the Resource Conservation and Recovery Act (RCRA). Accordingly, the requirements of section 1(a) of Executive Order 12875 do not apply to this rule.

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

Executive Order 13045: "Protection of Children from Environmental Health Risks and Safety Risks" (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be "economically significant" as defined under E.O. 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This final rule is not subject to the Executive Order because it is not economically significant as defined in E.O. 12866, and because the Agency does not have reason to believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. The Agency performed a risk assessment to assist in its determination whether to list or not to list the solvent wastes in this final rule as hazardous waste. This risk assessment calculated the potential risk resulting from the current management of these wastes to individuals (including sensitive populations like children). The Agency has determined that management of these solvent wastes as hazardous is not required and that the environmental health risks or safety risks addressed by this action do not have a disproportionate effect on children.

F. Environmental Justice E.O. 12898

EPA is committed to addressing environmental justice concerns and is assuming a leadership role in environmental justice initiatives to enhance environmental quality for all residents of the United States. The Agency's goals are to ensure that no segment of the population, regardless of race, color, national origin, or income bears disproportionately high and adverse human health and environmental impacts as a result of

EPA's policies, programs, and activities, and that all people live in clean and sustainable communities. In response to Executive Order 12898 and to concerns voiced by many groups outside the Agency, EPA's Office of Solid Waste and Emergency Response formed an Environmental Justice Task Force to analyze the array of environmental justice issues specific to waste programs and to develop an overall strategy to identify and address these issues (OSWER Directive No. 9200.3-17). The Agency has determined that a hazardous waste listing is not justified for the wastes examined in this rule. As a result, no specific action is required under this rule. It is, therefore, not expected to result in any disproportionately negative impacts on minority or low income communities relative to affluent or non-minority communities.

G. Paperwork Reduction Act

This rule does not contain any information collection requirements subject to OMB review under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.*

H. National Technology Transfer and Advancement Act

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

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

Under Executive Order 13084, EPA may not issue a regulation that is not required by statute, that significantly or uniquely affects the communities of Indian tribal governments, and that imposes substantial direct compliance costs on those communities, unless the

Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments. If EPA complies by consulting, Executive Order 13084 requires EPA to provide to the Office of Management and Budget, in a separately identified section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 requires EPA to develop an effective process permitting elected officials and other representatives of Indian tribal governments "to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities."

Today's rule does not significantly or uniquely affect the communities of Indian tribal governments. As mentioned above, no specific action is required by this action. Today's rule does not create a mandate on State, local or tribal governments. The rule does not impose any enforceable duties on these entities. Accordingly, the requirements of section 3(b) of Executive Order 13084 do not apply to this rule.

J. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA has submitted a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 261

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

Dated: October 30, 1998.

Carol M. Browner,
Administrator.

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