HAZARDOUS WASTE LISTING DETERMINATION: SPENT SOLVENTS

RESPONSE TO COMMENTS

October, 1998

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I. Introduction

The U.S. Environmental Protection Agency (EPA or the "Agency") issued a proposed rulemaking (61 *FR* 42319, August 14, 1996) in which the Agency proposed not to list wastes from the use of 14 chemicals as solvents as hazardous under 40 CFR Part 261. EPA received comments from the entities listed below on the proposed rulemaking. This document responds to those comments, and should be read in conjunction with the final rule published in the *Federal Register*, and documentation related to the revised risk assessment (*Assessment of Risks from the Management of Used Solvents: Supplemental Risk Assessment Background Document*, hereafter known as Supplemental Risk Assessment).

American Petroleum Institute (API)
Amoco Corporation
BP Chemicals
Chemical Manufacturers Association (CMA)
Chemical Manufacturers Association - Cumene Panel
Chemical Manufacturers Association - Ketones Panel
Chemical Manufacturers Association - Phenol Regulatory Task Group
Chlorobenzene Producers Association (CPA)
Ciba Specialty Chemicals Corp
Cement Kiln Recycling Coalition (CKRC)
U.S. Department of Energy (DOE)
Dow Chemical Company (Dow)
Environmental Defense Fund (EDF)
Environmental Treatment Council (ETC)
Exxon Chemical Americas (ECA)
Franklyn Isaacson, Foster Wheeler USA Corp
General Motors (GM)
Gossman Consulting, Inc.
Methyl Chloride Industry Association
Monsanto Company
PPG Industries, Inc
The Confederated Salish and Kootenai Tribes of the Flathead Nation
Utility Solid Waste Activities Group (USWAG)

II. Definition of Solvent

Commenter: American Petroleum Institute (API)
Comment: III. EPA Has Appropriately Defined The Scope Of These Listing Determinations. EPA bases this rulemaking on two legal mandates. First, section 3001(e)(2) of RCRA directs EPA to make a determination of whether or not to list, among other things, "solvents." 42 U.S.C. § 6921(e)(2). Second, the consent decree in Environmental Defense Fund v. Browner, Civ. No. 89-0598 (D.D.C.), requires EPA to make a listing determination as to 14 specified "solvent wastes."

While neither the statute nor the consent decree defines "solvents" or "solvent wastes," both mandates were created in the face of, and presumably with knowledge of, EPA's long-standing interpretation that solvent wastes are chemicals that have been used for their solvent properties. Under this interpretation, chemicals that could be used as solvents (e.g., as an agent or medium for dissolving other substances, for cleaning, degreasing, fabric scouring, or as diluents, extractants, and reaction and synthesis media), but which in fact are used for other purposes (e.g., as reactants or ingredients in the production of commercial chemical products) are not considered "solvents" and their resulting wastes are not "solvent wastes."

EPA introduced this interpretation in 1981 (shortly after, and in connection with, the original solvent listings for F001-F005). 46 Fed. Reg. 56584 (Nov. 17, 1981). EPA's interpretation has remained consistent since that time.[2] [[2] *See, e.g.,*50 FR 53316-17 (Dec. 31, 1985). *See also* Letter from M.A. Strauss (EPA) to R.C. Scott (Mobay Chemical Corp.), May 24, 1985; Letter from J.W. Sales (EPA) to G. Spiegelman (Interwaste Services Co.), Dec. 5, 1986; Letter from M.A. Strauss (EPA) to R.J. Drozdowski (Moog, Inc.), Jan. 27, 1987; Letter from J.W. Sales (EPA) to S.J. Evans (Modine Mfg. Co.), May 20, 1987; RCRA/Superfund Hotline Summary (Oct. 1989); Letter from R. Brandes (EPA) to J.E. Wilson (The Environmental Co.), Aug. 17, 1992] EPA has properly applied the delineation between chemicals used for their solvent properties and chemicals used for other purposes in defining the scope of this rulemaking. Thus, only solvents that have been used for their solvent properties are at issue in this proceeding.

The manner in which EPA has limited the scope of this rulemaking is reasonable and consistent with EPA's historical treatment of solvent listing descriptions. Moreover, it is consistent with the statute and the consent decree. When Congress amended section 3001 of RCRA in 1984 to direct a listing determination as to "solvents," it was surely aware of EPA's approach to the earlier solvent listings. Similarly, the parties to the consent decree had to have been aware of EPA's long-standing approach. Had either Congress or the parties to the consent decree desired a broader definition of the terms “solvent” and “solvent waste,” it would have been a simple matter for them to make that intention plain. Accordingly, EPA, has reasonably and appropriately defined the scope of the present listing determinations.
Response: The Agency appreciates the commenter’s summary of the historical definition of “solvent” within the RCRA program and concurs with the comment as being the correct reading

of the definition of solvent use applied in this rule. As the commenter notes, the Agency has a longstanding interpretation of “solvent” and “solvent use,” which was consistently applied in this rulemaking. Furthermore, it is reasonable for the Agency to interpret the scope of the Consent Decree’s application to solvent wastes to mean the same as the existing regulatory scope of solvent wastes, as noted in the comment.

Commenter: Department of Energy

Comment: On August 14, 1996, the U.S. Environmental Protection Agency (EPA) published a Notice of Proposed Rulemaking (NPRM) regarding a listing determination for 14 chemicals potentially used as solvents. This listing determination was conducted under the authority of Sections 3001(b)(1) and 3001(e)(2) of the Resource Conservation and Recovery Act (RCRA), and in accordance with a consent decree the Agency entered into with the Environmental Defense Fund (EDF). An investigation of the 14 chemicals was conducted by EPA which involved an evaluation of the chemicals potentially used as solvents, characterization of the wastes generated from the identified solvent uses, and a risk assessment evaluating plausible mismanagement scenarios for the resultant wastes. Based on this investigation, EPA is proposing not to list (under 40 CFR 261.31) wastes generated from the solvent use of any of the specific 14 chemicals evaluated.

In making its decision, EPA explains that this action should not be misconstrued as a determination that the 14 chemicals are nontoxic. On the contrary, the Agency indicates that many of these solvent wastes are already regulated as characteristic hazardous wastes, or because they are mixed with other solvent wastes that qualify as listed hazardous wastes. For clarification purposes, EPA states that the determination addressed by the proposed rule pertains only to the need for adding these specific solvent wastes to the RCRA hazardous waste listings (based on the criteria in the listing regulations).

As part of the consent decree with the EDF, the Agency also agreed to conduct a study concerning an additional set of seven solvents (in lieu of a listing determination) and to issue a final report regarding these additional chemicals. Subsequent to the subject NPRM, EPA published a notice (September 10, 1996; 61 FR 47751) announcing the availability of a study on these additional spent solvents (hereinafter referred to as the “Solvents Study”). Although the consent decree does not require a listing determination for the seven-solvent study chemicals, the preamble states that EPA may decide to issue a listing determination in a future rulemaking.

The Department of Energy (DOE) appreciates the opportunity to provide input in response to the proposed spent solvent listing determination and the Solvents Study. Based on the information provided in the NPRM, the Department generally supports EPA's proposal not to list as hazardous those wastes generated from the solvent use of the 14 specified chemicals. DOE believes that the methodology utilized for establishing the study universe is reasonable. Furthermore, the Department believes that it is appropriate for EPA to use the same approach in this listing determination as in the previous solvent listings, and concurs with EPA's retention of the interpretations used in the past to define "solvent use" and "spent solvent" waste generation.

Although the Department generally concurs with EPA's evaluation and listing determination, the enclosed comments also raise a few issues and concerns. One such issue relates to preamble discussion about the possibility of EPA receiving relevant new data and information during the comment period. If EPA receives such new information, DOE urges the Agency to announce the availability of the new information, and, if necessary, repropose those sections of the initial determinations that may be modified based on the new information. Much of the remainder of the response package discusses elements of the RCRA Subtitle C program that are not addressed in the proposed rule [e.g., permitting requirements, the mixture rule exemptions under 40 CFR 261.3(a)(2)(iv)], but would be impacted or could require modification if EPA determines that listing one or more spent solvent wastes is warranted. A comment is also included in response to the study concerning the seven additional chemicals (i.e., in regards to the Solvents Study).

The enclosed comments are presented for the Agency's consideration. These comments have been organized into two sections: specific comments regarding the spent solvent listing determination (i.e., the NPRM itself) and a comment on the Solvents Study. For clarity, each comment is preceded by a reference to the section of the proposed rule to which it applies and a brief description in bold-face type of the issue within that section to which DOE's comment is directed.

Response: As the commenter notes, the Agency has a longstanding interpretation of "solvent" and "solvent use," which was consistently applied in this rulemaking. The Agency appreciates the commenter's support of the continued, consistent application of these definitions as well as the methodology used to define the study universe. The commenter also notes the possibility that the Agency may receive new data, and requests an opportunity to review such data. EPA did not receive any data during the public comment period that would cause the Agency to reexamine or repropose the listing determinations for the 14 chemicals used as solvents. As a result, the Agency is finalizing its determination that residuals from the 14 chemicals used as solvents not be listed as hazardous waste. Thus, the commenter's concerns regarding permitting and the mixture rule are moot.

Commenter: ETC
Comment: G. The Criteria for Eliminating Industrial Solvent Users from Evaluation on the Basis of Solvent Usage is Flawed

It is erroneous for EPA to assume that the only important pathway for environmental exposure and harm from these solvents is due to the generation of spent solvent at any given facility. Indeed, many of these solvents, although they may be used in formulations of commercial products, still fit the definition of "solvent use" given at 61 FR 42320 of the proposed rule. That is, they are still used "to solubilize (dissolve) or mobilize other constituents" such as "degreasing, cleaning, and fabric scouring, use a diluents, extractants, and reaction and synthesis media, and similar uses."

However, in the "Hazardous Waste Listing Determination Document Background Document for Solvents, 'the survey results for solvent production and use, described in Tables 2-2 and 2-3, discount major quantities of these solvents that are used to produce or are otherwise incorporated in products, but are, in fact, used for ans still exist as solvents in the product. For example, EPA discounted over 50% of the isophorone reported in the 1992 use survey from the 1993 RCRA Survey as "Identified as Solvent Use" because it is "contained in paints or coatings (not solvent use)." Contrary to EPA's statement, however, isophorone is recognized by valid references to be used as a solvent in these paint and coating products.

Similarly, cyclohexanol, furfural, benzyl chloride, p-dichlorobenzene, and ethylene dibromide are used as solvents and mobilizing agents in such widespread commercial products as paints, coatings, dyes and liquid fuels. These products retain the solvent properties of the raw solvents which will unleash the same environmental impact as the otherwise "spent solvent" when these products are spilled, discarded or disposed of as waste. It is therefore irrelevant that the solvent is contained in a commercial product that inadvertently becomes a waste, or is a waste stream by design, because it should still be RCRA regulated to prevent improper disposal of the solvent.

Response: The Agency disagrees, and notes a long-standing policy of treating these cases differently. The Agency does define "solvent properties" as the ability to "solubilize (dissolve) or mobilize other constituents. For example, solvents used in degreasing, cleaning, fabric scouring, as diluents, extractants, reaction media, and similar uses are covered under the listing (when spent)." (50 FR 53316, December 31, 1985). However, the Agency goes on to point out that "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 Consent Decree signed by the parties in the EDF vs. Reilly (now EDF vs. Browner) in June, 1991 stipulates that "This [solvents] listing determination shall include the following spent solvent wastes, still bottoms from the recovery of the following solvents, and spent solvent mixtures" and goes on to list the 14 chemicals required for this listing determination. The Agency's operational definition of "solvent use" has been in existence since the Agency wrote this language in the regulations in 1980 (F001 - F005 listings, 40 CFR 261.31), and existed when Congress passed the Hazardous and Solid Waste Amendments of 1984, when the Agency clarified the scope of "solvent use" in 1985 (50 FR 53316), when the Agency listed four additional solvents (51 FR 6537, February 25, 1986), and when the 1991 Consent Decree was drafted and signed. The chemicals in this listing determination may well be used as reactants or ingredients in commercial formulations (such as paints, adhesives, or photoresist), but given the backlog of listing determinations under court-ordered deadlines, the Agency has focused its current efforts on those determinations required by law.

In addition, as this listing determination is oriented towards wastes from the use of these chemicals as solvents, and the Agency was given the task of determining which industries across a potentially broad spectrum may do so, the Agency found that the existing regulatory definition provided a useful way of determining what those solvent uses are, and how industries that use these chemicals as solvents are specialized in their solvent uses. Therefore, the Agency has retained the interpretations used in the past to define "solvent use" and "spent solvent" waste generation. The Agency is including selected correspondence in the docket to this rule for the convenience of the public.

Commenter: Utility Solid Waste Activities Group
Comment: II. EPA's Clarification Of The Scope Of The Existing Solvent Listings Should Be Included In The Preamble To The Final Rule As Useful Guidance

USWAG supports EPA's clarification of the scope of the existing solvent listings. 61 Fed. Reg. at 42320; 40 C.F.R. 261.31(a) (listing F001, F002, F003, F004 and F005). Although these solvent wastes were classified as listed hazardous wastes in 1985, there is continuing confusion in the regulated community about the universe of wastes covered by this listing determination. EPA explains in this rulemaking that the existing listings apply only to spent solvents that contain at least 10 percent (by volume), before use, of the listed solvents used for their "solvent properties." 61 Fed. Reg. at 42320. The Agency further states that
Solvents are used for their "solvent" properties - to solubilize (dissolve) or mobilize other constituents. Examples of such solvent use include degreasing, cleaning, and fabric scouring, use as diluents, extractants, and reaction and synthesis media, and for other similar uses. A chemical is not used as a solvent if it is used only for purposes other than those described above. Id.

This discussion of the scope of the existing solvent listings is consistent with EPA's prior statements and provides useful guidance to the regulated community. USWAG suggests that EPA repeat this discussion in the preamble to the final rule to address the continuing uncertainty in the regulated community about the universe of wastes covered under the existing solvent listings.
Response: The interpretations of “solvent” and “solvent use” are consistent with past Agency policy. No clarifications were made in the proposed rule; rather, the Agency reiterated existing interpretations for the assistance of the regulated community. The Agency will repeat this discussion in the preamble for the final rule.

III. Data Collection

A. Representativeness of Industry Characterization

Commenter: Department of Energy
Comment: Although the Department concurs with EPA that it is reasonable to limit the universe of 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 [as discussed on page 42321, col. 3], EPA may want to consider clarifying the extent of the applicability of this approach. Clarification may be useful to ensure that this approach to developing the study universe will not be misconstrued as an Agency action that also could be applied by hazardous waste generators determining their generator category (i.e., whether they qualify as a large quantity generator, small quantity generator, or conditionally exempt small quantity generator). Specifically, the Agency may want to consider clarifying that generators cannot use a moving average of 1,200 kilograms over a 12 month period (like the approach used in developing the study universe), but rather must continue to determine their generator category based on the total amount of all hazardous wastes generated at their site on a *month-to-month* basis.
Response: The Agency selected the 1200 kg/yr cutoff as a reasonable limit for determining which facilities should receive the full RCRA 3007 Solvent Use Questionnaire. The commenter is correct in noting that this cutoff may not equate, on a monthly basis, to the small quantity generator category cutoff. At the commenter's request, the Agency has clarified this issue in the preamble to today's final rule. Because of the complexity of the full RCRA 3007 Solvent Use Questionnaire, an effort was made to eliminate non-users (and very small users) of solvents from the mailing list for the questionnaire.

Commenter: EDF
Comment: 1. The Preliminary Questionnaire

EPA essentially conducted two industry surveys in support of this rulemaking. In the first survey, using the "preliminary questionnaire," EPA attempted to identify users of the solvents at issue in this rulemaking during calendar years 1991 and 1992. To identify appropriate recipients of the questionnaire, EPA contractors conducted literature searches, consulted with various trade associations and other organizations, and reviewed the TRI data base in an attempt to identify potential solvent users.[13] [[13] Listing Background Document at pp. 4-9.]

However, none of the principal information sources could or did provide anything approaching a complete picture of solvent use in 1991 and 1992.[14] [[14] The "bulk" of the solvent uses were identified from the chemical abstracts. See EPA Solvents Workgroup Meeting, May 1993, p. 3, provided to EDF pursuant to a Freedom of Information Act (FOIA) request.] The literature search was limited because it necessarily relies upon public information, and thus would fail to capture important proprietary uses of the solvents, or uses a company simply chose not to make public for whatever reason. Also, newer or lesser studied industrial processes would not appear in the published literature. Moreover, for some solvents, 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.[15] [[15] These limitations in the literature search are largely acknowledged by EPA in the rulemaking record. See Listing Background Document Record at 16-17. Still, without any supporting basis, EPA baldly asserts "few, if any" solvent uses were missed using this method. Id.]

Response: EPA disagrees with the commenter. The industry study provides the Agency with a complete and accurate understanding of the nationwide uses of these chemicals and whether or not the chemicals are used in large or small quantities as solvents. The Agency is confident that the collected information on solvent use covered the large solvent users. The Agency conducted a thorough literature search that targeted actual solvent use. In fact, it is for the reasons cited by the commenter that EPA did not limit its literature search and preliminary questionnaire identification of industries and facilities from a single source. Rather, the Agency conducted a thorough review utilizing a breadth and depth of sources, to provide a comprehensive search that identified all actual and potential solvent uses. The depth of the literature search, and the identification of potential new users of 14 chemicals as solvents is evidenced in the number of facilities that were identified as potential solvent users who, in response to the preliminary questionnaire, indicated no solvent use (40% of these surveyed). Through targeting actual solvent use, many SIC codes were omitted (see Appendix D to the Background Document to the proposal for SIC codes deleted and reasons for elimination of SIC codes). The methodology described by the commenter would have targeted SIC codes which have no solvent use.

The commenter has not considered the full depth of the investigation of potential chemical uses at the outset of the investigation. The Agency used a process of “winnowing” down uses of chemicals discovered in the literature to separate those that were and those that were not solvent uses. By using the various literature sources described below (and in the Background Document), the Agency could use information on uses of the chemical to develop a complete profile of the chemical, to eliminate those facilities or industries that did not use these chemicals as solvents, and to develop a preliminary questionnaire mailing list to target those facilities that were probable solvent users. Because of engineering knowledge, use of comprehensive literature sources and Agency databases, and elimination of non-solvent uses of these chemicals, the Agency is confident in having captured almost all (and certainly all the major) relevant industries and facilities involved in using these solvents.

As EPA explicitly stated in the Background Document [p. 16], “EPA did not pursue an industry study methodology based on random sampling; rather, EPA made a significant effort *to identify users of these chemical as solvents and collect data directly from facilities at which there was a reason for suspected solvent use* for each one of the 14 chemicals under study.” [Emphasis added.] The Agency made a significant effort to target the correct industries and facilities using one or more of the 14 chemicals as solvents, rather than employ a shotgun approach that would have squandered limited Agency resources and burdened businesses, both large and small, that do not use any of the 14 chemicals as solvents. More importantly, the Agency captured a greater amount of industries through the survey than through the literature searches. For further detail please refer to the response to EDF in Section IV. D. of this document.

The Agency conducted literature searches to identify industries using not only the 14 chemicals subject to this rule, but also the 7 chemicals involved in the study. These chemicals were included because the Agency was required to collect similar data about these latter 7 chemicals as the former 14. Their inclusion in this study reinforces the Agency's assertion that the data collection on the universe of solvent users for these chemicals is, in fact, comprehensive.

As stated in the preamble and background document to the August 14, 1996 proposal, initial sources searched included *Chemical Engineering Handbook*, the *Industrial Solvents Handbook*, and the SRI *Chemical Economics Handbook* to obtain basic information on production and potential solvent uses. Further, trade associations (Chemical Manufacturers Association, Pharmaceutical Manufacturers Association, Semiconductor Manufacturers Association, Chemical Distribution Association, American Chemical Society, and Synthetic Organic Chemical Manufacturers Association) were contacted for information on the potential solvent use of the target chemicals. In addition, as the commenter notes, a search of Chemical Abstracts was conducted to identify potential uses of the target chemicals for their solvent properties. Chemical Abstracts provides a comprehensive coverage of technical and industrial journals, as well as other publications related to chemical research. Chemical Abstracts gathers information from journals, patents, technical reports, books, conference proceedings, and academic dissertations from around the world. The fields covered by Chemical Abstracts include biochemistry, organic chemistry, macromolecular chemistry, applied chemistry, physical chemistry, analytical chemistry, inorganic chemistry, as well as chemical engineering. Through the solvents listing background document, the Agency attempted to disclose all of the limitations and uncertainties associated with the literature search methodology applied in the listing determination. That (1) solvents uses by may be considered "confidential" and therefore not published, and that (2) previous years' abstracts may have identified additional uses are two of the possible limitations of the chemical abstracts search.

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 would like to point out that the commenter fails to suggest any alternate method of identifying potential solvent users or name any specific solvent users the Agency may have missed. The commenter suggests that the Agency "might" have missed solvent uses or users, but the commenter never specifically identifies any missing data. The Agency identified uses and the proprietary information needed to characterize potential solvent users. Overall, the Agency regards the methodology used to identify potential users of solvents to be a comprehensive approach.

The claim that the Chemical Abstracts and published literature do not disclose proprietary information is irrelevant. Reporting of chemical use, production, and releases is still required by the Agency's TRI program, and the likelihood that use of any of the chemicals as solvents would remain completely out of published literature is quite remote. Data likely to be confidential are feed ratios, operating conditions, recovery efficiencies, etc.

TRI was also used to identify potential solvent use facilities. Facilities are required to report chemical use to TRI regardless of whether their process is considered to be confidential. Once these facilities receive a RCRA questionnaire, they are obligated to report all processes, non-confidential and confidential, that use any of the 21 chemicals as solvents, as evidenced by the confidential processes reported. From the confidential information that was reported, the Agency observed that in most all cases, the type of solvent used in a specific process in a specific industry was disclosed through literature; it is the feed ratios, operating conditions, and recovery efficiencies that are claimed as confidential. For example, Phillips 66's process that uses cyclohexanol to produce cyclohexane and Exxon's process for the manufacture of butyl rubber that uses methyl chloride are disclosed through literature, but specific aspects of the production processes, such as raw materials are claimed to be confidential. The Agency also did attempt to identify proprietary solvent uses within the Agency's existing sources (e.g., the effluent guidelines and previous industry listing determinations). No solvent use was reported through the Chlorinated Aliphatics Survey. A portion of solvent use was identified, and facility's addresses obtained from, the database supporting the effluent guidelines for the pharmaceuticals industry, and the Organic Chemicals, Plastics, and Synthetic Fibers industries.

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.

In summary, given the solvents' specialization of uses, chemical properties, and relative prices, the Agency is confident that the methodology used in identifying potential solvent users not only encompassed all potential solvent users, but also, contrary to the claims of the commenter, overestimated the potential number of solvent users of these chemicals. Logically, standard reference sources described solvent uses of these chemicals. Agency data confirmed these sources and provided a few additional industrial categories of solvent users. Use of Chemical Abstracts, while useful, provided the fewest incremental additional solvent-using industries and facilities due to the experimental nature of the activities described in the Abstracts. The likelihood of any of the chemicals under consideration being used as solvents is small to non-existent outside of the realm of the Agency's literature search and data collection procedures.

Commenter: EDF

Comment: The TRI data base is completely useless for cyclohexanol, furfural, and isophorone, since these solvents are not reported under TRI.[16] [[16] Listing Background Document at 8.]

Response: With respect to cyclohexanol, furfural, and isophorone not being reportable chemicals to TRI, the Agency relied on additional sources cited in the solvents listing background document. Other sources used included: Chemical Abstracts, SRI Chemical Economics Handbook, Chemical Engineering Handbook, and the Industrial Solvents Handbook, as well as other internal EPA sources to capture facilities falling under the TRI reporting threshold. For example, in order to capture pharmaceutical facilities processing less than 10,000 lbs of solvent, the Pharmaceutical Manufacturer's Association's membership list was obtained, as well as addresses from EPA's Development Document of Effluent Guidelines for Pharmaceuticals I and II.
EPA used the non-TRI sources described below to capture solvent uses for the following non-TRI chemicals:

Cyclohexanol - Through the literature search, potential solvent uses were identified for cyclohexanol in the following industries and preliminary questionnaires were sent to facilities within these SIC codes:

SIC code 2611 Pulp mills (8 primary; 11 including secondary and tertiary)
SIC code 2621 Paper mills (17 primary; 22 including secondary and tertiary)
SIC code 2842 Specialty cleaning, polishing, and sanitation preparations (determined that the solvent use is in the application of these products, not the manufacture)
SIC code 2851 Paints, varnishes, lacquers, enamels, and allied products (determined that the solvent use is in the application of these products, not the manufacture)
SIC code 2869 Industrial organic chemicals (181 primary; 229 including secondary and tertiary)
SIC code 2899 Chemicals and chemical preparations (15 primary; 29 including secondary and tertiary)
SIC code 2911 Petroleum refining (115 primary; 116 including secondary and tertiary)

Addresses for these potential industries were obtained through TRI from facilities within SIC codes 2611, 2621, 2869, 2899, and 2911. Although it was determined that cyclohexanol was not used as a solvent in SIC codes 2842 and 2851, facilities within these industries were captured in the preliminary survey through other solvents uses and secondary and tertiary SIC codes. The results of the preliminary survey confirmed what was originally determined. Through literature searches, cyclohexanol use in SIC codes 2842 and 2851 did not appear to meet the definition of solvent use. The preliminary survey results indicated that cyclohexanol, in fact, did not meet the definition of solvent use in these SIC codes. For the other SIC codes, the data from the preliminary questionnaire were entered into the large questionnaire screening process.

Cyclohexanol was added to the TRI database in the reporting year 1995. TRI reporting data was accessed through RTKNET and the Internet in 1997 for reporting year 1995. Both sources confirmed 24 facilities reporting of cyclohexanol manufacturing process or otherwise use. The following table defines the codes used to indicate the activity or use of the chemical at a facility. Only one facility of the 24 reported the activity code 3C- Otherwise use, 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). EPA contacted this facility and confirmed that the facility uses cyclohexanol in the production of adipic acid, a key ingredient to nylon-6,6; thus, the “otherwise use” category did not reflect solvent use. This new information substantiates EPA’s original findings that there are no other large users of cyclohexanol as a solvent.

Furfural - Through the literature search, potential solvent uses were ruled out for furfural in the following industries:
SIC code 2435 Hardwood veneer and plywood (determined that solvent is a formulation component of an adhesive/glue for laminating wood)
SIC code 2436 Softwood veneer and plywood (determined that solvent is a formulation component of a coating or laminating composition)
Preliminary questionnaires were sent to facilities in the following SIC codes:
SIC code 2899 Chemicals and chemical preparations (15 primary; 29 including secondary and tertiary)
SIC code 2911 Petroleum refineries (115 primary; 116 including secondary and tertiary)
SIC code 2992 Lubricating oils and greases (144 primary; 162 including secondary and tertiary)

Although a few other potential solvent uses were identified for furfural, it was determined that the primary use of furfural was as an extractive solvent in lube oil refining. EPA obtained addresses from both TRI for SIC codes that were identified through the Chemical Abstracts and the petroleum listing for all petroleum refineries.

Isophorone - Through the literature search, potential solvent uses were identified for isophorone in the following industries:
SIC code 2821 Plastic materials, synthetic resins, and nonvulcanizable elastomers (24 primary; 195 including secondary and tertiary)
SIC code 2851 Paints, varnishes, lacquers, enamels, and allied products (determined that the solvent use is in the application of these products, not the manufacture)
SIC code 2891 Adhesives and sealants (16 primary; 24 including secondary and tertiary)

Addresses for these potential industries were obtained through TRI from facilities classified within SIC codes 2821 and 2891. Although it was determined that isophorone use in SIC code 2851 did not meet the definition of solvent use, facilities within these industries were captured in the preliminary survey through other solvents uses and secondary and tertiary SIC codes. The results of the preliminary survey confirmed what was originally determined.

Commenter: EDF

Comment: For the remaining solvents, TRI reporting is not required when used in quantities of 10,000 pounds or less.[17] [[17] Id.] Therefore, substantial quantities of the solvents can be used and not reported under TRI.
Response: Because the Agency was aware that users of less than 10,000 lbs of solvent would not be captured through the use of TRI, it relied on additional data sources such as those cited in the solvents listing background document.

These sources include:

- Trade associations, such as the Pharmaceutical Manufacturer's Association, provided their membership list. EPA also conducted discussions with trade groups representing potentially affected industries such as the Chemical Manufacturers Association, the Semiconductor Manufacturers Association, the Chemical Distributor's Association, and the Synthetic Organic Chemical Manufacturers Association.

- The databases supporting EPA's development of two effluent guidelines were searched for facility addresses. The effluent guideline databases searched included Pharmaceuticals I and II, and the Organic Chemicals, Plastics, and Synthetic Fibers.

- The National Air Toxics Inventory of Chemical Hazards (NATICH) was accessed for facility addresses.

- The address list developed for the RCRA §3007 Questionnaires for petroleum refinery facilities was used.

- Addresses for pulp and paper mills developed during a study of Subtitle D disposal of pulp and paper mill sludge was used.

- Addresses for users of solvents were obtained from the Toxic Substances Control Act (TSCA) Office of Pollution Prevention and Toxics (OPPT) at EPA. These addresses resulted from OPPT's evaluation of solvents under the Source Reduction Review Project (SRRP).

- Finally, facilities that received a RCRA §3007 Chlorinated Aliphatics questionnaire were deleted from the mailing list because solvents questions were included in the questionnaire mailed to that industry.

Commenter: EDF
Comment:
More importantly, even larger quantities of solvent wastes can be generated by users of solvents in quantities below TRI reporting thresholds. Many of the solvent uses EPA did identify involve extremely high concentrations of the chemicals, up to and including pure solvent.[18] [[18] See Listing Background Document, Appendix I.] 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 and the environment.[19] [[19] For example, EPA's proposed HWIR wastewater exit levels for acetonitrile (0.78 mg/1), methyl chloride (.0959 mg/1), phenol (84 mg/1), and isophorone (0.531 mg/1) are well below 1% concentration levels for these solvents. See 60 FR 66427-32 (December 21, 1995).]

Response: 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 (> 1200 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 1200 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.

EPA responds in general in Section V to the comparison of exit levels from the HWIR proposal with solvent levels observed in this listing determination.

With regard to the commenter’s specific concern that large quantities of solvent wastes with concentrations of 1% for cyclohexanol can be generated by users of solvents in quantities below TRI reporting thresholds, RCRA 3007 data indicated that while small amounts of solvent (<5kg per facility) are consumed and large quantities of residual waste are generated (up to 12,440 kg), the concentrations (all <1%) and solvent loadings (all <4.5 kg) are extremely small. In addition, every user of cyclohexanol who reported a use consumption of less than 10,000 kg per year disposes of their waste through hazardous waste incineration rather than through land disposal.

For furfural, while RCRA 3007 data indicate that a large quantity (177,477,128 kg) of residual waste is generated from a solvent consumption of 2,947,431 kg, the total solvent loading is only 181,788 kg or 0.1%. However, these numbers are very misleading. Agency data show that very few facilities use furfural as a solvent, and that many of the losses of furfural are to product, not to the environment. Of the total 181,788 kg solvent loading, 165,250 kg were sent to wastewater treatment in a tank, which the Agency modeled. In addition, every user of furfural who reported a use consumption of less than 10,000 kg per year disposes of their waste through hazardous waste incineration, in their 3007 Survey response.

For isophorone, RCRA 3007 data indicate that 753,695 kg of residual waste are generated from 243,567 kg of solvent consumed, and the total solvent loading is only 13,937 kg or 1.8%. While the commenter notes that the concentration of isophorone is above the proposed HWIR exit level for wastewaters, all of the isophorone residuals are nonwastewaters (with concentrations ranging from 0.1% - 45%) that are thermally treated prior to land disposal. Solvent wastes generated from the use of isophorone containing low or negligible concentrations of isophorone are generated. However, these low concentration solvent wastes are far outweighed in terms of solvent loading and potential risks, by the more concentrated solvent residuals that EPA included in the Risk Assessment. In other words, the solvent uses included in the Risk Assessment were the primary drivers of risk to human health and the environment; therefore including other relatively low concentration solvent wastes in the Risk Assessment would not capture additional risks that would show harm to human health and the environment. Thus, the concentration of these residuals would be lower than the HWIR exit level prior to land disposal. In addition, every user of isophorone who reported a use consumption of less than 10,000 lbs. per year disposes of their residual waste through hazardous waste incineration.

Commenter: EDF
Comment:
As demonstrated by data reported to EPA, this waste generation pattern is not simply a theoretical phenomenon. For example, use of 9.3 million kilograms of acetonitrile in 1993 produced 9.15 billion kilograms of solvent wastes, including 15 million kilograms of nonwastewaters.[20] [[20] 61 FR 42327 (August 14, 1996).] Similarly, 623,645 kilograms of methyl chloride solvent used in 1993 generated 1.19 billion kilograms of solvent wastes, including 89 million kilograms of wastewater treatment sludge.[21] [[21] 61 FR 42332-3 (August 14, 1996).]

Accordingly, TRI data is limited in coverage for solvent uses, and solvent use is not a good surrogate for solvent waste generation because relatively small quantities of solvent use can result in large amounts of solvent wastes.

Response: The Agency modeled potential risks from all solvent wastes found through the questionnaires. The wastewaters and non-wastewaters from acetonitrile and other solvents were found not to present any risk of concern based on their management. The risk modeling is based on data from very large use (and large-quantity waste generation) facilities. Since releases (modeled at high-end assumptions) from these facilities did not show any risk of concern, smaller facilities cannot present a higher risk. The large quantities of wastewaters generated in the case of acetonitrile, methyl chloride, and other solvents are limited to a few large facilities, and these facilities skew the numbers reported by the commenter. In addition, most of the "loading" numbers may be attributed to quantities of solvent in non-wastewaters going to thermal treatment. Wastewater treatment sludges did not show any concentration of solvent in any case.

Contrary to the commenter's claims concerning solvent use versus solvent waste generation, the data show that very accurate data can be collected and analyzed. While the TRI has its limits, the large facilities for which the Agency collected data provide a maximum basis for release data. The large amounts of waste generated are just the kinds of data likely to show up on TRI (and other databases, given the Agency's ability to track the specialized uses of these chemicals as solvents).

Concerning acetonitrile (and other solvents), the commenter's claim that small quantities of solvents may lead to large amounts of waste generated with concentrations above levels of concern does not reflect the data accurately. The Agency's has data on facilities that use less than 1,200 kg of a particular solvent (where more than 1,200 kg of another chemical is used as a solvent). In every case, the chemical used in small quantity is mixed with other small quantity chemicals (often lab wastes) and sent to incineration, or the stream is sent into wastewater treatment. The Agency has modeled these scenarios for larger volumes of solvent wastes and found no risk of concern.

The statement that 9.3 million kg acetonitrile produces 9.15 billion kg waste is based on flawed reasoning. Of the 9.15 billion kg waste volume, more than 8.9 billion kg is the wastewater volume from two facilities. These wastewater streams are very dilute, and Agency modeling of wastewater streams, no matter how high the acetonitrile loading given by the questionnaire data, showed no risk of concern. Other streams with higher concentrations of acetonitrile are sent for incineration or fuel blending. The data show that the pattern of waste volume versus solvent use shows anything but an even 0.1% distribution of spent solvent in wastes. The data show higher concentrations in wastes sent to thermal treatment or very low concentration wastewaters that are treated effectively by wastewater treatment plants.

Commenter: EDF
Comment: Perhaps most importantly, assuming arguendo EPA's literature search, TRI data base, and other consultations had properly identified every potential industrial sector generating the solvent wastes at issue in the rulemaking, EPA's preliminary questionnaire was not sent to the vast majority of facilities within most of the respective sectors. As noted above, EPA identified 47 industrial sectors potentially affected by the solvents listing determination, but sent preliminary questionnaires to only 1,497 facilities.[22] [[22] 61 FR 42321 (August 14, 1996).]

Significantly, one of the potentially affected SIC codes, 3471 (electroplating), has more facilities than the entire number of preliminary questionnaires distributed by EPA for the instant rulemaking. This industry sector is comprised of approximately 3,300 facilities, according to a fact sheet on the industry prepared by EPA contractor IEC for the Common Sense Initiative (See Attachment A). Yet only seven facilities within this SIC code (or 0.21% of all facilities within this sector) received a preliminary questionnaire. [23] [[23] See SIC code sorted list of facilities receiving the preliminary questionnaire obtained by EDF pursuant to a FOIA request.]

Similarly, the table immediately below compares the number of establishments in 12 other potentially affected SIC codes identified by EPA,[24] versus the number of facilities within the SIC code receiving a preliminary questionnaire. [[24] The number of establishments was obtained from the Dun's Census of American Business, 1996. The number reflects only establishments where the SIC code is the primary line of business, thus it may understate the actual number of facilities engaged in the activity. Moreover, the number reflects the lower of separate numbers provided according to sales and employee locations.] The table illustrates the preliminary questionnaire's extreme lack of coverage within these sectors.

SIC Code	# Establishments in SIC Code	# Facilities Receiving Preliminary Questionnaire	% Coverage of SIC Code
1311	10,803	3	0.03%
2752	38,047	45	0.12%
2819	1,086	17	1.57%
2821	1,081	24	2.22%
2833	380	13	3.42%
2865	222	13	5.86%
2899	1,888	15	5.20%
3672	1,924	32	1.66%
3674	1,328	34	2.56%
3695	375	26	7.00%
3711	1,024	48	4.69%
3861	1,138	9	0.79%

Response: The Agency does not agree with the commenter that an insufficient number of preliminary questionnaires were sent. The Agency would like to point out that if an SIC code is potentially affected, it does not mean that 90% majority, or any of facilities within this SIC code would be using these chemicals as solvents. The Agency developed an analysis of actual use through the literature search, rather than the potential use method described by the commenter. In developing the mailing list for the preliminary questionnaire, the Agency choose not to use Dun & Bradstreet's database as its main source in obtaining facility addresses. The Dun & Bradstreet database is not linked to chemical use. Many of the addresses represent corporate headquarters, not facilities that use or generate hazardous waste. A single facility may have more than one Dun & Bradstreet number. Therefore, the number of facilities reported within each SIC by Dun & Bradstreet is exaggerated.

EPA 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*. The specific solvent uses from the literature search were then used to determine potential solvent users by Standard Industrial Classification. (SIC) code. The Toxic Release Inventory (TRI) database also, initially, was used to develop a baseline of SIC codes for solvents that were reported "as otherwise used" because this activity most closely paralleled EPA's definition of solvent use. The Chemical Abstract SIC codes were then cross-walked with the TRI SIC codes to develop a final SIC Code list. Where a chemical was reported to the TRI by facilities in a SIC code group as otherwise used, but did not correspond to any suspected or known solvent use from the literature search, the SIC code was omitted (if, of course, no other chemicals are used as solvents in that SIC code).
The commenter attempts to show that the SIC codes originally suspected of representing solvent use have more facilities within each of these SIC codes than surveyed by EPA. EPA's point is that the number or percentage of facilities surveyed within each SIC codes is irrelevant. Instead, EPA determined that the reasonable approach for identifying facilities to be surveyed was to conduct literature searches of facilities using one or more of the 21 chemicals as solvents, and then following the method discussed below to develop the actual facility mailing list for the RCRA 3007 Questionnaire.

Once specific industries were identified, a final facility address was developed. The TRI was the primary source of facility information for the solvent pre-questionnaire mailing list. Because of the limitations associated with the TRI, additional data sources were employed including the membership list from the Pharmaceutical Manufacturer's Association, the effluent guidelines databases for the Pharmaceuticals and the Organic Chemicals, Plastics, and Synthetic Fibers industries, the National Air Toxics Inventory of Chemical Hazards, printing facilities addresses from EPA's Office of Pollution Prevention and Toxics, the mailing list from the Petroleum RCRA 3007 Questionnaires, solvent recyclers, addresses from the Subtitle D study of the Pulp and Paper industry, and the Thomas Register for industries not covered by the sources mentioned above. Dun and Bradstreet was used only to confirm the SIC codes of potential facilities for mailing the preliminary questionnaire. In short, this methodology originated with a broad universe of establishments within each SIC code, identified facilities where solvent use was determined to be possible, and eliminated facilities where solvent use was determined not to be possible. From the data gathering activities, a total of 1,497 facilities were identified and sent the preliminary questionnaire (in addition to the 60 facilities surveyed in the Chlorinated Aliphatics questionnaire).

The Preliminary Solvent Use Questionnaire was used as a screening mechanism and data collected was limited to the total volume of solvents used in 1991 and 1992. EPA used the information obtained from the preliminary questionnaire to determine which facilities would receive the RCRA 3007 Questionnaire for Solvents Use. The full questionnaire was much more complex and designed to collect information including process descriptions, waste generation, waste characterization, and waste management data. Respondents to the preliminary questionnaire who reported no solvent use of any of the 14 solvents were eliminated from the full questionnaire mailing list. Moreover, because of the complexity of the full questionnaire, very small users of solvents (less than 1,200 kg/year combined of all 14 solvents) as identified from the preliminary questionnaire were also eliminated from the full questionnaire mailing list. A total of 156 facilities were sent a full questionnaire. There are solvent wastes containing negligible concentrations of the solvents. However, these low concentration solvent wastes are far out outweighed in terms of solvent loading and potential risks, by the more concentrated solvent residuals that EPA included in the risk assessment. In other words, the solvent uses included in the Risk Assessment were the primary drivers of risk to human health and the environment; therefore including these relatively low concentration solvent wastes in the Risk Assessment would not capture additional risks that would show harm to human health and the environment.

The first table provided by EDF compares the number of establishments in a given SIC code with the number of facilities receiving a preliminary questionnaire. The commenter's comparison in this table implies that the Agency should have mailed a preliminary questionnaire to every establishment within an SIC cited by Dun & Bradstreet. Mailing a RCRA questionnaire to 60,000 plus establishments is not within the Agency's budgeted resources or time constraints. More importantly, it is the Agency's conviction that if the Agency had sent questionnaires to all 60,000+ establishments, the information received would not merit the burden imposed. Therefore, in order to maximize data collection with available resources, the Agency followed the methodology described in the solvents background document in developing a mailing list.

The second table provided by EDF comparing the number of establishments in a given SIC code with the number of facilities receiving a final questionnaire excludes the number of facilities receiving the preliminary questionnaire. The preliminary questionnaire was a screening step wherein facilities that reported no use of any of the 21 solvents were removed from the list of facilities being sent a final questionnaire. This screening mechanism was used to save Agency resources and reduce facilities' burden hours. The commenter cannot maintain that this table shows coverage of establishments within these 12 SIC codes, when many of these facilities reported no use of the 21 solvents. The literature search used by the Agency targeted actual solvent use. As stated previously, many of the SIC codes were omitted because of no solvent use. Therefore, the methodology used by the Agency resulted in a better indicator of solvent use than a mere SIC Code screening.

In both tables the commenter has shown the number of facilities receiving the preliminary questionnaire based on the primary SIC code for those facilities. In developing the mailing list for the preliminary questionnaire, the Agency considered secondary and tertiary SIC codes of facilities when determining the representativeness of SIC codes. A shown in the Table below, for all but one SIC code, there are 25% more facilities receiving the preliminary questionnaire when the secondary and tertiary SIC codes are considered. The Agency notes that the commenter chose to display the 12 SIC codes receiving the smallest percentage of coverage when comparing number of establishments within an SIC code to the number of facilities receiving a preliminary of full questionnaire. The other SIC codes do not exhibit a greater representation of the number of questionnaires sent.

The Table below shows a breakdown of the number of facilities within each SIC code as reported by TRI, BRS, and Small and Large Quantity Generators. It also shows the percentage of coverage within each SIC code based on primary SIC codes. EPA notes that with the exception of SIC Code 1311, all facilities in the SIC codes in the following table are covered by TRI reporting requirements. Unlike Dun & Bradstreet, the facilities reporting to BRS are large quantity hazardous waste generators (i.e., greater then 1000 kg/month). Small Quantity Generators reporting to RCRIS generate greater then 100 kg/month, but less then 1000 kg/month. Large Quantity Generators reporting to RCRIS generate greater then 1000 kg/month. As explained in the Solvents Listing Background Document, in the methodology used to identify potential solvent users, facilities that did not report a TRI activity code indicating "otherwise use" of one of the 14 solvents were not included in the preliminary questionnaire mailing list. For the reasons stated above, EPA's representation within each SIC code was valid. EPA did not under-represent facilities within each SIC codes as the commenter attempts to show through the use of Dun & Bradstreet because Dun & Bradstreet does not adequately represent the number of facilities that may potentially use one of the 21 chemicals as a solvent.

SIC Code	# Facilities Receiving Pre-Quest. (1° SIC Codes Only)	# Facilities Receiving Pre-Quest. (including 2°&3° SIC Codes)	Small Quantity Generators (RCRIS)[1]	Large Quantity Generators (RCRIS)[1]	Conditionally Exempt Small Generators (RCRIS)[1]	# Facilities in SIC Code (BRS 1991)[1]	Percent Coverage in SIC Code	# Facilities in SIC Code (TRI 1990)[1]	Percent Coverage in SIC Code
1311*	3	3	20	27	60	39	7.7%	0	NA
2752	45	55	540	108	433	166	27.1%	161	**28%**
2819	17	32	140	533	82	198	8.6%	426	4.0%
2821	24	195	141	516	66	287	8.4%	437	5.5%
2833	13	19	27	118	10	41	31.7%	54	24.0%
2865	13	25	22	172	6	63	20.6%	121	10.7%
2899	15	29	124	352	71	180	8.3%	393	3.8%
3471	7	17	474	890	125	803	0.9%	881	**0.8%**
3672	32	37	38	60	25	417	7.7%	288	11.1%
3674	34	37	100	230	25	202	16.8%	194	17.5%
3695*	26	31	1	5	0	32	81.3%	35	74.3%
3711	49	50	78	84	60	99	49.5%	85	57.6%
3861	9	14	26	60	14	56	16.1%	73	12.3%

[1] Data were extracted from RCRIS Spring 1997.

*This SIC code is not reportable to TRI.

The table above shows from sources other than Dun & Bradstreet that fewer facilities exist within each SIC codes that could potentially use one of the 21 chemical as solvents and be hazardous waste generators, and thus EPA sent surveys to a significantly higher percentage of such facilities than claimed by the commenter.

The following are examples explaining how SIC codes are represented in the table:

Examples:

SIC code 1311 covers establishments engaged in the exploration and production of crude petroleum and natural gas. Because this SIC code is not reportable to the TRI, facilities addresses were obtained from the Thomas Register. Only three industrial facilities in SIC code 1311 were listed in the Thomas Register and sent a preliminary questionnaire. Based on the preliminary questionnaire results, none of three facilities surveyed reported solvent use of any of the 14 under investigation, and therefore EPA did not send the full questionnaire to any of these 3 facilities. The Agency chose not to access addresses from Dun & Bradstreet, because this list would have included facilities such as corporate headquarters which would not have used solvents.

SIC code 2752 covers establishments engaged in commercial lithographic printing. As can be seen from the table above, 55 facilities having a primary, secondary, or tertiary SIC code in 2752 out of the 161 facilities reporting to TRI in SIC code 2752 were sent a preliminary questionnaire. These 55 facilities reported a TRI activity code indicating “otherwise use” (i.e., used as a chemical processing aid, manufacturing aid, or ancillary or other uses) of one of the 21 chemicals. Although it is well known that solvents are used in the process of lithographic printing, these solvents are not one of the 21 chemicals under investigation. The Agency recognizes that these printers are relatively small businesses and probably use other solvents that are cheaper than the 21 chemicals under investigation. Based on the preliminary questionnaire results, however, none of the 55 facilities surveyed reported solvent use of any of the 14 chemicals under investigation. Therefore, no facilities with in the commercial lithographic printing industry were sent the full questionnaire.

SIC code 3471 covers establishments engaged in electroplating, plating, polishing, anodizing, and coloring. The commenter has made specific reference to this SIC code being under-represented by the preliminary questionnaire mailing list. Although it is well known that solvents are used in the process of electroplating, these solvents are not one of the 21 chemicals under investigation. The Agency recognizes that these electroplaters are relatively small businesses and probably use other solvents that are cheaper than the 21 chemicals under investigation. The TRI data are further evidence that the 14 solvents of concern are not used in the SIC code 3471 as initially suspected. Seventeen facilities having a primary, secondary, or tertiary SIC code in 3471 out of the 881 facilities reporting to TRI in SIC code 3471 were sent a preliminary questionnaire. Only these 17 facilities reported a TRI activity code of “otherwise use” of one of the 21 chemicals identified, and thus may *potentially* use the chemical as a solvent. Based on the preliminary questionnaire results, however, only one of the 17 facilities surveyed reported solvent use of any of the 14 chemicals under investigation. Therefore, only one facility within the electroplating industry was sent the full questionnaire.

Similar patterns exist for the other SIC codes mentioned by the commenter. SIC codes 2819, 2821, 2833, 2865, 2899, and 3861 represent a wide variety of manufacturers of special products and some specialty chemicals. The Agency observed from site visits that in SIC code 2865 (cyclic organic crudes and intermediates and organic dyes and pigments) and 3861 (photographic equipment and supplies), specialized chemical processes were very much the rule, and each chemical had a specific use, not likely to be shared throughout the industry. The other 28 series SIC codes operate much the same way – the chemical, to be used as a solvent, must have a well-suited application, especially to justify its cost relative to other commercially-available solvents. Facilities in SIC codes 3672 and 3674 were targeted mainly for their use of glycol ether solvents (i.e., 2-ME, 2-MEA, and 2-EEA). The Agency found that many of these facilities use the chemicals as an ingredient in photoresist formulations (not a solvent use), and that these facilities have greatly reduced use of these particular chemicals for any application due to occupational health and safety concerns and OSHA regulations. For the remaining SIC codes (3695 and 3711), the Agency has captured a large percentage of facilities in the SIC code likely to be hazardous waste generators. SIC code 3695 (magnetic and optical recording media) is likely to be very specialized in terms of chemical use, and SIC code 3711 (motor vehicle and passenger car bodies) does not have a large number of manufacturing facilities. This SIC code uses solvents in this listing determination only for specialized coating or cleaning applications. Motor vehicle plants also used to use glycol ether solvents for some cleaning applications, but use of these chemicals was reported to have declined significantly.

EPA, therefore, has employed a methodology that identified the universe of industries using the 14 chemicals as solvents. EPA further refined the original list of 1,497 facilities to capture only those sites actually using one (or more) of the 14 chemicals for its solvent properties. Contrary to the commenter's assertion, EPA has properly identified every potential industrial sector generating solvent waste from the 21 chemicals and has sent questionnaires to every facility suspected of using one of the 21 chemicals as solvents.

Commenter: EDF
Comment: It should also be noted that EPA intentionally 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".[25] [[25] See Listing Background Document at 9; EPA Solvents Workgroup Meeting, May 19, 1993, p. 6.] For this category of solvent use, EPA relies solely on unspecified "anecdotal" evidence that laboratory solvent wastes are managed as hazardous waste.[26] [[26] Listing Background Document at pp. 9-10.] Accordingly, even the paltry data base accumulated for other solvent uses does not exist for solvent wastes generated by laboratories, despite the large quantities of solvent wastes involved.

Response: Contrary to the commenter's claim, the Agency did not exclude laboratory uses of the solvents from the universe. EPA's evidence is not "anecdotal" but was part of on attempt to reasonably survey the numerous laboratories. It would not have been practical or useful to send a 3007 Survey to all laboratories in the U.S. due to the sheer number of labs that exist. Approximately 183,000 laboratories exist in the U.S. according to an estimate by EPA detailed below.

Type of Laboratory	Est. Number of Labs
Industrial	
- Captive R&D testing labs	10,000
- Independent labs, SIC code 8731	2,500
Medical	
- In-hospital, SIC code 8071	7,100
- Independent labs, SIC code 8071	7,600
- Dental labs, SIC code 8072	8,000
Analytical	
- Quality Assurance, SIC codes 8733 & 8734	40,000
Academic	
- Secondary, SIC code 8211	101,000
- Post-secondary, SIC codes 8221 & 8222	7,000
Total	**183,200**

Many of these laboratories are small, comprising research labs and university labs, as well as small analytical labs. The burden to complete a RCRA 3007 questionnaire would be beyond the means of many of these small businesses as organizations. Instead, in order to compile a usable data base without a massive, unproductive survey, the Agency worked with the American Chemical Society (ACS) and their laboratory network to define the universe of affected laboratories. The Agency presented information on the solvents listing determination and initiated a dialogue with the ACS Task Force on RCRA and Laboratories. Similar information was presented at the Twelfth Annual College and University Hazardous Waste Conference. Site visits were conducted with representatives from the university health and safety departments (supervising lab wastes) at both Carnegie Mellon and Duquesne Universities in Pittsburgh, Pennsylvania. Based on discussions with ACS and the colleges and universities, the Agency determined that spent solvent wastes from laboratories are already managed as hazardous waste. These lab wastes tend to be hazardous, many of them acutely hazardous, because they are mixed with other listed hazardous wastes and disposed of in lab packs, or they exhibit the characteristic of ignitability. In addition, due to concerns about quality of chemicals used, nearly all research laboratories dispose of the solvents under investigation as waste rather than recover them.

The Agency captured the solvent uses and management practices of numerous captive on-site laboratories of facilities who received the 3007 Survey. In so doing, the Agency captured large research, QA/QC, and analytical laboratories that operate at the same or larger scale as the small labs not surveyed. The table below summarizes the laboratories that reported using the solvents under investigation. Data from these captive on-site laboratories confirmed what was learned from the discussions with ACS and the colleges and universities; solvent wastes from laboratories are managed as hazardous, and with one exception, the solvents are not recovered. The waste management practices for laboratory use of solvents has been adequately characterized and additional information would not be gained through more widespread use of a 3007 Survey. Data from these facilities as well as site visits show that 1) solvent use in laboratories is at most 1% of solvent use in industrial process operations, and 2) reports of solvent use in laboratories may be exaggerated because reporting facilities erred on the side of caution in reporting the chemical in the laboratory inventory, rather than correlating laboratory use of the chemical with “solvent use” as defined by the Agency. Thus, 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.

Laboratory Use of Solvents

Fac. No.	Fac. Name	City	State	Solvent	Qty (kg)	Use Code	Solv. Use
002	DuPont	Axis	AL	Acetonitrile	178.4	B01	Lab chrom. HPLC
003	Ciba-Geigy	McIntosh	AL	Acetonitrile	6,684.0	B01	Lab chrom. HPLC
008	Chiron Corp.	Emeryville	CA	Phenol	49.9	B01	Lab chrom. HPLC
014	Unocal	Rodeo	CA	Acetonitrile	3.0	B01	Lab chrom. HPLC
019	Amgen, Inc.	Thousand Oaks	CA	Acetonitrile	1,439.4	B01	Lab chrom. HPLC
045	Eli Lilly	Indianapolis	IN	2-Methoxyethanol Cyclohexanol Ethylene dibromide Furfural Benzyl chloride Benzyl chloride	14.6 0.5 4.1 2.2 4.2 0.3	J99 J99 J99 J99 J99 J99	In R&D labs “ “ “ “ “
049	Eli Lilly	Shadeland	IN	Acetonitrile Cumene p-Dichlorobenzene	3,611.1	J99 J99 J99	Lab solvent waste “ “

Fac. No.	Fac. Name	City	State	Solvent	Qty (kg)	Use Code	Solv. Use
055	Exxon Chemicals	Baton Rouge	LA	Acetonitrile	251.4	B01	Lab chrom. HPLC
058	Ciba-Geigy	Saint Gabriel	LA	2-Methoxyethanol Acetonitrile	3.9 1,181.7	B99 B99	Lab chrom. Lab chrom.
072	Parke-Davis	Holland	MI	Acetonitrile	340.0	B01	Lab chrom. HPLC
080	3M	Hutchinson	MN	Acetonitrile	385.0	J99	Used in analysis of plasticized content of vinyl film.
081	IBM Corp.	Rochester	MN	Phenol	0.5	J99	Used in wastewater analysis in analytical lab.
082	3M Center	St. Paul	MN	Acetonitrile [1] 2-Ethoxyethanol acetate 2-Methoxyethanol Isophorone p-Dichlorobenzene Phenol	20,189.8 217.7 14,580.1 38.9 1.2 404.7	J99 J99 J99 J99 J99 J99	Lab experiments Lab experiments, photo lithography, past shelf life Lab experiments Ink testing & printing Chemical lab pail Lab experiments
089	Glaxo Inc.	Research Triangle Park	NC	Acetonitrile	1,983.1	B01	Lab chrom. HPLC
092	Hoechst Celanese	Branchburg	NJ	Acetonitrile	45.4	B01	Lab chrom. HPLC
093	Carter-Wallace	Cranbury	NJ	Acetonitrile Diethylamine Furfural Acetonitrile Ethylene oxide	706.3 0.1 1.2 706.3 0.0005	B01 B02 B02 B99 B99	Lab chrom. HPLC Lab chrom. TLC Lab chrom. TLC Lab chrom. Lab chrom.
096	E.R. Squibb & Co.	North Brunswick	NJ	Acetonitrile	3,653.5	B01	Lab chrom. HPLC
097	Hoffmann-LaRoche	Nutley	NJ	Acetonitrile	2,700.0	B99	Lab chrom.

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[1] 3M reported that the consumption quantity is associated with seven different use codes: A04 (coating remover), B01 (HPLC chromatography), D01 (liquid/liquid extraction), B99A (D349-FTIR, D353-GC lab), C99A (dye synthesis, catalyst synthesis), D99 (chromatography), and J99A (lab experiments). 3M maintains that it has numerous on-site research laboratories, thus specific use quantities are not readily available.

Fac. No.	Fac. Name	City	State	Solvent	Qty (kg)	Use Code	Solv. Use
100	Bristol-Myers	Princeton	NJ	Acetonitrile Acetonitrile	361.4 813.2	B01 B99	Lab chrom. HPLC Lab chrom.
101	Merck & Co.	Rahway	NJ	Acetonitrile	23,196.2	B99	Lab chrom.
104	Pfizer, Inc.	Brooklyn	NY	Acetonitrile Phenol Diethylamine	817.1 1.1 0.007	B01 B02 B99	Lab chrom. HPLC Lab chrom. TLC Lab chrom.
113	Ayerst Laboratories	Rouses Point	NY	1,4-Dioxane Acetonitrile Diethylamine	789.5 418.0 14.1	B99 B99 B99	Lab chrom. Lab chrom. Lab chrom.
116	J.C. Wilson	Webster	NY	Acetonitrile Cyclohexanol p-Dichlorobenzene Acetonitrile	0.008 0.01 0.01 67.6	J99 J99 J99 B01	Miscellaneous unclassified lab use Lab chrom. HPLC
136	Upjohn	Barceloneta	PR	Acetonitrile	921.0	B99	Lab chrom.
137	SmithKline Beecham	Cidra	PR	Acetonitrile	1,178.6	B99	Lab chrom.
139	Eli Lilly	Mayaguez	PR	Acetonitrile	392.9	B01	Lab chrom. HPLC
140	OCG Microelec.	East Providence	RI	Acetonitrile	4.5	B99	Lab chrom.
145	Tennessee Eastman	Kingsport	TN	Acetonitrile	2,186.3	B01	Lab chrom. HPLC
147	Great Lakes	Newport	TN	Acetonitrile	142.7	B01	Lab chrom. HPLC
161	Alcon Laboratories	Fort Worth	TX	Acetonitrile Acetonitrile Diethylamine	120,072,001.5	B01 B02 B02	Lab chrom. HPLC Lab chrom. TLC Lab chrom. TLC
172	Shell	Apple Grove	WV	Phenol	2,040.1	J99	Lab use
173	Rhone-Poulenc	Charleston	WV	Acetonitrile	232.6	B99	Lab chrom.

Finally, the Agency is aware of a plethora of information regarding good laboratory practices and effective waste management. For example, the National Research Council publication *Prudent Practices* establishes criteria for environmentally sound waste management. Additionally, the American Chemical Society has published several handbooks, including *The Waste Management Manual for Laboratory Personnel* and *Less Is Better: Laboratory Chemical Management for Waste Reduction*, and regularly delivers workshops and training on laboratory waste management.

These booklets provide guidance to laboratory professionals on the current hazardous waste regulations and proper management practices, as well as laboratory waste reduction techniques to conserve resources and minimize harm to personnel. Further, under 29 CFR 1910 Occupational Safety and Health Administration (OSHA) laboratory standard (January 31, 1990, 55 FR 3300), laboratories are encouraged to implement a Waste Disposal Program. OSHA establishes that sound waste disposal practices are crucial to maintain employee health. The standard suggests that specifications be made in each facility's Chemical Hygiene Plan as to waste collection, segregation, storage, and transportation, along with a consideration of the materials that can be incinerated. The standard also details the acceptable and unacceptable means for disposing of various chemicals and wastes.

Commenter: EDF
Comment: In summary, EPA's methodology for identifying potential solvent users could not possibly provide a complete picture of the relevant universe, because of the limitations of the sources utilized. Moreover, even if EPA had identified all the relevant industrial sectors, the Agency obtained solvent use data from only a small fraction of most of those sectors. Since all the waste management information relied upon by EPA for this rulemaking was obtained from a subset of preliminary questionnaire recipients, there can be no basis for determining the waste management information is either complete or representative of an entire industrial sector. In fact, the Agency has no idea how the vast majority of companies within the various sectors manage their solvent wastes.
Response: EPA disagrees with the commenter, for the reasons enumerated in previous responses.

Commenter: EDF
Comment: 2. The Final Questionnaire

The final questionnaire, from which all the waste management information was actually derived, was mailed to only 156 facilities that had received the preliminary questionnaire.[27] [[27] Listing Background Document at 12.] One reason for the small number was EPA's deletion of facilities using 1,200 kg or less of solvents in 1992, as reported in the preliminary questionnaire.[28] [[28] Listing Background Document at 18.] EPA's rationale for this deletion is only the large quantity solvent users could be expected to have onsite TSDs and many of the solvent uses are peculiar to large companies.[29] [[29] Listing Background Document at 37.]

However, as noted above, 1,200 kg of solvent use can and does result in quantities of solvent waste generation orders of magnitude higher.[30] [[30] Accordingly, EPA's position that 1,200 kg of annual solvent use corresponds to the 100 kg/month small quantity waste generator exemption is simply wrong. See 61 FR 42321 (August 14, 1996).] Moreover, limiting the facilities receiving the final questionnaire to only those likely to have onsite TSDs introduced a significant bias against solvent generators relying upon commercial services, including offsite nonhazardous landfills, for their waste management needs. EPA cannot argue offsite disposal in a nonhazardous waste landfill is rarely practiced when the very data gathering methodology it employed intentionally excluded those facilities most likely to use such facilities.[31] [[31] EPA asserts eliminating "small" solvent users did not significantly affect the risk assessment because the risk assessment results are based upon the highest waste volumes associated with each waste management practice reported. See 61 FR 42321 (August 14, 1996). However, EPA ignores the fact that different waste management practices may be reported by this class of solvent users, because (as EPA acknowledges) these waste generators are much more likely to employ offsite disposal practices.]

Response: As stated in the Background Document: "Of the corrected positive responses to the preliminary questionnaire, a number included small users (*e.g.*, 5 ml per year, 1 gallon per year). Because of the complexity of the full RCRA §3007 Solvent Use Questionnaire, an effort was made to eliminate these very small users of solvents from the mailing list for the Questionnaire. EPA examined the volume of solvents reported and determined that facilities reporting the use of less than 1,200 kilograms per year combined of all 21 chemicals under investigation could be eliminated from further study. This cutoff corresponds to a monthly use of 100 kilograms or less of the 21 solvents under investigation." The Table below, based on a table in the Background Document, presents the breakdown of the number of facilities reporting greater than or equal to 1,200 kilograms per year of the 14 solvents that were the subject of the proposed rulemaking, by solvent. In all, 156 facilities were sent a Questionnaire including 20 facilities targeted for use of solvents covered in the solvents study.

Number of Facilities Falling Within Solvent Quantities Ranges
(Source: RCRA §3007 Preliminary Questionnaire of Solvent Use)

Solvent	<120 kg	120 - <1200 kg	≥1200 kg
2-Ethoxyethanol Acetate	60	14	47
2-Methoxyethanol	62	7	27
2-Methoxyethanol Acetate	11	2	2
Acetonitrile	135	8	35
Benzyl Chloride	11	0	1
Cumene	37	9	20
Cyclohexanol	22	3	3
Epichlorohydrin	12	2	1
Ethylene Dibromide	9	0	2
Furfural	23	1	8
Isophorone	19	2	10
Methyl Chloride	28	0	3
Phenol	69	12	18
p-Dichlorobenzene	25	1	1
	480	48	137

As shown on the table, by far the greatest number of facilities (480) were eliminated because they reported using less than 120 kilograms of solvent per year. A much smaller number (48) reported using between 120 and 1,200 kilograms per year. In addition, these uses reported to be <120 kg. have been shown to be mainly laboratory uses, and their solvent use has not always been verifiable. Although 1200 kg of solvent use can result in quantities of solvent waste generation orders of magnitude higher**,** the solvent loading is still very small relative to the residual volume. More importantly, no risk was expected to be shown because the quantities >1200 kg did not show any risk. 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. Furthermore, as discussed in response to a similar comment, EPA examined the existing data from the Survey for low volume users (less than 1,200 kg per year), and found that the corresponding wastes did not present any significant risks, and that these wastes were managed in ways entirely consistent with the practices found for the wastes surveyed for larger volume users.

The text cited by the commenter at page 37 of the Background Document is taken out of context and does not reflect EPA's decision making basis. EPA did not determine that small users should be eliminated because they would not have on-site treatment capabilities. Rather, the emphasis in EPA's determination that small volume users of solvents be eliminated from further study rests on the Agency's determination that the burden of completing a complex, 100+ page questionnaire would not be commensurate with the information EPA would receive. EPA also recognizes that it would not gain useful information from sending large questionnaires to small users because many of these facilities, if they use these chemicals as solvents at all, would present a very small proportion of the risk, which the Agency found from characterization of larger facilities is not of concern. Small users of solvents were captured through the questionnaire and wastes from these uses were considered in the risk assessment. EPA recognizes that 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 RCRA 3007 Questionnaire for Solvent Use, wherein respondents indicated that both on-site and off-site practices were employed.

The Agency did not exclude facilities most likely to use off-site commercial services, nor did EPA exclude facilities without on-site TSDs. Total solvent consumption at a particular facility is not necessarily a reflection of the inclusive activities conducted at that facility. Many facilities are likely to consume very small amounts of the solvents of concern, but conduct large-scale operations using chemicals other than those of concern and have an onsite TSD. By the same token, many facilities such as those in the semiconductor industry, may use greater than 1200 kg/yr of solvents of concern, but are relatively small facilities in areas that rely on commercial services for their waste management, as witnessed through EPA's engineering site visits. The 3007 Survey has captured numerous facilities that use commercial services. Based on the results of the 3007 Survey, 62 percent of the wastestreams are managed in commercial offsite treatment or disposal units. Thus, 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. As such, the Agency has successfully obtained waste management data representative of both on-site management and off-site management; the Agency does not believe there is any significant bias in its Survey.

Commenter: EDF
Comment: In addition, as explained further below, solvent use fluctuates from year to year, therefore uses below 1,200 kg in one year can increase dramatically the next year, due to process changes, increases in production volumes, and/or solvent substitutions. Therefore, EPA intentionally excluded from the waste management data base identified solvent users generating significant quantities of solvent wastes that may increase over time.

EPA also deleted facilities that discontinued solvent use in 1991 and 1992, and therefore never reviewed the management practices associated with facilities that the Agency had identified as recent solvent waste generators.[32] [[32] See 61 FR 42321 (August 14, 1996).] Those facilities were relevant because EPA never determined whether the use terminations were temporary or permanent, and even if the use terminations were allegedly permanent, their management practices could have been indicative of additional plausible mismanagement scenarios.

The end result of the methodology deficiencies regarding both the preliminary and final questionnaires is that EPA generalizations regarding waste management practices are based upon a minuscule number of facilities. <u>Indeed; for 10 of the 14 solvents at issue in this rulemaking, EPA is basing its generalizations on fewer than 10 facilities reporting waste management information in the final questionnaire.</u>[33] [[33] See Listing Background Document, Table 2-2.]

Response: The purpose of the preliminary questionnaire was to capture what occurs at the facilities surveyed during a typical year. The facilities were asked to report data for 1991 and 1992. 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 used the most recent data when determining the cutoff for those facilities receiving the full questionnaire. Although there were some facilities that reported more than 1200 kg of solvent use in 1991 and less than 1200 kg of solvent use in 1992, most of these facilities discontinued use in 1992 or reported consumption that did not meet the definition of solvent use. More facilities reported greater than 1200 kg of solvent use in 1992 then in 1991. Additionally, as shown in Table 1-16 of the Listing Background Document, in the case of every solvent, the majority of facilities using less than 1200 kg/yr in fact used less than 120 kg/yr of solvent.

Facilities that had recently discounted use of a solvent or were in the process of phasing out a solvent indicated that the switch over was permanent. Data collected by the Agency showed a strong decline in the use of glycol ethers due to recent toxicological studies indicating possible adverse health effects, as well as tighter OSHA regulations, for exposed workers. The Agency does not have reason to believe that facilities would reintroduce these solvents after the investment made to replace them with adequate and less-toxic substitutes. Where facilities reported data prior to phase out, their management practices were taken into account.

EPA believes that the data collected provides a reasonable bases for decision-making. 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 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.

For ten of the 14 chemicals used as solvents, there are fewer than ten facilities that constitute large solvent users (e.g., greater then 1200 kg/yr). As a result, the risk assessment was based on the waste management practices reported by these facilities and captured the majority of the risk posed by management of the 10 chemicals.

Commenter: EDF
Comment: Incredibly, for several solvents, the quantity of <u>sectors</u> potentially affected outnumbers the quantity of <u>facilities</u> forming the basis for EPA's plausible mismanagement conclusions. For example, EPA identified seven industrial sectors potentially using 2-methoxyethanol acetate, but only three facilities using the solvent received the final questionnaire. In the case of methyl chloride, EPA identified eight SIC codes potentially using the solvent, while only seven facilities received the final questionnaire.

On a SIC code basis, the following table indicates the extent of coverage reached by the final questionnaire for the 12 industrial sectors included in the similar table above for the preliminary questionnaire, and the electroplating sector. In two of these sectors, not one facility received the final questionnaire. moreover, in only two of the remaining 11 sectors did greater than 1% of the facilities receive the final questionnaire.

SIC Code	Establishments in SIC Code	Facilities Receiving Final Questionnaire	% Coverage of SIC Code
1311	10,803	0	0%
2752	38,047	0	0%
2819	1,086	4	0.37%
2821	1,081	3	0.28%
2833	380	9	2.37%
2865	222	1	0.45%
2899	1,888	3	0.16%
3471	3,296	1	0.03%
3672	1,924	9	0.47%
3674	1,328	21	1.58%
3695	375	1	0.27%
3711	1,024	6	0.59%
3861	1,138	4	0.35%

Response: The Agency disagrees with the commenter's representation of the percentage of coverage of the SIC codes. As explained in the methodology for characterizing the potential universe of solvent users, a list of SIC codes was developed for industries suspected of using the chemicals for their solvent properties. Within these SIC codes nearly 1500 facilities were identified as potentially using one of the 21 solvents and sent a preliminary questionnaire. This preliminary questionnaire was used as a screening mechanism to determine those facilities that actually used one of the 21 chemicals as a solvent and would be required to fill out a full questionnaire. Of the nearly 1500 preliminary questionnaires mailed, fewer than 600 responded that one or more of the solvents were used at that facility. Further investigations revealed confusion over the definition of "solvent use" and further eliminated additional facilities. Facilities using small quantities of solvent (e.g. <1200 kg total) were also eliminated. In eliminating these facilities, several *potentially* affected industry sectors were eliminated. The industries in question are not using any of the 14 chemicals as solvents and thus can not be considered in evaluating plausible management scenarios. These sectors were considered "potential" because initially there was no means of determining with certainty that these industries use one of the 14 chemicals in a manner that meets the regulatory definition of solvent use. The full questionnaire was then mailed to 156 facilities that use the 21 chemicals as solvents and data from the 156 facilities was used to determine plausible management scenarios.

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 1992 preliminary questionnaire. However, based on their response to the 1993 full questionnaire, 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 1993 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 full questionnaire, 24 facilities were TSDs, 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 facility did not use it in a manner that met the regulatory definition of solvent use.

Commenter: General Motors
Comment: In the preliminary phases of this project the Agency conducted an intensive information gathering effort utilizing surveys, and literature searches to determine the types of processes and industries that manufacture and use such chemicals. Sources of data included abstracts, industrial address, product manufacturing list and several of the Agency’s own databases (e.g., TRI, NATICH, OPPT). General Motors agrees with the Agency in its approach for determining the extent that these particular solvents may be used within the United States. Although GM is somewhat concerned with the impression a reader may have of the surveyed universe. That is, it may appear that only facilities in the specifically mentioned industrial classes (Petroleum Industry, Pharmaceuticals and Organic Chemicals, Plastics, and Synthetic Fibers Industries, Pulp and Paper Mills, and semiconductor manufacturers) were surveyed; when in fact two General Motors facilities were included as well as others from the primary metals, manufacturing and transportation categories.

GM concurs with the Agency in the way it (the Agency) limited the volume of data collected. That is, facilities that used less than a combined total of 1,200 kilograms of all of the chemicals of concern were excluded from further consideration for purposes of this study.

Response: The Agency appreciates the commenter’s support of the methodology used to collect data on the uses of the 14 target chemicals as solvents. The commenter is correct in noting that the emphasis of much of the Background Document is on the large solvent users found in the pharmaceutical, petroleum refining, chemical manufacturing, pulp and paper, and semiconductor manufacturing industries. As the commenter notes, facilities in other industries, including and not limited to automobile manufacture, also were covered by the questionnaires.

B. Engineering Site Visit Reports

Commenter: ETC
Comment: H. EPA's Engineering Site Visit Reports are Inadequate to Support the No-Listing Decision, And Raise Numerous Questions Regarding Waste Management and Environmental Impact

The ETC has conducted a review of the Engineering Site Visit Reports in the RCRA Docket F-96-SLDP-FFFFF. It is clear from the 20 site visit reports present as non-CBI information that the engineering site visits were very superficial, and did not encompass a thorough review of waste management, solvent waste characteristics, and potential environmental releases or damage from waste handling. 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 2 hours, with anywhere from 0 to 60 minutes spent actually touring the facility. For example, the site visit to Stahl USA (Docket # S0020) allotted only 2 hours to review over 800 formulations and 6 production units. One site visit was conducted from a tour van and was strictly a windshield audit, and 2 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.

EPA's stated 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. 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. Specific information identified by the ETC from these site visit reports, that should have raised concerns with EPA with regard to this listing decision, are summarized below.

Response: 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 Agency did not attempt to conduct a full scale compliance investigation. Instead, the engineering site visits were performed to obtain a first hand understanding of solvent utilization and also to develop a working relationship with the industries. Detailed, site-specific information was collected through the 3007 Survey from 156 facilities. As enumerated below, engineering site visits afforded EPA staff an opportunity to become familiar with processes used in specific industries and field test the questionnaire. The Agency collected information concerning detailed waste characterization data, release, and waste management practices through the 3007 Survey. The site visits were conducted at a sample of these 156 facilities. Residuals generated by the facilities were discussed, and the locations of waste management units were examined during each of the site visits.

EPA conducted two rounds of engineering site visits. Early visits, including IBM (Manassas, Virginia), Wyeth-Ayerst Laboratories (West Chester, PA), Mobil Oil Corp. (Paulsboro, NJ), E-Systems (Greenville, TX), Hitachi Semiconductor (Irving, TX), Lyondell Petroleum (Channelview, TX), and Citgo Petroleum (Lake Charles, LA), provided an opportunity for investigation staff to become familiar with processes used in specific industries. Subsequent site visits including Xerox (Webster, NY), Eastman Kodak (Rochester, NY), Stahl USA (Peabody, MA), Polaroid Corp. (Waltham, MA), Hadco (Derry, NH), and Shipley (Marlboro, MA), served to allow field testing of the RCRA 3007 Solvents Use Questionnaire. Site visits conducted to this point were undertaken prior to mailing of the RCRA 3007 Solvents Use Questionnaire and were intended to provide an opportunity for preliminary evaluation of solvent use, examination of waste management practices, determination of appropriate sampling points in the event sampling was required, and assessment of pollution prevention. These early site visits were undertaken to familiarize EPA and contractor staff with the multitude of processes and industries potentially subject to the investigation through “first person” experience rather than “textbook” learning. Moreover, the site visits served as an outreach mechanism for EPA to interact with industry and inform potentially affected industries of the investigation. Seven additional visits were conducted following the receipt of RCRA 3007 Questionnaires. These site visits focused again on familiarization with processes used in target industries and assessment of data provided by respondents. The Agency was able to focus on larger scale users and specific processes up-close based on the information reported in the 3007 Survey. Such rounds of site visits are typical for the Agency in performing listing determinations and provide valuable information to Agency staff without the need for visiting every potential solvent-using facility, which is well beyond the Agency’s resources.

In response to the commenter’s concern that no sampling efforts were undertaken, as discussed in detail in responses to comments in Section II.C of this document, the Agency determined that sampling and analysis was unnecessary to support the solvents listing determination. As the Agency has also pointed out, due to the variability of processes and solvent mixtures involved (even within one industry), sampling would not yield and consistent data on typical and frequent spent solvent constituent levels. Therefore, sampling and analysis of additional constituents of concern is unnecessary. In addition, sampling and analysis was not necessary also because EPA obtained waste characterization data through the responses to the RCRA 3007 Surveys.

Tours of the facility lasted as little as 1.5 hours and as much as 3.5 hours, with a minimum of 30 minutes and a maximum of over 2 hours spent on tour and/or on the plant floor. Although many of the visited facilities were large, only a small portion of each facility was involved in the processes relating to solvent use and the solvents listing determination. As a result, only a short time was required to observe that portion of the facility. Moreover, the Agency spent additional time with the facility that was visited following-up questions regarding the site visit.

The risk assessment portion of the listing determination modeled releases that were much larger than any spills. . The Agency did not focus its site visit efforts on auditing facilities for compliance nor on preparing an exhaustive assessment of potential spills, releases, or damage from the solvents, although these issues were briefly discussed during the site visits. There were no spills or damage observed at the time of the site visits. The Agency requested detailed information in the RCRA 3007 Solvents Use Questionnaire in Sections 7.5.3 and 8.1 on those subjects and, in fact, found no instances of environmental damage associated with the 14 chemicals used as solvents at the facilities. If the Agency had observed compliance concerns, the issues would have been directed to the appropriate enforcement agency in that facility's state. Focusing the engineering site visits on this subject area would have squandered valuable time spent evaluating and understanding production processes and waste management practices--the very purpose of the visit.

This commenter raised a number of points on particular site visits that the commenter claims should have lead the Agency to modify its risk assessment or its analysis of plausible mismanagement scenarios. EPA disagrees with the commenter for reasons stated in each of the specific responses to the comments on the site visits given below. In general, EPA considered the broader information found in the 3007 survey, since the survey information was most important in determining risk assessments to be used in this listing determination.

Commenter: ETC
Comment: <u>Docket Document No. S0018: Continental Circuits Corp., Phoenix, Arizona</u>
Continental Circuits Corporation manufactures printed circuit boards, and uses 2-ethoxyethanol acetate and 2-methoxyethanol as solvents in applying a protective resin coating to the circuit boards.

This site visit was extremely superficial, and could have accomplished much more, particularly if the plant tour included a detailed environmental audit or assessment. A 30 minute tour does not even begin to evaluate potential environmental issues associated with waste handling.
The other striking factor revealed by this report is that all of the solvent waste is vented to air during the various coating, drying and curing stages. This method of managing excess solvent was also found at other engineering site visits of printed circuit board manufacturers (see Hadco Corporation - S0033; Analog Devices, Inc. - S0035; Hitachi - S0026; and Intel - S0019). Such direct volatilization of solvent waste was not a pathway or disposal route modeled by EPA in the proposed listing decision. All non-wastewaters were assumed to be combusted in controlled thermal destruction devices such as boilers or incinerators (see 61 FR 42325). A drying oven that vaporizes the solvent without destruction results in far greater environmental impact. The storage tank fugitive emission scenario modeled by EPA (see 42325) is also not representative of a drying oven or heater which essentially drives off large quantities of solvent, not trace fugitives. Such a reliance on volatilization of all of the spent solvent constitutes mismanagement of the waste, and is a poor practice which should motivate a listing decision.

Response: This site visit lasted three hours with the tour portion equivalent to 30 minutes. The Agency notes that many of these facilities, due to the nature of the industry (e.g., semiconductor manufacture), are not very big and therefore, do not require much time to cover the entire plant. The objective of the tour was not to conduct an environmental audit, but rather to observe manufacturing processes and waste generation and management for the purposes of staff familiarization.

Moreover, the air venting problem noted by the commenter does not indicate to EPA that it should evaluate another route of exposure in the risk assessment for this rule. This is because the use of the chemical noted by the comment does not generate a spent solvent that is covered under this rule. Furthermore, the air emissions noted by the commenter are regulated under the Clean Air Act (CAA) Sections 112. A rule establishing MACT standards for semiconductor manufacturers is due to be promulgated under CAA Section 112 by November 15, 2000. Since air emissions from a production process are regulated under the CAA, a listing decision under RCRA would not result in the facility altering this management practice, because these air emissions would still be regulated under the CAA. As explained in the Engineering site visit, a protective coating containing 2-EEA and 2-ME is applied to a circuit board. When the board is baked in order to harden the coating, the chemicals are evaporated off. The chemical vapors are pulled into the facility's exhaust system and released into the atmosphere through the exhaust system. Thus, chemicals are emitted to air during use - no venting of "spent solvents" occurs. This chemical emission would be regulated under the CAA because it is a process emission. Furthermore, because 2-EEA and 2-ME are used as components in the resin coating formulation and do not generate spent solvents, they do not meet EPA's definition of solvent use.

Commenter: ETC
Comment: Docket Document No. S0019: Intel Corporation, Chandler Arizona
In addition to similar concerns to S0018 above, the ETC also noted that the report identified that solvent waste is drained through an underground piping system to bulk waste solvent tanks. No assessment was made by EPA of leaks from this piping system, or containment practices for this piping system. Tank management standards under RCRA Subpart J would protect against releases from these waste solvent piping and tank systems, but without a listing decision, such standards would not apply. Underground piping and tank systems were also observed at IBM (S0023) and Hitachi (S0026). Also, Subparts AA, BB and CC requirements are needed to control fugitive emissions.

Response: This visit lasted approximately 3.5 hours with the tour portion equivalent to 2 hours. The piping system is located under the building floor, but not underground. If there had been any significant leakage from this piping system it would have been listed in the questionnaire under Question 7.6, Environmental Releases. The piping runs to the waste bulk solvent tank that is located in an enclosed building, but not underground. The photoresist waste that runs through the piping and into the tank carries a listed hazardous waste (F003) due to the presence of xylene, and is managed as a hazardous waste. Therefore, 40 CFR Part 264/265 Subpart J already applies to this waste .

The Agency examined data from the survey indicating the potential for higher risk scenarios and sill found no risk of concern. The commenter is bringing up a minor point based on a hazardous waste tank piping system that appears to have little risk potential. In addition, for tanks such as these, the facility is required to have spill prevention and response contingency plans.

EPA has examined the possibility of spills and leaks from management units such as tanks, as discussed in Section V on Risk Assessment. 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. Of the non-wastewaters, almost 90% are already regulated under Subtitle C of RCRA, and the waste in question is already hazardous. Spills from the RCRA units, therefore, are already covered under contingency planning and corrective action requirements. Subpart CC of Parts 264/265 includes additional requirements for spill protection during transfer of wastes. Therefore, EPA concludes that spills or releases of these wastes from tanks is not of significant concern.

Commenter: ETC
Comment: Docket Document No. S0020: Stahl, USA, Peabody, Massachusetts.
Stahl produces products for the leather tanning industry. Several items of concern should have caught EPA's attention in this report. First, the company could not account for losses of 8,323 lbs per year of 2-methoxyethanol and 3,600 lbs per year of 2-ethoxyethanol acetate. These solvents missing in action were attributed by the company to "tank meters being off", and the EPA site visit team accepted this with no further investigation. These MIA solvents amounted to between 5% and 12% of the purchased raw material solvent. What should have raised even more concern is that the company uses in-ground tanks for the waste solvents. Is there possible environmental damage from releases from these tanks? Is mismanagement of these solvent wastes occurring? This was not assessed during the 2 hour site visit.

In addition, there were numerous air emission loss pathways noted for the solvents, but again, EPA ignored this in the risk assessment. Purposely driving off waste solvent seems like a mismanagement scenario that must be modeled in doing a proper listing determination.

Finally, the report did discover that one of the waste streams (waste from urethane cook area) was possibly mis-classified by Stahl as non-hazardous. This is why a listing determination is needed to provide additional basis for the proper management of all potentially harmful waste streams.

Response: The general response to this comment is that whatever might occur at any one plant can have only limited usefulness for a risk assessment that needs to deal with a large number of facilities. EPA reiterates its general reliance on the 3007 Survey, although may use the site visits to inform its analysis.

In the specific case of Stahl USA brought up by the commenter, the commenter states that the Agency allowed only two hours to review over 800 formulations and six production units. The Stahl USA plant is relatively small, and produces product in batch runs. The batch preparations occur in six units, all of which are physically located near each other. Thus, EPA had the opportunity to observe the preparation of representative formulations. The quantity of 2-methoxyethanol or 2-ethoxyethanol acetate used may vary from formulation to formulation, but the processes and residuals management remain unchanged. This is among the reasons, noted above, why the Agency chose to rely on the questionnaires, which provide a much better way of characterizing the processes of concern.

The facility's consumption data, in addition to their process throughput and solvent residual quantities, were reported and verified through the 3007 Survey. Moreover, the reported losses are not "unaccounted for." The facility indicated that they thought their tank meters may be off because they may get more raw material metered to product than their instrumentation shows or that supplier levels may not be accurate. It was not the intent of the engineering site visit to test product tank meters or to conduct product material inventory assessments. The purpose of the site visit, as stated in the report, was to observe information regarding the industry, the manufacturing process, and waste generation and management.

Nowhere in the site visit report does it state that waste solvents are managed in in-ground tanks, contrary to the commenter's claim. In fact, the material placed in tanks is actually raw materials. RCRA regulates waste management, not raw material management. The last paragraph of page 5 states:

> "In the mixing tank operation, *raw materials* are placed in a 500 or 1,000 gallon in-ground tank. Solvent is pumped from the tank farm into the mixing tank." (emphasis added)

This in-ground product mixing tank is part of the process where raw materials are mixed. There are no solvent wastes stored in in-ground tanks

At the time of the engineering site visit, EPA noted that information obtained during the visit might be incorrect for one waste. However, in reviewing Stahl USA's response to the RCRA 3007 Questionnaire all waste streams generated were reported to be managed as hazardous waste. EPA followed up and confirmed this with the facility. The Agency appropriately based its risk assessment on the confirmed results of the 3007 Survey.

Commenter: ETC
Comment: Docket Document No. S0022: Mobil Oil Corporation, Paulsboro, New Jersey.
This site visit report also identified substantial missing-in-action solvents, totaling 172,000 gallons per year of furfural. The report did note that Mobil confirmed significant losses of furfural / oil mixtures to the sewer system. One of the mismanagement practices that inspired RCRA was the disposal of raw chemical wastes to sewers.

The report also noted that Mobil disposes of solvent residuals in an on-site coke unit. Yet no engineering details were provided regarding this unit. Does this unit have the same combustion controls as a Subpart O incinerator? If not, EPA should have modeled the coke device as a plausible management scenario.

Response: The 172,000 gallons per year of furfural are required as makeup to the lube oil extraction unit due to losses. Losses are identified by the facility in products from the process (raffinate and the extract), the steam stripping condensate/wastewaters, and due to thermal breakdown, as stated in the site visit report. The wastewater streams were evaluated by EPA in the risk assessment. This quantity is not "missing-in-action" as stated in ETC comment; EPA appropriately evaluated wastes containing furfural for this and other generators (see proposed rule 61 *FR* at 42340, and revised analyses given in the docket in the Supplemental Risk Assessment docuemnt in the docket**.** Due to the high cost of the furfural solvent, the facility has an incentive to achieve a high recovery rate.

In addition, much of the waste from this solvent use is very well controlled under other management systems and other regulations. The steam stripper waste containing furfural/oil is first sent to the sewer system that passes through an oil/water separator to remove the oil followed by biological treatment to treat the furfural in tanks. The sludges from primary and secondary wastewater treatment at refineries already are listed hazardous wastes. EPA evaluated potential air and groundwater risks from the treatment of large volumes of furfural wastewater in impoundments and tanks (e.g., see 61 *FR* at 42340). Thus, the Agency evaluated an aerated impoundment, which is clearly the scenario where the most significant air releases are likely to occur, and found no significant risk. Furthermore, refinery emissions controls under the CAA's Benzene NESHAP would likely provide controls for other volatiles such as furfural (see 40 CFR Part 61, Subpart FF). In addition, the wastewater treatment plant effluent is subject to Clean Water Act controls (40 CFR Part 419).

Because the process operates at elevated temperatures and pressure, some thermal breakdown of solvent occurs. Residuals from the thermal degradation of furfural generated in the unit are generated infrequently (3-5 years) and are managed in an on-site refinery coke unit. The facility reports in the 3007 Survey that the waste volume is small (<1 MT), and very little furfural is expected to remain in these residuals due to the operation of the furfural unit at high temperatures . The wastes is sent to a coke unit, which operates at temperatures in the range of 800 to 900 ^{o}C. Thus, any remaining furfural (which has a boiling point of 162 ^{o}C) would be either destroyed in the coke unit, or captured in the volatile products collected from the unit .

Commenter: ETC
Comment: Docket Document No. S0024: Wyeth-Ayerst Laboratories, West Chester, Pennsylvania.
The report identified spent acetonitrile solvent filter residues which are sent to a non-hazardous landfill. EPA claimed in the proposed listing determination preamble that no land disposal was observed to be occurring at all of the industries surveyed. Apparently, EPA did not read its own docket. EPA should have taken samples of the filters for analysis, or should have asked for data from the Wyeth-Ayerst representatives. But this significant source of mismanaged spent solvent waste was totally ignored or overlooked.

Spent solvent is recovered in an on-site solvent recovery process. The still bottoms are managed as hazardous waste, since methylene chloride, which is mixed with the acetonitrile, makes the still bottoms an F002 wastes. EPA concludes that no separate solvent listing is needed for acetonitrile, because the F002 methylene chloride listing captures this waste stream under RCRA. However, Wyeth-Ayerst could substitute a new solvent for methylene chloride and get away from the F002 listing anytime. Then the still bottoms could be disposed of as non-hazardous, perhaps at a landfill. This is why a separate listing is needed also for acetonitrile, and why EPA must model unlined land disposal units as a plausible mismanagement scenario.
Response: With regard to the spent filters, the commenter is incorrect in stating that they are acetonitrile wastes. There are filter residues from the process that uses acetonitrile, but they do not contain any detectable levels of acetonitrile as reported in the engineering site visit report and the 3007 survey. As stated in the report, the filters are washed prior to being disposed of in the landfill and the resulting wastewater is sent to the wastewater treatment system. The observations in this site visit report by the commenter, thus, does not show that acetonitrile was disposed of in a non-hazardous waste landfill. A full discussion of the acetonitrile disposal scenarios are found in the record for this proceeding and are based on the 3007 Survey, not particular site visits. Based on the Agency's experience and data from other facilities, filters and similar media are unlikely to contain any measurable quantities of solvents. The low volume of these materials and the negligible solvent concentrations make it unlikely that such wastes could cause any risks of concern. Because the filters are related to a particular pharmaceutical process, data on the solvent and other constituents would be meaningless and difficult to compare with wastes from other facilities to form any basis for a listing.

With regard to the still bottoms, the Agency does not believe that the facility would be likely to change its management practice from on-site recovery to non-hazardous land-based disposal, even if a non-listed waste was substituted for methylene chloride, due to the thermal recovery value of the acetonitrile solvent. In addition, the speculative changeover from methylene chloride to another solvent suggested by the commenter could also eliminate the acetonitrile. The Agency is not in a position to conjecture on the possible solvents that may be substituted at some unspecified future time. Given the strict FDA regulation of the pharmaceutical industry with regard to chemical substitution approval, substitution would be difficult due to testing requirements.

Commenter: ETC
Comment: Docket Document No. S0025: E-Systems, Greenville, Texas.
This report highlights how EPA was asleep at the wheel. This company sprays phenol based paint strippers on military planes parked outside on asphalt slabs. Potential for substantial surface water runoff and environmental contamination is present. During their 30 minute "windshield" audit, the two EPA officials and the SAIC consultant did not bother to evaluate the environmental impact of this open phenol spraying operation from concentrated solvent runoff.

In addition, the sludge from wastewater treatment of the rinsates, which contain phenol, are disposed of at a non-hazardous landfill. Again, EPA has misrepresented in the preamble that no landfill disposal scenarios were identified at any of the industries surveyed for non-wastewaters. This site visit report should have prompted EPA to perform a risk assessment on a unlined landfill disposal mismanagement scenario.

For the stripped paint solids mixed with the phenol/methylene chloride stripping solvent, EPA concludes that this is already managed as a hazardous F002 waste due to the methylene chloride. Therefore, EPA concludes that this waste stream is controlled without a separate solvent listing for phenol. Yet on page 8 of the report, it is stated that the company is working on eliminating methylene chloride. If this happens, there would be no requirement to manage this waste as hazardous, unless a separate solvent listing is promulgated for phenol.

Response: The site visit was not a “windshield” audit. Only a small portion of the tour was done in a van. The group was shown external and internal facilities. The group observed the paint stripping operation in detail from the ground. The group, as stated in the report, was shown a close-up view of the elaborate filtration system inside the hanger. Furthermore, during the site visit, the facility indicated that they were in the process of constructing a new hanger for purpose of conducting the stripping operation indoors. These plans were mandated by the CAA.

A solvents listing decision would not change any of the management practices at the E-systems facility because phenol, which reacts with paint primer, is used as an active ingredient, is part of the formulation of the paint stripper and its use does not meet the Agency’s definition of “solvent use.” The methylene chloride is, of course, used as a solvent because it is a carrier and a reaction medium.

The runoff from the paint stripping operation is captured and piped to the facility’s onsite wastewater treatment system where the phenol and methylene chloride are treated prior to discharge. This wastewater treatment system was specifically designed for the stripping and painting operations.

The sludge contains 50 ppm of phenol. In addition, as stated in the site visit report on page 11, the sludge is disposed of in a hazardous landfill, contrary to the commenter’s claim that the sludge is disposed of in a “nonhazardous landfill.”

Any changeover from methylene chloride to another solvent could also eliminate the phenol. The Agency is not in a position to conjecture on the possible substitutes that may be employed at some unspecified future time. In any case, as noted above, this particular use of phenol would not be solvent use as defined by the Agency.

Commenter: ETC
Comment: <u>Docket Document No. S0026: Hitachi Semiconductor Inc., Irving, Texas.</u>
This report identified three waste streams containing spent 2-ethoxyethanol acetate and phenol, that are sent to non-hazardous landfills. These consist of filters and glass that have come in contact with the solvent, and a wastewater filter cake containing these solvents. This is yet

another site visit report that should have prompted EPA to model an unlined landfill disposal mismanagement scenario for non-wastewaters.

Response: The glass containers are disposed of in accordance with EPA CFR Section 261.7 for residuals of hazardous waste in empty containers, because some of the glass containers held chemicals that are listed hazardous waste chemicals. The purpose of the HEPA filters is to collect particles. The facility's data indicate that no phenol or 2-ethoxyethanol acetate are present prior to disposal at a municipal landfill. The vaporized phenol and 2-ethoxyethanol acetate is exhausted to wet scrubbers which are designed to collect and contain the vaporized solvent. The only quantity of these solvents routed to the wastewater treatment is from the scrubber exhaust water and the water from the rinsing steps which are treated in the wastewater treatment system. The lime slurry filter cake generated from the wastewater treatment system does not contain phenol or 2-ethoxyethanol acetate based on data provided by the facility in their questionnaire response. Because the wastewaters are neither managed in a surface impoundment nor represent the high end concentration or loading of 2-ethoxyethanol in wastewaters, and because there is no solvent found in the lime slurry filter cake from the wastewater treatment system, EPA did not model the management of these wastes.

Commenter: ETC
Comment: Docket Document No. S0030: Citgo Petroleum Corporation, Lake Charles, Louisiana.
This site visit report identified extremely high solvent losses that could not be accounted for by Citgo. The missing-in-action solvents amounted to 1,267,466 lbs/year of furfural and 1,351,563 lbs/year of phenol. The speculation in the site visit report is that these losses are associated with "a small leak in valves and flanges that cause solvent to drip onto the ground or vaporize into the air" (page 3 and 4 of S0030). Such mismanagement would be avoided if EPA listed these solvents, since Subparts AA, BB and CC would apply, as well as Subpart J tank standards. The mismanagement scenario observed at Citgo was not modeled by EPA. Despite this major gap, EPA's engineering site visit report concludes that no spent solvent is discharged.

The wastewaters containing the spent solvents are treated in an unlined earthen surface impoundment. Releases to groundwater should therefore have been modeled as part of the listing determination.

Response: In their RCRA 3007 Questionnaire, CITGO provided more detail on losses of phenol and furfural in their system. Of the total throughput of both phenol and furfural, 99.9 percent is recovered in a closed-loop system. A total of 67,600 lbs. of phenol is incorporated into product (e.g., extract or raffinate) and 350,903 lbs. is lost to wastewater. The remaining 785,410 lbs. decomposes due to the high temperature at which the system operates. Phenol consumption, therefore, equals the losses to product and wastewater plus the amount decomposed. For furfural, a total of 42,473 lbs. is lost to product (e.g., extract or raffinate) and 219 lbs. is lost to wastewater. The remaining 1,114,040 lbs. is degraded or oxidized due to the heat and oxygen inherent in the process. Acids and polymers are formed that become entrained in the extract product and are not losses or releases to the environment. Thus, losses due to degradation and reaction were shown as unaccounted losses.

The Agency also modeled this surface impoundment for phenol and furfural losses (separately and in tandem) and did not find a hazard of concern, even under high-end assumptions. Losses of solvent from flanges and valves are the unused commercial chemical products, which, for furfural and phenol are listed under 40 CFR 261.33(f) as EPA Hazardous Waste Codes U125 and U188, respectively.

The site visit report states that no "spent solvent" is discharged because it is a closed loop process with 99% recovery of furfural. The waste streams that are discharged contain between 1-20 ppm of solvent. The Agency modeled these waste streams that were discharged to wastewater. For the air release pathway, the Agency choose to model releases from storage tanks. The potential releases from open tanks would exceed the losses from fugitive emissions. EPA modeled the critical pathway (e.g., releases from open storage tanks), which was shown to have no risk. The fugitive emissions are even lower and therefore, are of even less concern.

The commenter fails to consider the entire wastewater treatment system as described in detail in CITGO's 3007 Questionnaire response. Phenol and furfural wastewaters are combined with other wastewaters generated on site. These wastewaters are routed first to an API separator that removes slop oil (142 bbls/day containing 70 ppm phenol and <1 ppm furfural). The wastewater is then routed to a Dissolved Air Flotation (DAF) unit. The removed DAF is managed as hazardous waste code K048 (30 bbls/day containing 35 percent phenol). The API separator removes all furfural and some phenol; the DAF unit further removes phenol; remaining phenol is removed in a biological treatment process prior to wastewater discharge under NPDES permit. At no time does CITGO discharge untreated phenol wastewaters to an unlined surface impoundment. The Agency modeled phenol wastewater releases to groundwater after they underwent treatment due to management in a surface impoundment based on survey data from this facility and confirmed by the site visit.

Finally, the Agency notes that the commenter incorrectly cites 40 CFR Parts 264/265, Subparts AA, BB, CC and J as applicable to potential leaks in valves and flanges. These valves and flanges are not waste management facilities but are part of the process equipment. Thus, the hazardous waste regulations cited by the comment would not apply in any case.

Commenter: ETC
Comment: Docket Document No. S0027: PPG Industries, Springdale, Pennsylvania.
Several solvent waste streams were identified in the report, which were not addressed with regard to disposal practices. EPA and their consultant failed to assess how PPG disposes of solvent contaminated filtration cartridges, bags, elements, and still bottom sludges. The PPG facility uses cumene, isophorone and 2-ethoxyethanol acetate as solvents.   This report therefore does not support EPA's risk assessment scenarios selected for non-wastewaters.

Response: On page 4 of the engineering site visit report it clearly states the following with respect to cumene, isophorone, and 2-ethoxyethanol acetate at the facility:

> *Following the site visit, PPG corrected the consumption figures to eliminate isophorone and 2-ethoxyethanol acetate as solvents. These two compounds are part of formulations and, thus, do not meet the definition of 'solvent.' (p. 4, paragraph 2 following the table)*
>
> *Cumene is part of an aromatic mineral solvent, Solvesso 400, supplied by Exxon Corporation. The solvent has a maximum concentration of five percent cumene. The facility uses 800,000 pounds per year, of which 40,000 pounds is cumene. Of the Solvesso 400, 95 percent is used as an ingredient and 5 percent is used in plant cleanup.*

Thus, EPA determined during the engineering site visit that isophorone and 2-ethoxyethanol were not used as solvents. Further, cumene did not meet the threshold definition of solvent, as defined in the regulations, due to its low before-use concentration. The formulation itself contains greater quantities of currently-listed solvents. In addition, the amount of cumene used for plant cleanup (the before-use concentration that meets the threshold definition of solvent use) is less than 1200 kg per year. Based on the engineering site visit, EPA determined that PPG did not use isophorone, 2-ethoxyethanol acetate, or cumene as solvents subject to this listing determination.

The chemical that comes into contact with the filtration cartridges, bags, and elements is part of the coating formulation and, therefore, is not a solvent. The disposal practice for these residuals is incineration. PPG's does not use cumene, isophorone and 2-ethoxyethanol as solvents. The still bottom sludge is an F003/F005 waste due to the presence of xylene, toluene, and methyl ethyl ketone (MEK) and is managed as hazardous.

Commenter: ETC
Comment: Docket Document No. S0031; Polaroid Corporation, Waltham, Massachusetts. This report identified that Polaroid stores its acetonitrile and 2-methoxyethanol solvent wastes in underground storage tanks. These tanks do not meet Subpart J standards, and no assessment of potential environmental damage was made during EPA's site visit. Without a waste listing decision for these solvents, there is no guarantee that such underground storage tanks will meet Subpart J standards. This is a mismanagement scenario that should have been modeled by EPA.

Response: No where in the site visit report does it state that acetonitrile and 2-methoxyethanol solvent wastes are stored in underground storage tanks. The last paragraph of page 6 states:

> *The facility does have onsite capacity to recover solvents. Larger solvents, such as xylene, are recovered and stored in a double walled underground storage tank.*

Recovered solvent is a product, not a hazardous waste. CFR Part 264/265 Subpart J never applies to stored product; it only applies to hazardous waste storage. This management practice only applies to recovered solvents, and as stated in the site visit report on page 6, acetonitrile and

2-methoxyethanol are not recovered. They are managed as hazardous and stored in tanks, having secondary containment and covers, in a Part B permitted storage area prior to being sent off-site for incineration. These wastes were considered in the risk analysis as appropriate.

Commenter: ETC
Comment: Docket Document No. S0033: Hadco Corporation, Derry, New Hampshire, and Docket Document No. S0035: Analog Devices, Inc., Waltham, Massachusetts.
These companies are printed circuit board manufacturers, for which the same comments as made regarding S0018 above apply. In addition, for Hadco no accounting was made as to how the solvent still bottoms are managed, and for Analog Devices, Inc., several solid waste streams were noted for which disposal practices were not identified or reviewed. Therefore, EPA cannot claim that these reports support the management scenarios modeled in the listing decision.

Response: The engineering site visits were reviewed against the 3007 Surveys to ensure that reporting was consistent. No additional management practices other than those reported were observed during the site visits. Hadco's use of 2-ME and 2-EEA as components of a solder mask and a protective coating for printed circuits boards does not constitute solvent use. Most of the photoresist from Analog also does not qualify as solvent use for the same reasons; however, the site visit notes that the stripped photoresist is stored with flammable wastes and sent to a cement kiln. Therefore, the still bottoms from the recovery of these formulations would not be modeled in the risk assessment regardless of how they are managed.

Commenter: ETC
Comment: In summary, the above engineering reports document non-hazardous landfill disposal of solvent wastes, and other potential for environmental damage through release mechanisms not modeled in the listing determination. These reports emphasize ETC's position that EPA must consider plausible mismanagement scenarios in making a listing determination. The evidence of such mismanagement scenarios was present in EPA's own Docket for this proposed listing decision, yet EPA chose to ignore or overlook it.
Response: The Agency disagrees with the comment for the reasons stated in specific responses or comments in this section. Further, as discussed in detail in Section IV. C. which addresses comments on selection of plausible mismanagement scenarios, the Agency considered and selected for risk assessment management scenarios based on evidence that the scenario was plausible.

C. General Comments; Not Otherwise Classified

Commenter: EDF
Comment: The Environmental Defense Fund (EDF) requested a 30 day extension of the comment period on the proposed solvent listing determinations published in the Federal Register of August 14, 1996. The comment period was scheduled to expire on October 15, 1996. EDF sought an extension until November 14, 1996.

The proposal involved 14 different solvent listing determinations, and is based upon a substantial number of background documents concerning the use, toxicity, waste management practices, and risks associated with these solvents. Given the amount of technical material involved, and the importance of these listing determinations, an additional 30 days would be required to review and assess the various documents, and prepare responsive comments. The need for additional time is compounded by the hazardous waste combustion and HWIR-media rulemakings occurring on parallel tracks.

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Response: The Agency provided all commenters with a 30 day extension in the comment period in response to this request.

Commenter: Ciba Specialty Chemicals Corporation
Comment: <u>DEFINITION OF SOLID WASTE</u>:

Because of the way EPA was able to apply conservative risk assessment procedures and reach an appropriate regulatory decision, Ciba would like to take this opportunity to praise EPA for these efforts and encourage EPA to apply such risk tailoring and realistic approaches to other of its regulatory reinvention initiatives. In particular, EPA has expended a great deal of resources over the past several years through task groups and other avenues attempting to refine the definition of "solid waste." EPA's efforts have focused on developing a definition that, like risk tailoring, allows for better, more realistic, more practical, cost-effective, and appropriate continued manufacturing use of “secondary materials”. Ciba urges the Agency to continue its efforts to revise the definition to remove unnecessary impediments to recycling and to provide tangible regulatory relief. EPA should make such revisions a priority and promulgate proposed revisions to the definition of solid waste as expeditiously as possible.
Response: The commenter’s suggestions are noted, however, implementation of these suggestions is outside of the scope of this rulemaking.

Commenter: Ciba Specialty Chemicals Corporation
Comment: <u>HAZARDOUS WASTE IDENTIFICATION RULE</u>:

EPA has provided numerous occasions for stakeholder discussion on other regulatory efforts at which industry has consistently requested that realistic, risk-based approaches be employed. In particular, the proposed hazardous waste identification rule (HWIR) for process wastes and the proposed HWIR contaminated media rule both leave open the possibility that the Agency will embrace realistic, risk-tailored approaches that would allow low-risk waste to "exit" the Subtitle C system. Since the HWIR final rule appears to be delayed in order to make needed modifications to the multi-pathway risk assessment model, we request the Agency finalize an interim rule that provides relief to the regulated community by excluding one or both of the following exemptions that we recommended in our comments to the HWIR proposal published at 60 FR 666344 (December 21, 1995). As stated in our comments, both of these exemptions are for materials which the Agency has already determined meet a “minimize threat” standard and should be expeditiously exempted from the hazardous waste listings.

Recommended listed waste exemptions.

A. Wastes that meet the applicable waste code specific land disposal restriction LDR requirement and the Universal Treatment Standards (UTS) should be exempted from continuing to carry any listed waste codes.
B. Except for wastes listed for metals, the residues from permitted Subtitle O incineration (e.g. incinerator scrubber water, slag and ash), should be exempted from continuing to carry those listed waste codes.

Response: The commenter’s request is noted, however, implementation of these requests is outside of the scope of this rulemaking.

IV. Methodology

A. Consistency Of Methodology With Other Listing Determinations

Commenter: American Petroleum Institute (API)
Comment: API commends the Agency's efforts in this rulemaking and encourages the Agency to use the methodology applied here in other pending and future listing determinations under RCRA. Based on this methodology, API agrees with the Agency's proposal not to list, under RCRA, the fourteen solvents at issue in this rulemaking.
Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste.

Commenter: ETC
Comment: EPA asserts on pages 42320/2+3 that in two prior hazardous waste listing determinations, EPA utilized the same general approach of evaluating waste management scenarios in the risk analysis for the listing determination. The ETC has reviewed the management scenarios assumed in both the Dyes and Pigments listing determination (59 FR 66072, Dec. 22, 1994) and the Petroleum Refining Process waste listing determination (60 FR 57747, Nov. 20, 1995). Contrary to EPA's claim, these listing determinations were based on different scenarios than EPA is using in the proposed solvent rule.

In the Dyes and Pigments wastes listing determination, EPA used plausible mismanagement scenarios of disposal in unlined municipal landfills and on-site monofills (see 59 FR 66087), in addition to other plausible scenarios (wastewater treatment tanks, industrial boilers). As noted by EPA in the Dyes and Pigments rule (59 FR 66074):

> "It is important to note that a management scenario need not be in use currently to be considered plausible by EPA since disposal practices can and do change over time. Potential future waste management practices are projected and considered in the risk analysis, if appropriate. The Agency often projects risks from management that reasonably could be employed."

This policy in the Dyes and Pigments rule was not followed in the proposed solvent listing. EPA did not consider mismanagement scenarios that reasonably could be employed, particularly disposal in unlined landfills. 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 (see sections below on ETC's review of the engineering reports and questionnaire responses). The policy set forth the Dyes and Pigments listing indicates that EPA should also evaluate the risks posed by disposal of the solvent wastes in unlined land disposal units.

The same can be said of the listing policy used in the Petroleum Refining Waste determination (see 60 FR 57758 and 57759). Here, as with the Dyes and Pigments rule, EPA also considered plausible mismanagement scenarios, including disposal in on-site and off-site Subtitle D landfills. Again, contrary to the statement on page 42320 of the solvent rule, EPA is deviating from the policy followed in past listing determinations without an adequate justification.

Response: The commenter has misconstrued EPA's methodology for selecting and evaluating plausible waste management scenarios for the solvents at issue in this rulemaking. EPA evaluated practices that the industry reported in the 3007 Survey as currently in use. In addition, the Agency did also consider management practices not currently in use; however, where it was not reasonable to conclude that a potential management practice could be employed in the future, the Agency eliminated that practice as implausible.

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 the 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 triarlymethane pigments using aniline as a feedstock, despite risks that might arise if the waste were send to a landfill. For this waste category, EPA determined a landfill was not plausible management (see 59 *FR* at 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 (IV.E), 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.

In the Dyes and Pigments proposal, the Agency stated that it will presume that certain scenarios (e.g., municipal and industrial unlined landfills for solid materials, tanks and unlined surface impoundments for liquids, and boilers for organic liquids and solids) are plausible, “unless circumstances unique to a particular industry show that one or more [of these scenarios] is not plausible for that industry.” 59 FR 66074. The Agency explained in that proposal that waste management practices not currently in use can be considered plausible and considered in the risk analysis “if appropriate” and if the evidence demonstrates that such practices reasonably could be employed. Id.

Accordingly, in the solvents rulemaking EPA has assessed potential future management practices based on reported management practices. The Agency considered whether or not a management practice would be likely to change and whether the impact of future “list” or “no list” decisions might cause shifts in management practices. This assessment was based on the types of residuals generated (e.g., solvent concentration, aqueous/organic content, hazardous/nonhazardous) and the current management practice for each residual. (See EPA’s response to comment below for the Agency’s solvent-by-solvent assessment.) The Agency determined that the actual management practices represent average or typical management practices. For example, the typical management practice for high organic content wastes is some type of thermal treatment and the typical management practice for wastewaters containing spent solvent is treatment in tanks. Wastewater treatment in surface impoundments occurs only if the solvent concentration is negligible prior to entering the impoundment and disposal in nonhazardous landfills occurs only if the residual is a solid with negligible solvent concentration.

In essentially all instances, the Agency did not have 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 land based treatment. 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.

Commenter: ETC
Comment: EPA violated its own risk assessment criteria as presented in Figure 1 of the listing determination for the Dyes and Pigments wastes (see 59 FR 66076). This Figure and the preamble at page 66077/1 states that it is EPA's 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. 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. Again EPA is incorrect in stating on page 42320/2

of the proposed solvent rule that it followed the same listing criteria as used in the Dyes and Pigments wastes determination.

Response: 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. After consideration of the fact that nearly all of the wastes evaluated in the intermediate analyses were already hazardous, EPA's final assessments for these scenarios indicated risks below levels of concern for the remaining nonhazardous waste streams (see Supplemental Risk Assessment).

B. Lack of Sampling and Analysis of Other Constituents

Commenter: EDF
Comment: A. Failure to Consider All Hazardous Constituents in Wastes
In the risk assessment supporting this rulemaking, EPA assessed the risks of each of the solvents individually, without considering the toxicity of each solvent in conjunction with the other solvents or hazardous constituents comprising particular solvent wastes. For example, when assessing the potential risks posed by a solvent wastewater, EPA considered the presence of only one particular solvent, notwithstanding the potential for other solvents at issue in this rulemaking, or other hazardous constituents, to be present in the wastewaters. Therefore, EPA never completely characterized any of the solvent wastes to determine all hazardous constituent concentrations, thus the risk assessment inputs likely understate substantially the toxicity of the wastes involved.

EPA's failure to completely characterize the chemical content of solvent wastes manifests itself in a variety of ways. First, as discussed above, the Agency discounts surface impoundment use as a plausible mismanagement scenario based upon the dilution of solvent wastewaters with other wastes, but never considers the chemical content of the wastes mixed with the solvent wastewaters and the resulting toxicity of the wastewater mixture.

Second, where EPA performed a quantitative risk evaluation, EPA estimated risks based upon the release of only one solvent from a unit, notwithstanding the documented comanagement of multiple solvents. For example, EPA calculated a high-end Hazard Quotient (HQ) of 0.7 associated with onsite accumulation tanks storing 2-EEA residuals.[67] [[67] 61 FR 42339 (August 14, 1996).] However, one facility in Texas (#162) reported generating both phenol and 2-EEA wastes requiring onsite accumulation, and other questionnaires reported the utilization of both 2-EEA and 2-methoxyethanol.[68] [[68] See Listing Background Document, Appendix I; Documents # S0018, S0033, S0035.] The sum of the risks posed by the comanagement of these solvents would exceed the HQ of 1, and therefore warrant a hazardous waste listing.

The substantial potential for comanagement of multiple solvent wastes can be further documented by resorting the data provided in Appendix G to the Listing Background Document first by facility and then by solvent, instead of first by SIC Code as presented in that Appendix. EPA should conduct this data resorting and perform a comanagement risk analysis consistent with the potential for such practices.

Third, for all the waste streams at issue in this rulemaking, EPA is required to consider the presence of "any" hazardous constituents on Appendix VIII to 40 CFR Part 261, not just the solvent itself.[69] [[69] See 40 CFR 261.11 (a) (3).] Other hazardous constituents may be present in the waste due to the chemical content and impurities in the solvent product used, 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. Since solvents are intended to remove unwanted materials from a process or piece of equipment, the presence of other hazardous constituents is very likely. EPA's failure to determine the actual, complete chemical content of the solvent wastes involved in this rulemaking violates statutory and regulatory directives, and is indicative of substandard risk assessment practices.

Response: In response to this comment, EPA did conduct an assessment of the cumulative risks posed by exposure to multiple solvents. In this analysis (see Supplemental Risk Assessment Document), EPA assessed all cumulative solvents risks where multiple solvents were managed in one unit or different units at a facility; a total of 26 facilities fit this description. See the discussion in the Risk Assessment, Section V for further details of this assessment.
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 widely used as a solvent in many 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 highly 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 many 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 and the environment from these wastes, as discussed in detail elsewhere in this document.

Commenter: EDF
Comment: In addition, the Agency never sampled the solvent wastes in question, therefore the solvent waste concentrations used by the Agency in the risk evaluations may be substantially

understated, and do not reflect the presence of multiple solvents and other hazardous constituents that may be present in these wastes. The Agency also ignored potential tank releases into land and groundwater, and failed to consider important combustor emissions.

Response: 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. Even collecting a large number of samples 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.

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 corresponds 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 this 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 where unclear or unreported, telephone contact was made with the facility.

EPA addressed the comments related to the presence of multiple solvents or other hazardous constiutents in the preceding comment.

Commenter: ETC

Comment: D. **The Determination is Flawed Since No Sampling and Analysis of the Subject Waste Streams Was Performed**

The ETC objects to EPA doing absolutely no sampling and analysis of these waste streams. 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. This would have resulted in a range of between 10 to 100 samples, which is not cost prohibitive. Instead, EPA relied upon questionnaire responses and created overly generalized hypothetical waste characteristics based on unvalidated assertions from survey respondents.

Moreover, because EPA conducted zero sampling and analysis of waste streams in this rulemaking, the hazardous constituents that are typically found in these solvents were not identified, nor were the risks posed by multiple hazardous constituents evaluated. After all, the solvents are used for their solvent properties, and thus they will contain many other potentially hazardous compounds as a result of normal use. By evaluating the risks posed solely by each individual solvent chemical, EPA has overlooked the obvious hazards posed by these solvent wastes, resulting in a completely arbitrary and capricious proposed non-listing determination.

Response: The commenter states that between 10 and 100 samples would adequately characterize the 10 solvents of concern across all SIC codes. The Agency disagrees. Unlike recent sampling and analysis events for other listing determinations, 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, 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 may not allow EPA to fully characterize underlying constituents in solvent wastes, as some commenters have indicated the Agency should do.

Sampling alone costs approximately $1,000 per sample (including staff time, travel, and expenses), without the additional costs associated with development of sampling frames, quality assurance project plans, site sampling plans, or health and safety plans. Analysis of each sample batch, including matrix spike and matrix spike duplicate is roughly $1300 for simple analyses of volatiles, semivolatiles, total and leachable metals, pesticides, herbicides, and cyanide/sulfide/fluoride. Analytical costs increase if the Agency requires analysis for non-routine constituents. Thus, a sampling and analysis program that attempted to sample all types of solvent wastes across all industries could cost the Agency, at a minimum, over $1.2 million if carried out as this commenter and others have suggested. Non-routine analyses would increase the costs, as would the possibility of needing to obtain familiarization samples. The Agency reiterates that a sampling and analysis effort such as the one described is beyond the Agency's resources.

The Agency also disagrees with the commenter's statement that EPA created overly generalized hypothetical waste characteristics based on invalidated assertions from survey respondents. The Agency relied on the data presented in the 3007 Survey by 156 facilities. 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. The Agency also found that facilities over reported solvent use (e.g., lab use of solvents that may not have conformed to the definition provided by the Agency). In instances where concentrations where unclear (e.g., units missing) or unreported, telephone contact was made with the facility. The facilities provided ranges of concentration where concentrations within a waste stream varied. As a conservative approach, the Agency used the high end of concentration range in their risk assessment. The Agency does not have reason to believe that the solvent concentrations reported are underestimated.

The Agency further disagrees with the commenter's position that sampling was necessary to identify potential hazardous constituents in the solvents. The constituent of concern that forms the basis for a solvent listing determination is the solvent itself. Sampling and analysis of waste streams to reveal other constituents would not be relevant to the solvent listing determination due to the high degree of variability in the solvent uses and, therefore, any other constituent present. Therefore, a listing determination for a spent solvent or still bottoms from the recovery of that spent solvent could not be based on the presence of other constituents because not all spent solvents or still bottoms from the recovery of spent solvents are likely to contain the same constituents due to variability of solvent use across the industries.

The Agency feels that it would not be helpful to simply over regulate in the hopes of capturing a hypothetical risk that we might find; instead, the agency focused on particular risks that could be derived from the survey. In the case of the current solvents rulemaking, the Agency evaluated the common set of chemicals - the fourteen solvents of concern. The Agency's assessment of these 14 solvents shows no risk to human health and the environment from these wastes, as discussed in detail elsewhere in this document.

Commenter: ETC
Comment: EPA states as an uncertainty (page 42323/2) that the risk analysis relied on data provided from questionnaires, and that this is dependent on the quality of the data. The ETC agrees with this statement, and is concerned, as stated above, about the validity of using such surveys collected from parties with a potential bias to see that the waste is not listed under RCRA. At the very least, EPA should verify the information in some way, through select site visits, and a sampling and analysis program. For example, there is no verification by EPA that the wastes are not land disposed. EPA simply takes the survey responses as true and accurate, with no field

verification. The quality of the entire risk assessment is suspect if it relies solely on industry survey responses.

Response: The Agency relied on the data presented in the 3007 Survey by 156 facilities. The Agency has the authority to collect such data under RCRA. 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 and these contact reports were included in the docket for the proposed rule. The facilities provided ranges of concentration where concentrations within a waste stream varied. As a conservative approach, the Agency used the high end of concentration range 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 seemed reasonable and correspond with observations of residual streams during Engineering Site Visits.

The solvent concentrations and residual volumes are further substantiated through mass balances performed on the solvent use process by the reviewers of some of the 3007 survey responses as detailed in Section III.B of the Response to Comment Document (Engineering Site Visit Reports). These reviewers 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.

C. Plausible Mismanagement Scenarios

Commenter: American Petroleum Institute (API)
Comment: A. EPA Has Dealt Reasonably With The Issue Of Plausible Management Scenarios.

Under EPA's listing determination policy, a key step in assessing risk is to identify the "plausible" ways in which a waste may be mismanaged. See 59 Fed. Reg. 66074 (Dec. 22, 1994). See also 40 C.F.R. § 261.3(a)(3)(viii). In identifying plausible management scenarios in the present rulemaking, EPA has relied in the first instance on management practices reported in response to the RCRA section 3007 industry surveys. Only if there is a reasonable basis to believe that other management practices are being used or would be used in the future, does EPA go on to evaluate the potential risks associated with such practices.

For example, no respondent reported disposing of furfural in a landfill, and the Agency found it unlikely that this waste would be disposed of in a landfill, given that 99.9 percent of the furfural waste constitutes wastewater. 61 Fed. Reg. 42340. As to 2-ethoxyethanol acetate (2-EEA), no facility reported landfill disposal, and virtually all nonwastewaters were reported to exhibit a characteristic or to be mixed with a listed hazardous waste and to be subject to fuel blending or combustion. Because such wastes would already be precluded from disposal in a subtitle D landfill, EPA reasonably found such landfill disposal to be implausible. 61 Fed. Reg. 42338. As to management of 2-methoxyethanol (2-ME), the evidence showed that all wastewaters are treated in tank-based wastewater treatment systems, and EPA reasoned that switching to treatment in surface impoundments would be cost-prohibitive, and hence, unlikely. 61 Fed. Reg. 42331. This approach correctly recognizes that while almost anything is "possible," EPA, under its regulations and listing policy, is to evaluate only plausible mismanagement scenarios, and its authority to list is limited to such scenarios. See DTF v. EPA, No. 95-1249, 1996 U.S. App. LEXIS 28268 at 3-4.

Response: The Agency appreciates the commenter’s support of the methodology used in selecting plausible management scenarios. EPA assessed potential future management practices based on reported management practices. The Agency considered whether or not a management practice would be likely to change and whether the impact of future “list” or “no list” decisions might cause shifts in management practices. This assessment was based on the types of residuals generated (e.g., solvent concentration, aqueous/organic content, hazardous/nonhazardous) and the current management practice for each residual. (See response to the first comment of EDF, below, for a solvent-by-solvent assessment.) In essentially all instances, the Agency did not have reason to believe that the current management practices would change significantly. The Agency determined that the actual management practices represent average or typical management practices.

Commenter: American Petroleum Institute (API)
Comment: D. The Agency Rationally Links Waste Characteristics and Volumes With Specific Management Practices.

Throughout its analysis of the 14 solvent wastes, EPA links specific waste volumes and constituent loadings with the specific management practices reported for those waste volumes and loadings. See, e.g., 61 Fed. Reg. 42324. In other words, by way of illustration, where a large volume, low concentration nonwastewater was reported to be disposed in a landfill, while a small volume, high concentration nonwastewater was reported to be incinerated, EPA did not leap to the assumption that the high concentration waste would be disposed in a landfill.

This reflects a rational approach to hazardous waste listings under RCRA. The Agency conducted a thorough survey that gave EPA an excellent picture of how these wastes are in fact being managed. EPA found no reason to suppose that these waste management practices would change significantly in the future.

An alternative approach, which no doubt will be advocated by some interested parties, would require EPA to deal with speculation, not facts. However, nothing in the statutory language nor EPA's implementing regulations requires EPA to consider unsupported possibilities in determining which wastes pose risks substantial enough to warrant regulation as hazardous wastes. To the contrary, recent case law suggests strongly that reliance in the RCRA program on merely hypothetical possibilities, in the absence of supporting data, may fall short of the "reasoned decision making" in which the Agency is required to engage. See DTF v. EPA, No. 95-1249 (D.C. Cir. Nov. 1, 1996) (1996 U.S. App. LEXIS 28268); Edison Electric Institute v. EPA, 2 F.3d 438, 446-47 (D.C. Cir. 1993). Thus, EPA's approach in this rulemaking is both rational and consistent with RCRA's statutory language.

Response: As the commenter noted, the Agency was sued by the Dithiocarbamate Task Force (DTF) over the issue of selection of “plausible” waste management practices. DTF successfully argued that EPA cannot arbitrarily select waste management practices to model in risk assessments simply because the possibly of the practice being used may exist at some unidentified period in the future. Regardless of this decision however, in this listing determination the Agency modeled these management practices reported to be in use, and thus, is consistent with the court decision.

Commenter: Utility Solid Waste Activities Group
Comment: I. The 14 Solvents At Issue Do Not Merit Listing As Hazardous Waste Based On Plausible Mismanagement Scenarios
A. EPA Is Legally Authorized To Consider Plausible Mismanagement Scenarios In Making Listing Determinations

The legality of considering plausible mismanagement scenarios in determining whether a particular waste merits listing as a hazardous waste is well established. RCRA defines "hazardous waste" to include solid waste which may "pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." RCRA § 1004(5) (emphasis added). EPA's regulatory criteria for hazardous waste listings expressly states that the Agency should consider "the plausible types of improper management to which the waste could be subjected" in rendering a listing determination." 40 C.F.R.§ 261.11(a)(3)(vii). Further, several federal courts have upheld EPA's authority to consider management-based approaches in hazardous waste classification decisions. See Natural Resources Defense Council v. U.S. EPA, 25 F.3d 1063, 1071 (D.C. Cir. 1994) (affirming EPA's decision not to list used oil as hazardous because the existing network of federal regulations ensure proper disposal); Edison Electric Institute v. EPA, 2 F.3d 438, 446 (D.C. Cir. 1993) (finding that EPA was free to consider a "management-based approach" to identifying hazardous wastes).1

USWAG therefore supports EPA's evaluation of the plausible scenarios in which the 14 spent solvents could be mismanaged in making its listing determination. Such a management-based approach to RCRA rulemaking promotes RCRA's evolution into a more effective, risk-based regulatory program and is consistent with the Administration's efforts "to refocus private industry and government resources toward higher-risk environmental problems related to hazardous waste management." See "Reinventing Environmental Regulation", President Bill Clinton and Vice President Al Gore, March 16, 1995, at 20.
Response: The Agency appreciates the commenter's support of the methodology used in selecting plausible management scenarios.
Commenter: Utility Solid Waste Activities Group
Comment: B. EPA's Methodology For Selecting Plausible Mismanagement Scenarios And Exposure Pathways Is Appropriate

USWAG supports EPA's basic approach for identifying the appropriate waste management scenarios and exposure pathways to be considered. Specifically, EPA examined current management practices and assessed whether other practices are available and would reasonably be expected to be used. 61 Fed. Reg. at 42323. For each waste stream, EPA then evaluated whether these current or projected management practices are likely to pose significant risk by analyzing the exposure pathways of concern. Id.

This approach is consistent with the methodology applied by the Agency in the dye and pigment listing determination (59 Fed. Reg. 24530 (Dec. 22, 1994)) and the petroleum refining listing determination (60 Fed. Reg. 57747 (Nov. 20, 1995).

Based on this management-based analysis, EPA chose to evaluate five potential pathways: inhalation of emissions from combustion, inhalation of volatilized solvents from storage tanks, wastewater treatment tanks, and wastewater treatment surface impoundments, and ingestion of groundwater contaminated by solvents leaching from wastewater treatment surface impoundments. Id. at 42325. USWAG agrees with the Agency's decision not to model the potential risks from landfills or deep well injections, the groundwater risks posed by surface impoundments, or the potential risks from spills. EPA explained that wastes that go to landfills contained little or no solvents, that there was no evidence of solvent disposal in non-hazardous deep wells (as opposed to Subtitle C wells), and that solvents going to surface impoundments were diluted by the flow of other dilute wastewaters at the headworks. Id. EPA further stated that the potential risks from spills were not significant because the vast majority of spent solvent wastes are already subject to hazardous waste management requirements as characteristically hazardous waste or as listed hazardous wastes due to use or mixing with other listed solvents. Id. USWAG agrees that the Agency does not need to conduct extensive analysis of these exposure pathways because they pose no reasonable possibility of significant risks.

Response: The Agency appreciates the commenter's support of the methodology used in selecting plausible management scenarios.

Commenter: EDF
Comment: EDF is fully aware that statisticians and pollsters often use very small proportions of a study population to reach conclusions about the population as a whole. For example, statisticians may determine the average height of Americans based upon the height of a relatively small sample of people.

However, in the instant rulemaking, EPA is not using its data collected to determine average waste management practices. Instead, the data was used to disregard otherwise standard mismanagement scenarios, on the theory that such practices do not and will not ever occur. Therefore, the data is inappropriately relied upon to ascertain the complete range of potential mismanagement practices.[34] [[34] A statistician would also rely upon random samples, while EPA never explains in detail precisely how the universe of potentially affected facilities was reduced to 1,497 preliminary questionnaire recipients. Moreover, in transitioning to the final questionnaire, EPA eliminated a large number of documented solvent users in previous years, as discussed above.]

In the final analysis, whether evaluated by solvent or industrial sector, EPA's data are not even remotely sufficient to support sweeping conclusions that otherwise standard mismanagement scenarios are not applicable to the solvent wastes at issue in this rulemaking.

Response: EPA responds to the general comment on plausible mismanagement assumptions in Section IV.C. As EPA explicitly stated in the Background Document [p. 16], "EPA did not pursue an industry study methodology based on random sampling; rather, EPA made a significant effort *to identify users of these chemical as solvents and collect data directly from facilities at which there was a reason for suspected solvent use* for each one of the 14 chemicals under study." [Emphasis added.] The Agency made a significant effort to target the correct industries and facilities using one or more of the 14 chemicals as solvents, rather than employ a shotgun approach that would have squandered limited Agency resources and burdened businesses, both large and small, that do not use any of the 14 chemicals as solvents. The approach described by the commenter would result in 60,000 plus questionnaires being mailed with an extremely small percentage actually using any of the chemicals as solvents. As a result, 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 chemical as solvents. The Agency's decision not to model certain scenarios in its risk assessment were sound for the reasons discussed in the proposed rule and summarized below.

Acetonitrile

As noted on page 45 of the Background Document accompanying today's final rule, U.S. consumption of acetonitrile was estimated to be 11 million kg in 1994 (SRI CEH, 6/95)[1][[1] This number has been updated and will be reflected in the final Background Document.], of which 76% was believed by literature to be used in solvent applications and 24% in non-solvent applications (SRI CEH, 6/95). The major end uses of acetonitrile as a solvent are (1) as a reaction solvent in the pharmaceutical production, especially insulin and antibiotics, accounting for 32% of consumption, (2) as a solvent for analytical instrumentation in laboratories, accounting for 28% of consumption, and (3) for extraction of butadiene/isoprene, accounting for 16% of consumption (SRI CEH, 6/95). Through the 3007 Survey EPA captured a greater quantity of solvent use than was indicated by literature as the total solvent use.

The largest use of acetonitrile as a solvent was reported in the survey to be in the pharmaceutical industry for the production of drugs and medicinal chemicals. This use was predicted by the literature search and EPA conducted a full preliminary survey of this industry. (A total of 1497 facilities including 128 pharmaceutical companies received the preliminary questionnaire; <600 reported using solvents. A total of 156 facilities were sent a RCRA 3007 Questionnaire and 64 reported using acetonitrile as a solvent. The Solvents Listing Background Document states that 58% of these 64 facilities reporting acetonitrile use were pharmaceutical companies. The Background Document also mentions that the total 1993 use of acetonitrile was reported to be 9,322,487 kg.

The second largest solvent use was for analytical instrumentation, usually as a medium for high pressure liquid chromatography (HPLC) analyses, based on survey results by laboratories. Discussions with the National Association of Chemical Distributors, the American Chemical Society, various colleges and universities, and 3007 Survey responses indicate that solvent waste from laboratories is managed as hazardous and thus was not further investigated. [EPA addressed the issue of laboratory waste management in Section I.A of this document. The reader is referred to EPA's response to EDF on this issue.] Acetonitrile was also reported based on literature and survey results to be used in the organic chemicals industry as an extraction medium and in the petrochemical industry for the separation of butadiene from C_4 hydrocarbons by extractive distillation. Based on the quantity estimated to be used as a solvent from literature, the Agency has captured nearly the entire amount of acetonitrile used as a solvent in these industries through the 3007 Survey. The Agency is confident that additional management scenarios other than those reported by these users are unlikely to exist, particularly in cases in which a large enough quantity would be present to cause risk.

As noted in the proposed rule (see 61 *FR* at 42328), of the 254 acetonitrile solvent wastes reported, eight were reported to go to deep well injection in Subtitle C units that are permitted to accept hazardous waste. Six of the eight were small volume wastes from one site (about 2 kg total acetonitrile loadings); except for these 2 kg, all of the remaining were classified as hazardous waste and could not be injected in a nonhazardous well. Given the infrequent use of this practice, and the fact that disposal was in units already fully regulated under RCRA, EPA did not evaluate this practice further.

Only three acetonitrile wastes were reported to go to surface impoundments, and these were found to present no significant risks. In all cases, the acetonitrile concentrations in the wastewaters going to impoundments were negligible. EPA has no reason to conclude that this practice would change given the current capital investment in tanks and potential regulatory costs associated with siting a new surface impoundment (e.g., groundwater monitoring, liners, closure requirements).

As shown in Appendix I to the Background Document, no wastestreams containing detectable levels of acetonitrile were reported by the 3007 Survey to be managed in a nonhazardous landfill. EPA concludes that this practice would not change given that nonwastewaters with all but negligible acetonitrile loadings are managed as hazardous under Subtitle C (because of ignitability of these wastes, and/or the mixing of other hazardous waste solvents) or recycled onsite and given the liability issues associated with management in a nonhazardous landfill.

2-Methoxyethanol

U.S. production of 2-methoxyethanol (2-ME) was estimated to be approximately 24 million kg in 1993 (EPA RM_1 estimate). The two major uses of 2-ME are non-solvent uses: (1) as a jet fuel additive, accounting for 76% of its production (SRI CEH, 4/93), and (2) an additional 9% is estimated to be used as a chemical intermediate (SRI CEH, 4/93). Through the 3007 Survey, EPA has captured the remaining 15% of 2-ME produced. The primary solvent use of 2-ME is in the pharmaceutical industry as a reaction or extractive medium and for dissolution and dilution. It also has significant use as a solvent in the coating and lacquers industry, the electronics industry, and the photographic chemicals industry. SRI estimates that 7.6% of 2-ME produced is used in the electronics industry (SRI CEH, 1993); however, as discovered through the 3007 Survey, 8 of the 11 facilities using 2-ME's in the electronics industry do not meet EPA's definition of solvent use because the chemicals were used as part of coating formulations. EPA surveyed all significant solvent users of 2-ME and is confident that no other significant waste management practices for the associated wastes exists. Furthermore, with the use of this chemical as a solvent is declining due to its replacement with less toxic solvents (SRI CEH, 1993), being replaced with propylene glycol monoethyl ether acetate, new management practices are unlikely to occur.

EPA did not consider the wastewater treatment of 2-ME containing wastes in a surface impoundment to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey go to a surface impoundment. All wastewaters are currently treated in a tank. Changes from treatment to wastewaters in a tank to treatment in an impoundment seem unlikely given the capital investment associated with tanks and the liability issues associated with disposal in a surface impoundment (e.g., groundwater monitoring, liners, closure requirements).

EPA did not consider disposal of 2-ME containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario.   None of the wastestreams reported in the 3007 Survey go to a landfill. Essentially all nonwastewaters containing 2-ME are thermally treated. Over 96% of this treatment is hazardous because the wastes either exhibit a characteristic or are listed. EPA concludes that it is implausible that high organic wastes or aqueous liquids currently sent to thermal treatment would be managed in a landfill due to the BTU value of the high organic wastes and liability issues associated with disposing aqueous liquids in a landfill (e.g., groundwater contamination, closure requirements).

Methyl Chloride

The U.S. consumption of methyl chloride in 1993 was approximately 268.6 million kg (SRI CEH, 3/95). The principal use of methyl chloride is as an intermediate in the manufacture of chlorosilanes, accounting for 82% of methyl chloride production (SRI CEH, 3/95). Approximately 15.4% is used in the production of quaternary ammonium compounds, agricultural chemicals, and methyl cellulose (SRI CEH, 3/95). Approximately 1.4% is accounted for in other uses including as a raw material for pharmaceuticals, in the production of triptane (an antiknock additive for aviation fuel), as a blowing agent for plastic foam, and as a refrigerant (SRI CEH, 3/95). Approximately 1.2% is estimated to be used as a solvent in the production of butyl rubber (SRI CEH, 3/95). EPA captured all of the methyl chloride used in the production of butyl rubber through the 3007 Survey. Nearly all of the solvent use of this chemical was accounted for by the two facilities that produce butyl rubber. One company owns two plants and is the sole producer of butyl rubber in the country. Given this highly specialized use and that methyl chloride exists as a gas at room temperature, the Agency is confident that no other significant waste management practice for the associated wastes exists.

EPA considered the wastewater treatment of methyl chloride wastes in surface impoundments to be a plausible management scenario. One wastestream reported in the 3007 Survey containing relatively high amounts of methyl chloride (175,000 kg) was sent to an impoundment. EPA modeled the potential risks from air releases.

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. This impoundment was 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 releases from impoundments and transport to receptors by groundwater is not likely to be significant.

EPA considered the management of methyl chloride wastes in a nonhazardous landfill to be an implausible management scenario. All wastes reported in the 3007 Survey sent to a nonhazardous landfill were treatment residuals with nondetectable or nonmeasurable solvent content. In these instances in which solvents residuals were reported to be sent to landfills, telephone contact was made with the facilities to verify the solvent concentration because the Agency sought to verify units, quantities, and monitor process changes that may be mandated by other regulations. Therefore, EPA concludes that no significant risks are likely to arise from landfills for methyl chloride wastes, and this exposure route was not modeled.

Given that methyl chloride is a gas and the highest concentration of methyl chloride in all of the wastestreams reported was 1% with this residual being managed in a BIF (see page 84 of the Background Document for the proposed rule). EPA has no data indicating that management of high concentration methyl chloride wastes in a landfill is likely to occur in the future.

Phenol

The total available synthetic phenol from production and imports was approximately 1.5 billion kg in 1993 (USITC). The major uses of phenol are not as a solvent but as a chemical intermediate in the production of bisphenol A, caprolactam, adipic acid, alkyl phenols, aniline, and xylenols, accounting for 65% of production, and in the production of phenol resins, accounting for 30% of production (SRI CEH, 4/96). Phenol is also used in the manufacture of other alkyl phenols, dyes, pentachlorophenol, and 2,4-D and its ester salts, accounting for 1.5% of production. Small amounts of phenol are used in medicinals (SRI CEH, 4/96), miscellaneous lab uses, and ingredients in other formulations, such as a reactant in the paint remover found at the E-Systems facility (See site visit report). The 3007 Survey accounted for less than 0.1% of the remaining 3.5% of synthetic phenol production.

However, an additional 3 billion kg of phenol reported to be used as solvent is native phenol (e.g. naturally recovered, not chemically produced) used at a captively-owned facility. Native phenol was not included in the production total for synthetic phenol. Nearly all of the solvent use of this chemical (>99.9%) was attributed to the petroleum industry, of which EPA conducted a complete preliminary survey. Phenol also has solvent use as a coating remover in the semiconductor and metal finishing industries, and in laboratory operations. Given that the major uses of this solvent were very specialized (e.g., extraction of lube oil), the Agency is confident that other large specialized or small non-specialized uses are unlikely to exist and therefore, that no other significant waste management practices for the associated wastes is likely to exist.

Three wastestreams reported in the 3007 Survey were sent to a surface impoundment. EPA conducted a risk assessment on those streams and found no significant risk to be present from the management of phenol containing wastewaters in a surface impoundment.

EPA did not consider the disposal of phenol containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey are managed in a landfill. Very few solids residuals were generated and only one solid wastestream, spent carbon, contained significant levels of phenol. This was sent to offsite regeneration or incineration. EPA has no reason to conclude that the practice of landfilling will increase. Wastes with higher organic content are thermally treated for their fuel value, and most (92%) of the waste was thermally treated in hazardous waste units or blended for fuel. Therefore, none of the wastes with significant phenol concentration are likely to be placed in a landfill.

2-Ethoxyethanol Acetate

The U.S. production of 2-ethoxyethanol acetate (2-EEA) was estimated to be approximately 22.3 million kg in 1993 (EPA RM_1 estimate). Of the 2-EEA produced in the U.S., 79% is exported and 19% is used in non-solvent uses (e.g., as an ingredient in paint and coating formulations) (SRI CEH, 1989). Nearly the entire remaining 2% was captured in the 3007 Survey. The use of 2-EEA has been decreasing dramatically in recent years, thus other generators of this solvent waste are unlikely to exist. The primary solvent uses of 2-EEA are in semiconductor manufacture and chemical productions. 2-EEA is most often used for tank cleaning in conjunction with processes that incorporate the chemical into formulations. Given the declining use of 2-EEA and EPA's capturing of the solvent use portion of 2-EEA's production, the Agency is confident that no other significant waste management practice for the associated wastes than those considered exists.

EPA did not consider wastewater treatment of 2-EEA containing wastes in surface impoundments to be a plausible mismanagement scenario. 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.

EPA did not consider the disposal of 2-EEA containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey go to a landfill. Essentially all (99.8%) of the nonwastewaters are managed as hazardous through some form of thermal treatment. The types of residuals resulting from these industrial uses are almost exclusively spent solvent waste that are thermally treated and are not likely to be managed in a landfill or surface impoundment. EPA finds it implausible that high organic wastes or aqueous liquids that are already hazardous and currently sent to thermal treatment would be placed in a landfill due to the BTU value of the high organic wastes and the liability issues associated with disposal in a landfill.

Furfural

The U.S. consumption of furfural in 1992 was approximately 43.2 million kg (SRI CEH, 3/94); 1993 consumption data are not available for comparison with other chemicals and questionnaire data. Of furfural produced, 84% is used as a chemical intermediate in the production of furfural alcohol and tetrahydrofuran (SRI CEH, 3/94). Solvent use of furfural is estimated to be 8.4%, 7.4% in lube oil processing and 1% for butadiene extraction (SRI CEH, 3/94). The remaining 4.2% is consumed by other miscellaneous uses (SRI CEH, 3/94). Several minor additional non-solvent uses have been identified by literature including use as a resin former, a plasticizer, a wetting agent, and a reactive solvent in the formation of resins for the manufacture of grinding wheels (SRI CEH, 3/94). Through the 3007 Survey, EPA has captured a greater quantity solvent use than was indicated by literature as solvent use. Nearly all of the solvent use of this chemical (>99.9%) was attributed to the petroleum industry, of which EPA conducted a full survey, for lube oil extraction. The use of furfural for butadiene extraction was not reported in the Survey. This is believed to be attributed to the declining use of furfural due to its replacement with n-methyl pyrrolidone and N,N-dimethyl formamide for extraction (SRI CEH, 3/94). Due to the high cost of furfural, the petroleum refineries have an economic incentive to achieve a high recovery rate and minimize solvent losses. By the nature of this closed-loop process and almost complete solvent recovery, few solvent residuals are generated. Given that the major use of this solvent was very specialized (e.g., lube oil extraction), the Agency is confident that no other significant waste management for the associated wastes is likely to exist.

One facility reported in the 3007 Survey sending their wastewater to a surface impoundment in a captive offsite secondary wastewater treatment system. EPA modeled risk from air and groundwater releases. EPA did not consider the disposal of furfural containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey are manage in a landfill. Those residuals that are generated are wastewaters with very low (<0.5%) solvent concentrations. EPA finds it implausible that aqueous wastes would be placed in a landfill as they are more appropriately treated in a wastewater treatment plant and due to liability issues associated with disposal in a landfill.

Cumene

The U.S. consumption of cumene in 1993 was approximately 2 billion kg (SRI CEH, 1996). Approximately 98% of cumene produced is used as a chemical intermediate in the production of phenol and acetone (SRI CEH, 1996). Most of the remaining 2% percent of cumene produced is either consumed in the manufacture of poly(alpha-methylstyrene) by five petrochemical companies (SRI CEH, 1996). Several other minor non-solvent uses of cumene are cited in literature including as a chain initiator in polymer chemistry and as a component in aviation gasoline used to improve the octane rating (Kirk-Othmer, 1979). As nearly 100% of the total consumption is accounted for by nonsolvent uses, the 3007 Survey captured 0.03% of the total consumption quantity. The major solvent use (82%) of cumene is as a reaction medium for specialty chemical production. Other uses for cumene contain less than 10 percent before use. Because the use of cumene as a solvent is very limited based on survey data, other significant generators of this solvent waste are unlikely to exist.

Only one facility reported the treatment of cumene wastewaters in a surface impoundment. The annual loading of cumene was very small (247 kg), and cumene levels were negligible (i.e., orders of magnitude below the health-based level) after mixture with other wastewaters at the headworks. Furthermore, cumene volatilizes relatively quickly from water and is efficiently removed during wastewater treatment. Thus, any cumene reaching a surface impoundment would be further reduced. Thus, wastewaters generated from use of cumene as a solvent contain low levels of cumene at the point of management in a surface impoundment. In response to comments, EPA further assessed the risks and found no significant risk from this waste (See Risk

Assessment discussion in Section V). Inhalation due to air releases from an aerated wastewater treatment tank was modeled and no risk was found.

Only one cumene waste was reported to be disposed in a landfill. This was a sludge generated after treatment of wastewater that was reported to contain less than 28 kg of cumene. Thus, the amount of cumene in this treated sludge would be well below the maximum of 28 kg that was used in the original solvent mixture. Thus, after treatment, any risks from cumene would be negligible. . Given the limited use of cumene as a solvent as reported by literature and the 3007 Survey and the minor volumes reported, EPA sees no evidence that the practice of landfilling will increase.

Cyclohexanol

The U.S. consumption of merchant cyclohexanol in 1993 was approximately 11.4 million kg (SRI CEH, 7/93); 1993 consumption data are not available. About 56% of merchant cyclohexanol produced is used in the production of cyclohexamine, 12% is used in the production of pesticides, and 12% is consumed in the production of cyclohexyl esters, particularly the plasticizer dicyclohexyl phthalate (SRI CEH, 7/93). The remaining 20% is primarily small volume distributor sales (SRI CEH, 7/93). A significant quantity of cyclohexanol is consumed in the production of cyclohexyl mercaptan (SRI CEH, 7/93). The quantity of cyclohexanol captured by the 3007 Survey that is used as a solvent is protected as confidential business information. The major solvent use of cyclohexanol is as an extraction solvent in the production of cyclohexane. This solvent use is conducted in petroleum refining and EPA conducted a full preliminary survey of the petroleum industry. Because cyclohexanol used in this process is recycled, very few spent solvent residuals are generated. There is no evidence of significant use of cyclohexanol outside of the petrochemical industry. Given the specialized and limited uses of cyclohexanol as a solvent, EPA concluded that other wastes or management practices are not likely to be significant.

EPA did not consider wastewater treatment of cyclohexanol containing wastes in surface impoundments to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 go to a surface impoundment. In fact, no wastewaters containing spent cyclohexanol were generated. EPA did not consider the disposal of cyclohexanol containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario. One wastestream, filter media with negligible solvent content, was sent to a nonhazardous landfill. All other cyclohexanol wastes were reported to be incinerated in a hazardous waste BIF.

Isophorone

U.S. consumption of isophorone is approximately 30-35 million pounds per year (SRI CEH, 4/96). The largest market for isophorone is as a raw material in the production of isophorone diamine (IPDA) and isophorone diisocyanate (IPDI) (SRI CEH, 4/96), accounting for 63% of consumption (Union Carbide, 3/97). The second largest market for isophorone is for baked industrial coatings and coil coatings for sheet metal (SRI CEH, 4/96), accounting for 19% of consumption (Union Carbide, 3/97). The third largest use is as a formulation carrier for propanil, a rice herbicide (SRI CEH, 4/96), accounting for 9% of consumption (Union Carbide, 3/97). An additional 8% is used as a chemical intermediate in the production of other compounds, such as homomenthyl salicylate (Union Carbide, 3/97). Other minor non-solvent uses of isophorone include use as a starting material for insecticides, xylenol-formaldehyde resins, disinfectants, wood preservatives, as part of the synthesis of vitamin E, and as an emulsifier for insecticides and herbicides (Kirk-Othmer, 1995). Isophorone also is used as a component in a large number of synthetic polymers, resins, waxes, fats, oil and pesticides (Handbook of Environmental Fate & Exposure Data, 1990), but does not meet the regulatory definition of solvent use because it is consumed in the product and does not generate a spent solvent. The 3007 Survey captured 1.8% of total U.S. consumption. The Agency eliminated 268,679 kg reported by nine facilities because the isophorone was an ingredient in paints or coatings used by these facilities. Also, an additional two facilities were eliminated because they are TSDFs and it could not be determined that the wastes received by these facilities were generated from solvent uses because no spent solvent is generated. Isophorone was reported to be used as a solvent for cleaning in the printing and coating industry and for removing heavy ends residuals from waste storage tanks. Because of the limited uses of isophorone as a solvent, EPA concluded that wastes or management practices other than those considered are not likely to be significant.

EPA did not consider wastewater treatment of isophorone containing wastes in surface impoundments to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey go to a surface impoundment. Because of the primary use as a solvent for tank bottoms or coating removal, no wastewaters containing spent isophorone are generated. EPA did not consider the disposal of isophorone containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey go to a landfill. All wastestreams were reported to be managed as hazardous by some type of thermal treatment. Most (80%) wastestreams are hazardous either due to the characteristic of ignitability or comanaged with other listed constituents.

2-Methoxyethanol Acetate

Production data and non-solvent consumption of 2-methoxyethanol acetate (2-MEA) are unknown due to lack of accurate U.S. production data. One source estimated that 500,000 kg were produced in 1993 (EPA RM_1 estimate). Non-solvents uses of 2-MEA are as a component in cellulose acetate, polymers, nitro lacquers, and other coatings, dips, and cements, and in non-flammable celluloid. It is also used in the paper and electronics industries (SRI CEH, 9/89). There was only one U.S. producer of 2-MEA; however, the Chemical Manufacturers Association reported that domestic production has ceased. 2-MEA is primarily used as a solvent in the photographic/specialty chemicals industry as a reaction or synthesis medium and for dissolution, and in the plastics industry as a diluent in a coating formulation. Given the limited and decreasing use of this chemical as a solvent (SRI CEH, 9/89), EPA has no evidence that other significant management practices are likely to be found.

EPA did not consider wastewater treatment of 2-MEA containing wastes in surface impoundments to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey go to a surface impoundment. No wastewaters containing spent 2-MEA were reported to be generated. EPA did not consider the disposal of 2-MEA containing wastes in a nonhazardous landfill to be a plausible mismanagement scenario. None of the wastestreams reported in the 3007 Survey go to a landfill. All wastestreams were reported to be managed as hazardous by some type of thermal treatment. All wastestreams are hazardous either due to the characteristic of ignitability or are listed on the basis of other constituents.

Commenter: EDF
Comment:
<u>D. EPA Rationales Regarding Plausible Mismanagement Unpersuasive</u>

In this portion of the comments, specific rationales advanced by EPA for not evaluating the risks posed by nonhazardous land disposal of solvent wastes will be addressed. As discussed below, EPA lacks a sufficient legal, factual, and/or policy basis for each of these rationales.

2. Solvent Use Will Not Change Over Time
EPA is required to consider potential as well as current mismanagement practices when rendering listing determinations. See Section 1004(5) of RCRA; 40 CFR 261.11(a)(3). Therefore, EPA's contention that it has characterized all significant solvent uses and waste generation practices applies to future uses and waste generation practices as well.[46] [[46] See 61 FR 42324 (August 14, 1996).]

However, once again, the record does not support this assertion, thus EPA violated the statutory and regulatory directive to consider potential solvent uses. For four of the solvents at issue in this rulemaking, use volumes reported by one or more facilities in the final questionnaire for calendar year 1993 were higher than the rates reported for the same facilities in the preliminary questionnaire for calendar year 1992.[47] [[47] See Listing Background Document, Table 2-2.] In the case of acetonitrile, the increase in 1993 associated with only two facilities was equal to 68% of the solvent use reported by all industries for 1992, and accounted for 42% of the solvent use in 1993. Similarly, five of the six users of isophorone receiving the final questionnaire reported increases versus the previous year. The increase alone accounted for 59% of the solvent use in 1993. One of three 2-methoxyethanol acetate users in 1993 reported an increase over 1992, and the increase alone accounted for 96% of the solvent use in 1993.

Significantly, while EPA admits "variations in usage are to be expected", EPA fails to appreciate the consequence of these fluctuations.[48] [[48] Listing Background Document at 19.] Even assuming arguendo that EPA had identified all significant solvent users and waste management practices in 1993, substantial changes can be expected from year to year. Changes in production rates and schedules, new product slates, solvent switching, and process modifications can all result in significant increases in solvent uses by either previous users of the same solvent, or new-users of such solvents heretofore not considered by the Agency.[49] [[49] For example, a facility using less than 1,200 kg of solvent one year may use substantially more than that amount the next year. As noted above, this potential for substantial solvent use fluctuation use from year to year is one reason why EPA's decision not to send a final questionnaire to solvent users below 1,200 kg in

1992 added yet another shortcoming to EPA's data base.] Since there is no legal or technical bar to such increased uses, and even the limited data collected by the Agency documents the potential magnitude of such fluctuations, EPA lacks an objective basis for simply assuming the data it collected is fully dispositive with respect to future solvent uses and management practices.

Response: EPA responds to comments on the adequacy of the Survey in Section III.A of this document, and similar comments on the rationales for plausible mismanagement earlier in this Section (IV.C).

Commenter: EDF

Comment: Consequently, EPA's efforts produced only a partial and misleading snapshot of solvent use because of the limitations inherent in EPA's methodology and data base. However, notwithstanding the substantial gaps in EPA's data, the Agency approached the listing determinations as if it completely characterized the uses and waste management practices associated with the 14 solvents now and in the future. On this incorrect basis, the Agency disregarded standard plausible mismanagement practices, such as land disposal in unlined surface impoundments and landfills. Thus, the risk evaluations relied upon in support of the negative listing determinations are grossly incomplete.

EPA is not typically required by law or policy to identify all or even most facilities potentially affected by a listing decision in order to render a hazardous waste listing determination, because EPA can project standard mismanagement scenarios that may not be currently documented or practiced. In addition, EPA can evaluate the implications of damage cases and other environmental problems even though they are not found at every location. However, as in the instant rulemaking, where EPA seeks to disregard standard plausible mismanagement scenarios on the basis that they do not and will 'not ever occur for a given industry or waste, the factual basis required to sustain this burden must be much more encompassing. In this context, EPA is not identifying average or typical waste management practices, but the full range of actual and potential waste management practices applicable to a particular industry or waste in order to discharge its mandate to protect human health and the environment.

Response: EPA responds to comments on the adequacy of the Survey in Section III.A of this document, and similar comments on the rationales for plausible mismanagement earlier in Section IV.C.

Commenter: EDF

Comment: In the instant rulemaking, EPA generally regarded thermal treatment, storage in tanks pending incineration, and wastewater treatment in aerated tanks as the plausible mismanagement scenarios warranting risk evaluations.[5] [[5] See Assessment of Risks from the Management of Used Solvents, EPA, July 1996, p. 7 (hereafter "EPA Risk Assessment")] In rare instances, the Agency considered surface impoundment management as a potential option, only to eliminate it from consideration without estimating high-end exposure risks based upon site-specific factors, as explained further below.[6][[6] This neglect is remarkable since impoundments receive an estimated 97% of all nonhazardous industrial waste generated in the United States.

See Environmental Information Ltd (1996), Nonhazardous Industrial Surface Impoundments, EI Ltd, Minneapolis, MN. p. 3.]

Therefore, disposal in an unlined landfill was not considered a plausible mismanagement scenario requiring a risk evaluation for any solvent wastes in the instant rulemaking. The same is true for management in waste piles and land treatment units, which received virtually no attention in the rulemaking record. The use of an unlined surface impoundment was considered implausible for most solvent wastewaters simply because the 156 facilities receiving the preliminary questionnaire did not use an impoundment for that particular solvent wastewater.[7] [[7] Even though surface impoundment usage was reported for some solvent wastewaters (see 61 FR 42324), the Agency did not consider it plausible that other solvent wastewaters could be managed in a similar manner. It is EPA's contention that solvent wastewater generators not using surface impoundments now would be unlikely to switch to impoundments based upon the costs to construct the wastewater treatment system already incurred. See 61 FR 42324 (August 14, 1996). However, this rationale presumes EPA has identified every solvent wastewater generator now and in the future, since EPA has no idea how any facility but the 156 receiving the final questionnaire manage their solvent wastewaters.] In short, the Agency generally contends that nonhazardous waste land disposal is not a plausible mismanagement scenario for the solvent wastes in this rulemaking.

Response: The data collected show that the management practices of most concern to the commenter (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 notice (see Section III.A.).

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 this document 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 V on surface impoundment modeling).

While Environmental Information Ltd estimated that 97% of nonhazardous industrial waste goes to surface impoundments, there is no direct corollary between use of a chemical as a solvent and management of wastes, much less management of solvent bearing wastes in a surface impoundment. Wastewaters generated from various sources, including non-contact sources (i.e., those not directly contact process streams), are commonly treated in surface impoundments, but these wastes have no direct relevance to the solvent wastes under examination.

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* at 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 waste waters 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.

Commenter: EDF
Comment: A. Statutory and Regulatory Framework
The term "hazardous waste" is defined in RCRA as "a solid waste or combination of solid wastes which may ... pose a substantial present or potential hazard to human health and the environment when improperly treated, stored, transported, or disposed of, or otherwise managed". See Section 1004(5) of RCRA. Pursuant to this definition, and the associated mandate in Section 3001(a) of RCRA to develop criteria for listing hazardous waste, EPA promulgated a series of factors it would consider in rendering hazardous waste listing determinations, including but not

limited to "the plausible types of improper management to which the waste could be subjected". See 40 CFR 261.11(a)(3).

As part of the recent description of its hazardous waste listing determination policy, EPA explained how EPA would determine which mismanagement practices are "plausible":

> There are a number of disposal scenarios for wastes not hazardous under RCRA that are common across industries. These include municipal and industrial unlined landfills for solid materials, tanks and unlined surface impoundments for liquids, and boilers for organic solids and liquids. The Agency will presume that these scenarios are plausible unless circumstances unique to a particular industry show that one or more is not plausible for that industry.”[4] [[4] 59 FR 66074 (December 22, 1994)(emphasis added).]

Therefore, according to EPA's listing policy, standard mismanagement scenarios such as land disposal in unlined landfills and surface impoundments are presumed plausible, absent extraordinary circumstances specific to a particular industry. Notwithstanding this policy, however, EPA contends in the instant rulemaking that such land disposal is generally not plausible.

EPA's contention relies principally upon the claim that it has characterized solvent waste generators so well that management practices not identified in its data base can be eliminated from consideration as a plausible mismanagement scenario. As explained throughout Section II of these comments, the limitations of EPA's data base make such a claim insupportable.

Response: EPA responds to similar comments related to consistency with past listing determinations, such as the Dyes and Pigments proposal, in Section IV.A of this document. Responses to similar comments related to plausible mismanagement assumptions are given earlier in Section IV.C. EPA has responded in detail to the commenter’s statements regarding the adequacy of the characterization of solvent waste generators in Section III.A.

Commenter: EDF
Comment: In a Report to Congress on nonhazardous waste management practices, EPA estimated the number of facilities with nonhazardous waste land disposal units within some of the same sectors potentially affected by the solvents rulemaking. For example, EPA estimated over 2,300 industrial facilities had active nonhazardous waste landfills,[8] [[8] EPA Report to Congress: Solid Waste Disposal in the United States, EPA/530-SW-88-011B, Volume II, October 1988, Table 4-8 (hereafter "EPA Subtitle D Report").] over 6,600 industrial facilities used nonhazardous waste surface impoundments,[9] [[9] Id., Table 4-55.] more than 2,000 industrial facilities employed active land treatment units,[10] [[10] Id., Table 4-67.] and more than 4,200 industrial facilities managed nonhazardous waste in waste piles.[11] [[11] Id., Table 4-82.]

These estimates do not include offsite facilities receiving industrial nonhazardous wastes, or onsite facilities not within the 17 industrial sectors surveyed by EPA, therefore the estimates represent only a portion of nationwide nonhazardous waste land disposal practices. Nevertheless, the report confirms the pervasive use of land disposal units for nonhazardous wastes generally. The report also indicates land disposal is a "prevalent" waste management method for many of the sectors that use the solvents at issue in this rulemaking.[12] [[12] For example, regarding the pharmaceutical sector, EPA indicates approximately 85-90% of the nonhazardous wastes from this industry are managed in offsite land disposal facilities. See EPA Subtitle D Report, Appendix B, Table B-2. As explained below, EPA's data gathering methodology in the instant rulemaking would likely miss many offsite waste management activities.] Accordingly, insofar as EPA's data base in the instant rulemaking fails to provide a comprehensive characterization of current and future waste management practices, other available data indicate presumptions in favor of including nonhazardous waste land disposal practices as plausible mismanagement are clearly warranted.

Response: EPA explains its reasoning for assuming evaluating certain management practices earlier in Section IV.C, especially in responses to comments immediately prior to this one. Furthermore, the Agency disagrees with the commenter’s conclusion regarding the information cited. The commenter is trying to assess the use of nonhazardous landfills and surface impoundments for wastes specifically related to the solvent use of the 14 chemicals of concern by relying on data appearing in a 1988 Report to Congress. This Report to Congress did not examine specific chemical uses. EPA, using a methodology developed to target the management practices utilized by facilities using the 14 chemicals of concern as solvents, evaluated actual data reflecting current management practices as of 1993. As a result, it is not surprising to the Agency that, in the case of pharmaceutical manufacturers cited by the commenter, management practices have changed in the intervening years between the 1988 Report to Congress and the 1993 survey. EPA surveyed 38 pharmaceutical manufacturers in 1993 and 1994 and found that management of residuals containing detectable concentrations of the target solvents did not occur in nonhazardous landfills.

To apply the management practices identified in the 1988 Report to Congress, which included facilities in industries not using the target chemicals, to the universe of solvent-using facilities would be stretching the definition of plausible management to a point that is not supported by the data collected from *actual solvent users*.

The Agency has addressed the commenter’s statements regarding the data collection activities that formed the basis for the solvents listing determination. Responses to these comments appear in Section III.A of this document. The Agency made a significant effort to target the correct industries and facilities using one or more of the 14 chemicals as solvents, rather than employ a shotgun approach that would squander limited Agency resources and burden businesses, both large and small, that do not use any of the 14 chemicals as solvents. As a result, as the Agency has explained in prior responses, EPA could and did target the facilities and industries actually using these chemicals as solvents.

Commenter: EDF
Comment: D. EPA Rationales Regarding Plausible Mismanagement Unpersuasive

In this portion of the comments, specific rationales advanced by EPA for not evaluating the risks posed by nonhazardous land disposal of solvent wastes will be addressed. As discussed below, EPA lacks a sufficient legal, factual, and/or policy basis for each of these rationales.

1. The "Specialized" Uses of the Solvents

EPA contends it has identified all significant users of the solvents at issue in this rulemaking, and by doing so, has characterized all waste management practices associated with those solvent users. EPA argues it was able to identify all significant solvent users because of the specialized nature of the solvent uses identified by the Agency.[35] [[35] See Listing Background Document at 16.]

The record demonstrates otherwise. First and foremost, EPA incorrectly presumes it has identified all of the potential solvent uses or users to determine whether the uses are specialized. As discussed in the previous portion of the comments, all of the techniques used to identify potential solvent users have severe limitations, and the preliminary questionnaire was not even sent to the vast majority of facilities within most industrial sectors where solvent use was reported in the literature.

EPA acknowledges it has not identified all facilities using the solvents now, let alone the universe of facilities that may use these solvents in the future.[36] [[36] Id.] In fact, the Agency candidly admits, "the facilities submitting data represent only a limited sample of all solvent-using facilities. Additional facilities may also use these chemicals as solvents, but did not supply data."[37] [[37] EPA Risk Assessment at 52.] Moreover, the "management at facilities that were not surveyed may differ."[38] [[38] EPA Risk Assessment at 7.] Therefore, how can the Agency conclude all the solvent uses are specialized when it is unaware of many of the solvent uses and users?

Second, even assuming arguendo that EPA did identify every important solvent use, the record indicates many of the solvents are widely used for non-specialized purposes. For example, EPA explained it did not sample any solvent wastes because:

> EPA found that obtaining representative samples would be almost impossible due to potential use of these solvents in a variety of different industries. The cost of such a program would be prohibitive to the Agency.[39] [[39] 61 FR 42321 (August 14, 1996)(emphasis added). The Agency cannot claim the solvent uses are so specialized it has identified all the relevant solvent generators within a universe of 156 facilities, yet claim the potential universe is too large to sample when that number of facilities is fewer than in the recently sampled petroleum refinery industry sector.]

> Indeed, the record indicates acetonitrile is a widely used solvent.[40] [[40] Listing Background Document at 16.] This solvent, as well as 2-methoxyethanol, phenol, cyclohexanol, and isophorone are often used to clean process equipment, clean metal parts, in laboratories, or for a variety of miscellaneous applications indicative of routine, generalized solvent use.[41] [[41] Listing Background Document at 53, 70, 94, 136, 139.] Fifteen different SIC codes reported using isophorone as a solvent in the preliminary questionnaire, more than EPA identified through its literature search.[42] [[42] Listing Background Document at 139. The fact that EPA's literature search only identified three SIC codes that use this solvent (see Appendix A to Listing Background Document) clearly illustrates the limitations of the source materials used, as discussed in Section II.C of the comments.]The final questionnaire yielded four solvent users in four different SIC codes.[43] [[43] 61 FR 42322 (August 14, 1996).]

In the case of 2-ethoxyethanol acetate (2-EEA), solvent use is associated with a wide range of industries, including 14% attributed to a catch-all category of "miscellaneous" industries.[44] [[44] Listing Background Document at 103.] These different industries use 2-EEA often for routine solvent applications, such as equipment and tank cleaning.[45] [[45] Listing Background Document at 106; 61 FR 42338 (August 14, 1996).]

Finally, as noted above, EPA's literature search identified 47 industrial sectors potentially affected by the solvents listing. Most of the solvents at issue in this rulemaking are used by a large variety of industry sectors, as documented in Appendices C and G to the Listing Background Document. This breadth of industrial sector involvement completely belies any notion that use of many of the solvents at issue in this rulemaking is limited exclusively or even predominantly to industry-specific, specialized applications.

Response: The Agency is confident that it has captured all of the larger users. These larger uses are specialized uses such as acetonitrile use in the pharmaceutical and petrochemical industries, furfural use in the refining industry, phenol use in the petrochemical and refining industries, and methyl chloride use in the rubber industry. EPA has characterized all of the waste management practices associated with these solvent users. While EPA did not send a questionnaire to every facility within the industries where solvent use was identified through the literature search, it did send a questionnaire to facilities within each of the industries where solvent use was suspected (e.g., could be linked to one of the 21 solvents of concern).

Through its methodology outlined in the background document supporting this listing determination and previous comment responses in Section III.A of this document, EPA remains confident that no large uses were missed. EPA does not possess any new data to indicate that smaller uses would have a greater impact on the risk assessment than the larger uses whose risk was assessed. The smaller uses are less than 1200 kg of solvent. In fact, as shown in Table 1-16 of the Listing Background Document, in the case of every solvent, 90% of facilities using less than 1200 kg/yr in fact used less than 120 kg/yr of solvent. Therefore, at most, no smaller use would release a total annual loading in excess of 120 kg to any one management practice (assuming direct pass through of 120 kg of solvent at 100% concentration before use). If larger quantities which the Agency modeled did not show risk, smaller quantities are not expected to due to the total potential solvent loading.

The Agency disagrees with the commenter's finding that EPA cannot argue that uses are specialized and that representative sampling could not occur due to variability. Many solvent uses are specialized; however, within the specialized uses, there is a high degree of variability. This analysis required looking at not only cases of real solvent use of these chemicals, but also management of industrial wastes from these solvent uses. For example, acetonitrile has a specialized use within the pharmaceutical industry as a reaction medium; however, characterizing the variability within processes (e.g., for the vastly different drugs that may be produced, etc.) using acetonitrile as a reaction medium would require extensive sampling. Similarly, 2-methoxyethanol finds specialized uses in the pharmaceutical industry as a reaction or extractive medium and for dissolution and dilution, the electronics industry as a solvent for cleaning the edge of the semiconductor wafer after application of the photoresist, and the photographic chemicals industries as a reaction/synthesis medium and product wash, but within those processes, characterizing the variability would require extensive sampling. Added to this, EPA has identified general or non-specialized uses of the chemicals. For example, such non-specialized uses occur in laboratories.

The commenter is correct in that facilities within four industries responded to in the full questionnaire for isophorone. Based on facility call backs to pre-questionnaire respondents, it was determined that 26 out of the 45 facilities within the fifteen industries had reported chemical consumption that did not meet the Agency's definition of solvent use. Isophorone was either used as a component of a formulation and/or the before use concentration was for less than 10 percent. As stated in the Background Document on page 39:

> *"The concentration of isophorone in the diluent is below 10% threshold EPA has used in past to define solvent use in previous solvent listings (e.g.,F001)." "However, EPA included the waste derived from the use of an isophorone mixture with a before use concentration of 8.8% in its evaluation in order to more fully characterize potential risks from these wastes."*

As a result of the information received from these follow-up calls, the Agency did not send these facilities a full questionnaire because they do not meet the definition of solvent use. Record of these phone calls are in the RCRA Docket. See ADDRESSES in the Federal Register notice.

Commenter: Chemical Manufacturers Association
Comment: CMA is pleased that the Agency properly addressed the issue of plausible mismanagement in the course of its decision-making process for the listing determination. "As experience is gained in listing determinations, the Agency recognizes the need to more specifically describe its approach to plausible mismanagement scenarios for the circumstances related to each listing." *Id*. at 42323. In particular, the Agency correctly concluded that it should project

unreported mismanagement practices only where “compelling reasons” exist to do so. *Id*. at 42324. This conclusion is consistent with the D.C. Circuit’s more recent decision in *Dithiocarbamate Task Force v. EPA*, No. 95-1249 (D.C. Cir. Nov. 1, 1996), slip op. at 10-14. The proposal also wisely does not lend weight to damage cases arising from waste management practices that are no longer legal or likely. *Id*. at 42326. CMA hopes that EPA will continue to undertake this type of in-depth risk-based decision-making process in all future hazardous waste listing determinations.
Response: The Agency appreciates the commenter’s support of the methodology used in selecting plausible management scenarios for this listing determination.

Commenter: ETC
Comment: B. The Proposed Determination Failed To Consider Plausible Improper Management Scenarios
The central flaw in EPA's proposed non-listing determination is that EPA did not consider real mismanagement scenarios for these wastes. Instead, EPA has assumed that the wastes would be treated using on-site combustion in boilers for non-wastewaters, and wastewater treatment in tanks and/or surface impoundments for wastewaters. EPA improperly discounted plausible mismanagement by disposal in Subtitle D landfills, for example. In addition, while most of the respondents to EPA's questionnaire claim to currently manage these solvent wastes in this manner, there is no assurance that all of the 10 solvent wastes will be managed in this way by all generators. Particularly in the absence of a hazardous waste listing determination, generators of waste from use of these 10 solvents are free to dispose of these wastes anywhere, including in unlined landfills and impoundments, and are free to store these wastes indefinitely. Put simply, the non-listing determination is not valid since for non-wastewaters, EPA has not analyzed the risk of disposal in any land based unit.

EPA's criteria for listing hazardous waste under 40 CFR 262.11(a)(3) states that EPA must evaluate the potential hazard to human health and the environment when the waste is "improperly" treated, stored, disposed of or managed. Instead, in this present solvent determination, EPA has only considered proper treatment scenarios, based on a questionnaire survey response of 156 industrial participants. Since the 156 respondents for the most part said they treat the waste in combustion or wastewater units, EPA jumps to the conclusion that this is the management scenario that is always followed and therefore is the only scenario that need be evaluated.

The listing criteria in § 262.11(a)(3)(vii) require that the "plausible types of improper management" must be evaluated. EPA totally disregards the "improper" adjective, and instead proposes not to list the 10 chemicals based solely on evaluation of plausible proper management scenarios. Based on the responses of only 156 respondents, EPA concludes that the world is perfect and thousands of companies that produce these solvent wastes will always do the right thing.
Response: The Agency responds to similar comments related to adequacy of the data collected (Section III.A) and assumptions of plausible mismanagement used earlier in Section IV.C. The

comment is incorrect in stating that the management scenarios are not “real”, since the management scenarios modeled in the risk assessment were the actual ones found. The Agency did not find that any of the land disposal scenarios speculated by the commenter will be used. The listing determination was based on actual management practices reported in the 3007 Survey. 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 conclude that they would (see solvent-by-solvent rationale above).

The commenter asserts that the Agency only considered “proper” management. The Agency determines plausible management scenarios, assess the risk from those management scenarios, and then determines which of those are proper of improper. “Proper” or “improper” management can only be determined after the risk has been assessed, “a fortiori” determination can not be made.

The Agency disagrees with the commenter’s notion that it should list a solvent waste as hazardous based on speculation that current practices will not continue. Instead, the Agency evaluated potential future management practices based on reported management practices. The Agency considered whether or not a management practice would be likely to change and whether the impact of future “list” or “no list” decisions might cause shifts in management practices. This assessment was based on the types of residuals generated (e.g., solvent concentration, aqueous/organic content, hazardous/nonhazardous) and the current management practice for each residual. (See above comment for solvent-by-solvent assessment.) In essentially all instances, the Agency did not have reason to believe that the current management practices would change significantly. The Agency determined that the actual management practices represent average or typical management practices. For example, the typical management practice for high organic content wastes is some type of thermal treatment and the typical management practice for wastewaters containing spent solvent is treatment in tanks. Wastewater treatment in surface impoundments only occurs if the solvent concentration is very low prior to entering the impoundment and disposal in nonhazardous landfills only occurs if the residual is a solid with negligible solvent concentration.

Commenter: ETC
Comment: I. The Questionnaire Responses Reveal That Disposal of Solvent Wastes in Unlined Landfills is a Plausible Mismanagement Scenario
Docket Document No. S0016, Detailed Tables of 3007 Questionnaire Reported Solvent, summarizes the 3007 Questionnaires sent to generators of the solvent waste. A review of this document reveals many additional cases of generators who land dispose this waste in Subtitle D units exist. These include the following:

BF Goodrich, Henry Illinois: Acetonitrile solvent wastes.
Zeeland Chemical, Zeeland, Michigan: Acetonitrile solvent wastes
Lederle Laboratories: 2-Methoxyethanol solvent wastes.
Exxon, Baton Rouge, Louisiana: Methyl Chloride solvent wastes.

Exxon, Baytown, Texas: Methyl chloride solvent wastes.
GMC, Roanoke, Indiana: Cumene solvent wastes.
Philips 66, Borger, Texas: Cyclohexanol solvent wastes.
Burroughs Wellcome, N.C.: Acetonitrile solvent wastes.

In addition, many of the site visit reports discussed above reveal current or recent landfill disposal of solvent wastes that EPA apparently overlooked. EPA's conclusion that these solvent wastes cannot plausibly be sent to landfills for disposal, and therefore EPA's failure to evaluate the risks posed by this mismanagement scenario, were clearly incorrect.

Response: Where the RCRA 3007 Solvent Use Questionnaire reported disposal of solvent wastes in Subtitle D units, the Agency considered these wastes in the risk assessment and included them in the background materials in the public docket. EPA strongly disagrees with the commenters allegation that EPA chose to ignore or overlook non-hazardous landfill disposal of solvent wastes documented in the engineering reports. The engineering reports are entirely consistent with the 3007 data and the risk assessment statistics. All streams reported as going to non-hazardous waste facilities were reported as having non-detectable or trace quantities of the solvent constituent of concern.

Where facilities reported Subtitle D land disposal of solvent wastes having zero or non-detectable solvent concentrations, the Agency included these wastes in the Solvents Listing Background Document as "not further considered." The commenter points to three specific site visits where they contend that disposal in a nonhazardous landfill was overlooked by EPA. At two of these facilities (Hitachi and Wyeth-Ayerst) the solvent concentration of the waste was non-detectable. At the third facility (E-Systems) the solvent waste is disposed of in a *hazardous* waste landfill, not a nonhazardous landfill. EPA fails to see how risk assessment can be conducted for residuals that contain no detectable levels of the constituent of concern (i.e., the solvent). The Agency is not persuaded by the commenter's argument that the use of these management units for residuals containing non-detectable concentrations of a solvent is mismanagement or justifies the assumption that residuals with detectable levels of a solvent would be managed in this manner.

Commenter: CKRC
Comment: The Cement Kiln Recycling Coalition ("CKRC") is a national trade association representing virtually all the U.S. cement companies involved in the use of waste-derived fuel in the cement manufacturing process as well as those companies involved in the collection, processing, managing, and marketing of such fuel. CKRC's members are regulated by Resource Conservation and Recovery Act ("RCRA") rules for burning hazardous waste-derived fuel in boilers and industrial furnaces ("BIF rules") codified at 40 CFR part 266, Subpart H, and standards for owners and operators of hazardous waste treatment, storage, and disposal facilities codified in 40 CFR 263, 264, 265 and 270.

CKRC has a strong interest in EPA's rules and policies respecting the definition of hazardous waste, as CKRC's members are engaged in the beneficial burning for energy recovery of large volumes of the nation's hazardous waste. As EPA has long recognized, our members' hazardous waste recycling practices promote a "fundamental RCRA goal of encouraging recovery of energy from wastes (RCRA Section 1002(d)." 54 Fed. Reg. 48422, November 22, 1989. We are thus central players in the national system of hazardous waste management, and have a strong interest in promoting a credible, rational, coherent, and consistent set of national regulations and policies for hazardous waste management.

In the above-referenced notice, EPA has proposed not to list as hazardous waste under RCRA fourteen wastes from solvent uses. For most of these wastes, EPA is basing its action on EPA's finding that the waste management of these materials "does not pose a risk to human health and the environment under the plausible mismanagement scenarios." 61 Fed. Reg. at 42320, col. 3.

We believe there are significant legal and policy issues regarding the degree to which EPA can emphasize "plausible mismanagement" factors when deciding whether to regulate waste as hazardous. We have not undertaken an analysis of the statute and legislative history at this point, and do not pretend to have the definitive answer to these difficult legal and policy questions. We should note that the degree to which certain factors may be considered may depend upon distinctions among waste types recognized in the statute, such as the mining and other mineral processing wastes specified in RCRA §3001(b)(3)(A) and the factors specified in RCRA §8002(o).

We do believe it is clear, however, that the current proposal represents a very fundamental change in the way EPA has determined whether to list hazardous wastes over the last 16 years and raises significant concerns over inconsistency in the RCRA regulatory system. For instance, there are now hundreds of listed hazardous wastes in the F, K, U, and P codes in the RCRA rules. For virtually every one of these listings, as we understand them, EPA did not consider "plausible mismanagement scenarios" factors to any significant degree (if at all).

There has been no change in the statute relevant to these issues, of course, and similarly there has been no change in EPA's regulations. We are aware that a recent D.C. Circuit opinion [1] [[1] Dithiocarbamate Task Force v. EPA, 1196 U.S. App. LEXIS 28268 (D.C. Cir., November 1, 1996) calls EPA's previous approaches into question, but that opinion only adds to the general state of confusion for the RCRA system at this time.

If EPA wants to change its fundamental legal policy on whether and when to list hazardous wastes, it is far preferable in light of all the foregoing that EPA undertake a broad national rulemaking in which all interested parties will have the full opportunity to consider and comment upon the basic options. CKRC would be eager to participate in such a process.

Response: The Agency outlined its rationale in the solvents listing for plausible mismanagement in response to comments earlier in this Section. The Agency did not make any fundamental changes in the solvents listing compared to other recent listing determinations. This is discussed in more detail in Section IV.C of this document. The solvents listing determination was made in accordance with the carbamates decision (DTF vs. EPA). The Agency is still considering policy decisions as a result of the court ruling in that case.

Commenter: General Motors
Comment: With regard to the selection of waste management scenarios; General Motors agrees with the Agency that in the evaluation process one must:

2. identify plausible management practices, projecting less common practices as plausible, if there are compelling reasons to do so;

3. determine potential volumes and loadings of a solvent entering the environment by various pathways; and

4. select actual exposure pathways that could be expected to be created through a particular management practice.

Assumptions stated in the discussion of waste management scenarios make sense and would be difficult to refute. For instance, the assumptions that: large amounts of such concentrated organic wastestreams would not be shifted from combustion or recycling to waste management practices for which they were not reported, such as landfilling, especially when the concentrated organic waste streams are already hazardous wastes subject to the land disposal restriction rules; spent solvents with relatively high value are also recovered by on-site distillation/fractionation in a closed-loop recycle stream; and investment by industry in waste management practices suggests that dramatic changes in reported volumes going to specific waste management practices would not occur. For example, it would be unreasonable to assume that a generator with a large investment in a wastewater treatment plant would abandon that management practice for another. General Motors also feels that high strength streams that are not recycled in on-site closed looped systems are most certainly reclaimed off-site because of the economic advantage of utilizing reconstituted solvent as opposed to purchasing virgin equivalents, through such mechanisms as tolling agreements.
Response: The Agency appreciates the commenter’s support of the methodology used in selecting plausible management scenarios.

V. Risk Assessment

A. Health-Based Limits

Commenter: Chemical Manufacturers Association - Ketones Panel
Comment: The Chemical Manufacturers Association Ketones Panel is pleased to submit the enclosed comments on EPA's proposed decision not to list isophorone as a hazardous waste solvent under the Resource Conservation and Recovery Act (RCRA). *See* 61 Fed. Reg. 42318 (August 14, 1996). The enclosed comments address those aspects of the proposed rule that relate specifically to isophorone.

The Panel supports EPA's decision not to list isophorone as a hazardous waste from solvent use under RCRA. The Panel agrees with EPA's finding that the chemical, as a solvent, does not pose a risk to human health and the environment under plausible mismanagement scenarios. However, the Panel disagrees with the Agency's underlying hazard assessment, and in particular with the Agency's decision to base its hazard evaluation for isophorone on a potential cancer hazard. The Panel addressed this issue in detail in comments that were submitted by the Panel on April 22, 1996 (copy enclosed) in conjunction with the EPA's proposed Hazardous Waste Identification Rule, 60 Fed. Reg. 66344 (December 21, 1995) (hereafter "HWIR Comments").

The Panel believes available data do not support the regulation of isophorone as a carcinogen. In chronic studies performed by the National Toxicology Program (NTP) in mice and rats, increased tumors were observed only in the kidneys and preputial glands of the male rats. *See* HWIR Comments, p. 5. EPA previously acknowledged that the male rat kidney tumors are not relevant for human health hazard assessment. Furthermore, the Panel believes that effects on male rat preputial glands cannot be extrapolated to humans because humans do not have these glands. *See* HWIR Comments, pp. 5-7.

The Panel strongly believes that isophorone should not automatically be regulated as a carcinogen simply because the EPA has classified it as a group C "possible” human carcinogen. This issue arose recently in the context of EPA's proposed relative hazard ranking of hazardous air pollutants under Section 112W of the Clean Air Act, 42 U.S.C. § 7412. Because the threshold of evidence necessary to justify a Group C cancer classification is very low, the EPA's Scientific Peer Review Panel in that rulemaking unanimously endorsed the position that Group C substances typically should not be regulated as carcinogens. See HWIR Comments, pp. 7-9 and Attachment III.

The Ketones Panel believes that the health benchmark for isophorone should be based instead on the 90-day feeding study in dogs reported in the Integrated Risk Information System (IRIS) database. The oral reference dose, (RfD) reported in the IRIS database is based on that study. This recommendation is consistent with the Minimal Risk Level for isophorone determined by the Agency for Toxic Substances and Disease Registry. *See* HWIR Comments, pp. 9-10. Accordingly, when evaluating isophorone for potential regulation under RCRA in the future, the Panel believes EPA should base its evaluation on the oral RfD derived from the 90-day study.

Response: EPA does not disagree with this commenter, and did not evaluate isophorone as a carcinogen for the used solvents risk assessment. An oral slope factor of 9.5E-4 per (mg/kg)/day is listed for isophorone on IRIS, but no inhalation slope factor is available. Because there was no ingestion route of exposure for isophorone in this risk assessment, this was not an issue. EPA will continue to rely on the reviewed data in IRIS and use those benchmarks whenever possible for RCRA listing determinations.

Commenter: Chemical Manufacturers Association - Cumene Panel
Comment: The Cumene Panel (Panel) of the Chemical Manufacturers Association (CMA) submits this letter in response to EPA's proposed spent solvents listing determination. Panel members represent the major U.S. manufacturers and processors of cumene.[1] [[1] Panel members are: AlliedSignal Inc., Ashland Chemical Company, Chevron Chemical Company, CITGO Refining & Chemicals, Inc., The Dow Chemical Company, Georgia Gulf Corporation, Koch Industries, Shell Chemical Company, Sun Company, Inc., and Texaco Chemical Company.]

The Panel supports comments filed separately by CMA on this proposed rule. The Panel is concerned specifically about the proposed listing of cumene as an "F" waste under the Resource Conservation and Recovery Act (RCRA). We are pleased that the risk assessment methodology described in the proposed rule resulted in the conclusion that cumene does not satisfy the listing criteria described in 40 CFR § 261.11(a)(3).[2] [[2] 61 Fed. Reg. 42343.]

The Panel's concerns about the Agency's proposed listing of cumene have been addressed in earlier correspondence. In our letter of June 6, 1996, we provided extensive toxicological information to support our assertion that cumene should not be added to 40 CFR §261, Appendix VIII. Studies referenced in our letter were sponsored by the Panel under a test rule promulgated under Section 4 of the Toxic Substances Control Act (TSCA), and include pharmacokinetics, subchronic toxicity, developmental toxicity and neurotoxicity testing via inhalation. Although all of these studies were completed and final reports submitted to the Agency in 1991, the Agency has not included this information in the Integrated Risk Information System (IRIS) database. We are pleased that the Agency will consider our submitted information in the context of this rulemaking. To assist in this evaluation, we are including our proposed calculations for the inhalation reference concentration (RfC) and the oral reference dose (RfD), derived from the TSCA test rule study data. We are confident that this information will confirm the Agency's proposed decision not to list cumene as an "F" waste. We are also hopeful that the Agency will subject this information to an external peer review, culminating in the use of updated human health-based numbers in future cumene risk assessments.

Response: EPA is not making any determinations regarding appendix VIII with this listing determination. In regard to the toxicity values for benchmark, the Agency notes that since publication of the risk assessment, the toxicity values for cumene on IRIS have changed. The RfD increased from 0.04 mg/kg/day to 0.1 mg/kg/day, and the RfC increased from 0.009 mg/m^3 to 0.4 mg/m^3. Accordingly, the risks originally calculated for cumene have decreased. See the supplement to the risk assessment for details.

Commenter: Department of Energy
Comment: II.G.2.b. Physical/Chemical Properties and Toxicity [and corresponding sections concerning certain other chemicals]

1. pp. 42336, col. 2; 42343, col. 3; 42345, col. 2; 42346, col. 3) -- EPA acknowledges that the data on the health effects of certain chemicals are limited and that provisional values [i.e., for the reference doses (RfDs) and reference concentrations (RfCs)] have been utilized. EPA requests comment on the appropriateness of the provisional numbers, and seeks additional data on the toxicity of certain chemicals.

In the event that the external peer reviews (planned for completion prior to issuing final determinations), and/or additional data on toxicity is received, that indicate the carcinogenicity or toxicity values for any of the solvents for which EPA uses "provisional numbers" are more stringent and, therefore, require EPA to modify the corresponding health-based numbers, DOE requests that EPA (1) make revised health-based numbers and any recalculated risk assessments available for review, and (2) repropose those sections of this rulemaking that are modified based on new calculations. This will afford stakeholders an opportunity to comment on the revised proposal.

Response: As noted in the proposed rule, EPA has secured external peer reviews of the toxicity benchmarks that the Agency calculated for four solvents. EPA has made these available, along with the agency response to the recommendations of the peer reviewers in the docket for the final rule. The results of the peer reviews, however, have not changed the Agency's conclusions about the risks associated with these solvents.

Commenter: Methyl Chloride Industry Association
Comment: MCIA supports the EPA's decision not to list methyl chloride as a hazardous waste from solvent use under RCRA. MCIA agrees with EPA's finding that the chemical as a solvent does not pose a risk to human health and the environment under plausible mismanagement scenarios. However, MCIA disagrees with the Agency's underlying hazard assessment, and in particular with the Agency's decision to base its hazard evaluation for methyl chloride on a potential cancer hazard. MCIA addressed this issue in detail in the enclosed comments that were submitted by the members on April 22, 1996 in conjunction with the EPA's proposed Hazardous Waste Identification Rule, 60 Fed. Reg.66344 (December 21, 1995) (hereafter "HWIR Comments").

MCIA believes there is insufficient evidence to support regulating methyl chloride as a potential human carcinogen. For instance, the International Agency for Research on Cancer (IARC) and the Agency for Toxic Substances and Disease Registry (ATSDR) have recognized that the data do not support the classification or regulation of methyl chloride as a carcinogen. See HWIR Comments, pp. 3-4.

Furthermore, methyl chloride should not automatically be regulated as a carcinogen simply because the EPA has classified it as a group C “possible” human carcinogen. This issue arose recently in the context of EPA’s proposed relative hazard ranking of hazardous air pollutants under Section 112(g) of the Clean Air Act, 42 U.S.C. §7412. Because the threshold of evidence necessary to justify a Group C cancer classification is very low, the EPA’s Scientific Peer Review Panel in that rulemaking unanimously endorsed the position that Group C substances typically should not be regulated as carcinogens. See HWIR Comments, pp. 8-10 and Attachment V.

Since the available data do not warrant regulation of methyl chloride as a potential human carcinogen, the health benchmark for methyl chloride should be based on non-cancer effects observed in the chronic studies in mice and rats. The ATSDR has derived a chronic inhalation Minimal Risk Level for methyl chloride based on a NOAEL of 225 ppm reported in the chronic mice study. The MCIA believes that this NOAEL provides a good basis for deriving a human health benchmark. See HWIR Comments, pp. 10-11. Accordingly, when evaluating methyl chloride for potential regulation under RCRA in the future, the members believe EPA should base its evaluation on this figure.

Response: In the absence of a value on IRIS, the Agency followed the standard practice of using the classification on the Agency’s Health Effects Assessment Summary Tables (HEAST) and slope factor in its assessment. Although values on HEAST have not undergone the level of peer review used for values on IRIS, they have undergone internal Agency peer review. The evaluation from the International Agency for Research on Cancer, provided by the commenter, noted that no conclusion on carcinogenicity in animals was possible, because the animal data were available only as an abstract. By contrast, the full laboratory report was used by the Agency in its assessment presented in HEAST.
EPA notes that accepting the commenter’s suggestion would only lead to an assessment of even lower risk, and not change the decision in this listing determination. EPA agrees with the commenter that methyl chloride should not be regulated under this listing determination.

Commenter: Franklyn Isaacson, Foster Wheeler USA Corp.
Comment: Pages 42318 through 42354 for the Federal Register on 14 August 1996 contains an NPRM for not listing 14 solvents as hazardous waste.
Column 3 on Page 42327 states:

> Acetonitrile is not classified as a carcinogen.

This claim appears, to be in error, for the following reason:

> Pages 50500 to 50501 for the Federal Register on 26 September 1996 says:
> ...there was equivocal evidence of carcinogenic activity of acetonitrile...

This statement is based on the report <u>Toxicology and carcinogenesis Studies of Acetonitrile</u>, National Toxicology Program Report TR-447.
Response: The statement that acetonitrile is not classified on IRIS as a carcinogen is correct; however, EPA based its initial evaluation on the lack of a carcinogenicity assessment on IRIS, and available data at the time (prior to the September 26, 1996 announcement).

The September 26, 1996, *Federal Register* announcement reported on toxicology and carcinogenicity studies conducted by the National Toxicology Program (NTP, 1996). Under the conditions of these two-year inhalation studies, NTP concluded that there was "equivocal evidence" of carcinogenic activity of acetonitrile in male F344/N rats, based on marginally increased incidences of hepatocellular adenoma and carcinoma. There was no evidence of carcinogenic activity of acetonitrile in female F344/N rats or in male or female B6C3F1 mice.

Both the current (51 FR 33991) and proposed (61 FR 17959) guidelines for carcinogen risk assessment include "weight of evidence" factors that are used to evaluate the available data and to make an informed judgment regarding the carcinogenicity of a chemical. Under the current guidelines, acetonitrile could be considered as a possible human carcinogen (Class C) based on limited animal evidence. However, Class C chemicals are not automatically considered as suitable for a quantitative risk assessment (i.e., development of a cancer slope factor) but are considered on a case-by-case basis (51 FR 33996). Under the proposed cancer risk guidelines, the weight-of-evidence factors are used to determine if a chemical should be considered as a "known/likely" carcinogen, "cannot be determined", or "not likely" a human carcinogen. For example, an agent may be placed in the "cannot be determined" category "because the existing evidence is composed of conflicting data (e.g., some evidence is suggestive of carcinogenic effects, but other equally pertinent evidence does not confirm any concern)." The "not likely" category includes "agents not likely to be carcinogenic to humans when carcinogenicity is dose or route dependent. For instance, not likely below a certain dose range (categorized as likely above that range) or not likely by a certain route of exposure (may be categorized as likely by another route of exposure). To qualify, agents will have been appropriately evaluated in animal studies and the only effects show a dose range or route limitation or a route limitation is otherwise shown by empirical data" (61 FR 17986).

The new evidence is currently under evaluation by EPA, and decisions have not been made. Thus, EPA has used the available RfC for acetonitrile in this listing determination.

Commenter: BP Chemicals
Comment: BP Chemicals also believes a further degree of conservatism was used in the entire acetonitrile risk assessment due to the very low Reference Dose and Reference Concentration used. In their analysis the Agency used an RfD of 0.006mg/kg/day and an RfC of 0.05mg/m$^{3.}$ We realize these are the values contained in IRIS. However, these doses do not incorporate the most recent findings from the NTP chronic effect testing program which would lead to higher reference values.
Response: EPA has relied on data from IRIS (where available) for toxicity benchmarks. Where IRIS data is not available, EPA has sought to use reviewed data in the Health Effects Assessment summary tables. These sources provided the toxicity benchmarks used for the acetonitrile risk assessment.

EPA notes that accepting the commenter's suggestion would only lead to an assessment of even lower risk, and not change the decision in this listing determination.

Commenter: General Motors
Comment: General Motors supports the use of existing published peer reviewed data (MCLs, RfDs, RfCs, CSFs) for estimating a solvent's toxicological effects and corresponding Health Based Levels. However, General Motors does not feel that is appropriate to use proposed MCLs, unless the Agency found that this value was the only available data for a particular solvent.
Response: EPA has used RfDs, RfCs, and CSFs as toxicity benchmarks in this risk assessment. EPA has not used MCLs as benchmarks in this risk assessment.

B. Methodology Used in Assessing Risk

Commenter: American Petroleum Institute (API)
Comment: V. The Agency Has Made Judicious Use Of Qualitative Risk Characterization.

As noted above, EPA has employed an iterative or "screening" approach to evaluating potential risks associated with each plausible management scenario. In several cases, EPA has evaluated risks qualitatively and found that risks would not be significant, so that performance of a quantitative "bounding" analysis was unnecessary. For example, while the Agency considered disposal of certain phenol wastes in a landfill to be plausible, it eliminated that scenario from further consideration because 1) no respondent actually reported using landfill disposal; 2) few phenol wastes were generated as solids; 3) spent carbon was the only solid with any significant concentration of phenol, and was reported to be either regenerated or incinerated; and 4) while it might be reasonable to expect that residuals from wastewater treatment would be land disposed, such residuals would be unlikely to contain significant concentrations of phenol, since phenol is highly susceptible to biodegradation during treatment.6 61 Fed. Reg. 42336.
Response: The Agency agrees with the commenter, and appreciates commenter's support of the management scenario approach taken by the Agency.

Commenter: American Petroleum Institute (API)
Comment: The judicious use of qualitative risk characterization to narrow the field of inquiry, as in the present rulemaking, makes common sense. The agency is at liberty to apply its expertise to eliminating clearly non-hazardous wastes or management practices from further consideration. Nothing in the statute, the listing criteria, or EPA's listing policy requires EPA to use quantitative risk assessment to screen out wastes of low risk potential, and the use of qualitative evaluations in this context rationally conserves Agency resources for quantitative evaluation of wastes or scenarios that are more likely to pose a significant hazard.
Response: The Agency agrees with the commenter, and appreciates the commenter's support of the risk assessment methodology used by the Agency.

Commenter: EDF
Comment: 4. Volatile Solvents Can and Do Contaminate Groundwater

Without any evidentiary support, EPA claims the volatility of a solvent provides additional justification for ignoring nonhazardous land disposal mismanagement scenarios, on the theory that the solvent would become airborne before it had a change to migrate into groundwater. Of course, the scope of volatile organic groundwater contamination in the United States is completely inconsistent with this bald assertion, and EPA never even attempts to explain the inconsistency.

Indeed, the damage cases EPA identified that are associated with the very solvents at issue in this rulemaking do not support EPA's position. For example, EPA claims methyl chloride would be rapidly volatilized when released on land, and would hydrolyze and slowly degrade in groundwater.[53] [53 Listing Background Document at 87-88.] However, methyl chloride has contaminated groundwater at a minimum of two locations.[54] [54 EPA Risk Assessment at 15] While EPA is unsure whether the contamination can be linked to a waste management practice, the important fact in this context is the presence of methyl chloride in the groundwater, not the contaminant's pedigree.

Similarly, EPA claims phenol is both volatile and "readily biodegrades" in groundwater.[55] [55 Listing Background-Document at 101.] Yet according to the Agency, phenol contamination is "common" at environmental damage sites.[56] [56 EPA Risk Assessment at 13.] Again, EPA makes much ado regarding the uncertainty as to whether the contaminant can be linked specifically to solvent wastes, but the phenol is still in the groundwater regardless of the particular source, notwithstanding EPA's revisionist theory in the instant rulemaking that phenol is not a significant groundwater pollutant.

Moreover, in the recent HWIR process waste rulemaking, EPA performed a multipathway risk assessment on four of the solvents at issue in this rulemaking. For three of the four solvents (acetonitrile, phenol, isophorone), the groundwater pathway was the driving risk pathway for wastewaters containing these solvents, therefore in that rulemaking EPA judged the groundwater contamination risks for these solvents greater than the risks posed by volatility or other release pathways.[57] [57 60 FR 66427, Table C-1 (December 21, 1995).]

EPA's inconsistent positions in these two rulemakings is simply caused by overreaching in the instant rulemaking to try to justify the unjustifiable - ignoring land disposal as a plausible mismanagement scenario.

Response: The comment is based on an incorrect assumption. EPA did not, in fact, ignore groundwater contamination from these solvents, and did consider land disposal as a plausible management scenario where the data supported such an assessment. Although these contaminants are present in groundwater at some Superfund sites, the risk assessment for this rule is based on plausible management scenarios for these chemicals in their solvent uses. For the proposed rule, the agency examined the risks via the groundwater pathway from management of solvents in surface impoundments. In some cases (acetonitrile, cumene) the agency concluded that more analysis was unnecessary, since the concentrations in the impoundment (outside of any leaching to groundwater or dilution/attenuation) were below health-based levels for ingestion. Other scenarios (phenol, furfural, and methyl chloride) were examined and also determine not to pose health risk via ingestion or inhalation.

In response to comments, the Agency conducted thorough scientific analysis of the fate and transport of solvents in groundwater for each plausible management scenario where groundwater contamination was a potential exposure pathway.

These scenarios include four solvent wastewaters managed in surface impoundments: phenol, cumene, acetonitrile, and furfural. EPA assessed the risk at each of the impoundments managing the solvents. For all the impoundments, The Agency conducted a bounding analysis, using high-end values for parameters describing the size, construction, and operating parameters of the impoundment. The specific parameters and their sources are noted in the full description in *Assessment of Risks from the Management of Used Solvents: Supplemental Risk Assessment Background Document*. Parameters describing the waste streams themselves (volume, concentration) were taken from the actual waste streams generated and managed at each facility.

EPA also had received data that one facility in the country is managing methyl chloride wastewaters in a surface impoundment. Because of this unique waste stream, EPA sought to model this scenario in a more specific fashion. This impoundment was reported to be virtually an in-ground tank, with six-inch concrete walls, 2" of compacted clay around the walls, and a slurry wall outside the clay. In addition, this unit is a RCRA permitted hazardous waste unit. Such units are subject to groundwater monitoring, corrective action, and closure requirements. Because of the details of the construction of the unit and the operational characteristics of a permitted unit, EPA judged that the groundwater pathway was not a significant risk.

The results of the risk analysis are reproduced here. The hazard quotients represent combined hazards from the groundwater pathway (direct ingestion, inhalation and dermal contact from showering) and direct inhalation. These combined hazard quotients are calculated based on the (unlikely) assumption that the toxicological endpoints of these combinations of chemicals are the same. Nevertheless, this conservative assumption allows the Agency to screen out the possibility that solvents at these impoundments are a significant health threat.

Facility	solvents	bounding HQ	“high-end” HQ
Tennessee Eastman	Acetonitrile, phenol	3.30e-02	N/A[1]
Exxon Baytown	methyl chloride[2]	4.60e-06	<3.50e-06
Mobil Beaumont	Furfural, phenol	1.20e+00	<8.00e-01
Lyondell	Cumene	9.10e-03	N/A
Rhone-Poulenc	Acetonitrile	6.52e-02	N/A
Citgo	phenol, furfural	7.40e-01	N/A

[1] NA indicates high-end analysis was not done because the bounding analysis showed no risk of concern. [2] Risks for methyl chloride represent excess lifetime individual cancer risk ; all other contaminants are evaluated as non-carcinogens.

Risk management decisions were made based on this formal risk assessment modeling or screening that the agency conducted. Although the preamble for the proposed rule discussed hydrolysis, volatilization, and degradation, this information was not the key bases of decisions, but merely supplemental to these analyses.

Commenter: EDF
Comment: H. Phase III Portion of the Risk Assessment

EPA's risk assessment consisted of three phases. In the first phase, EPA performed a bounding analysis to determine whether further risk evaluations were warranted. In the second phase, EPA performed high-end and central tendency risk analyses, analogous to risk evaluations performed in other listing determinations.

However, where the high-end risk analyses demonstrated certain solvent wastes presented substantial risks to human health and the environment, EPA added a third and unprecedented phase to the risk assessment. Simply stated, EPA adjusted the risk assessment to evaluate only that portion of the waste stream managed as nonhazardous by one or more facilities receiving the final questionnaire.[90] [[90] EPA Risk Assessment at 51] Therefore, instead of waste containing 800,000 mg/L acetonitrile stored in onsite accumulation tanks under the high-end analysis, the concentration was reduced to less than 10,000 ppm for the Phase III assessments.[91] [[91] See EPA Risk Assessment at 27, 51] Similarly, while the concentration of 2-methoxyethanol stored in onsite accumulation tanks was 500,000 ppm under the high-end analysis, EPA ignored the risks posed by the storage of such wastes in the Phase III assessment simply because none of the facilities receiving the final questionnaire happened to store 2-methoxyethanol in nonhazardous waste tanks.[92] [[92] EPA Risk Assessment at 52]

Accordingly, not only has EPA's inappropriate discounting of land disposal as a plausible mismanagement scenario resulted in a grossly incomplete risk assessment, but EPA has modified the results of the risk evaluations for other plausible mismanagement on the assumption that only the waste management practices reported by the facilities receiving a final questionnaire - a tiny fraction of the relevant industries - are the exclusive current and future mismanagement practices associated with the solvents. For all the reasons discussed above in these comments, there is no basis for such sweeping generalizations, therefore the rationale underlying the Phase III assessment procedure is completely lacking.
Response: The Phase III analysis conducted by the Agency was a reasonable step in the normal iterative risk assessment process. To avoid this step, EPA would have had to make regulatory decisions based on currently-regulated wastes. The Agency assessed risks for both regulated and non-regulated wastestreams for 30 waste management scenarios. The iterative process of risk assessment began with bounding analyses; 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, a more realistic but “worst-case” set of conditions. Of all 30 scenarios, only two showed significant risk when modeled under high-end conditions.

The commenter refers to the hazard quotients calculated for these two waste streams, but those results were reported as an intermediate step in the risk assessment process. EPA had significant concerns about ending the iterative risk assessment process for those two scenarios at that point.

Both scenarios involved storage of solvent wastes pending incineration. Limitations of technology and resources required the agency to estimate risks based on solvent storage in tanks without tops — such that significant portions of the solvents were volatilizing from the tanks before incineration could take place. The Agency judged this scenario highly unlikely (because of the irrationality of wasting valuable fuels) and because Subpart CC would preclude hazardous wastes from being managed in that scenario.

The more pressing concern was that the evaluation was assessing the risks associated with both regulated and non-regulated wastes. The Agency determined that the focus of the risk assessment, therefore, should be those solvent waste streams which are not already regulated. Although the risk assessment focused on all solvent waste streams, the Agency refocused the assessment on these non-regulated waste streams in order to further refine the assessment of these two scenarios (acetonitrile and 2-methoxyethanol in storage tanks, pending incineration). This refocusing, the third phase of the risk assessment, is a normal and logical step in the iterative risk assessment process.

Commenter: EDF
Comment: C. <u>No Inhalation or Dermal Exposure to Contaminated Groundwater Considered</u>

In estimating risks from contaminated groundwater, EPA considered the impacts of ingestion only. [74] [[74] EPA Risk Assessment at 29.] Without explanation or justification, the Agency ignored the risks of inhaling contaminants transferred to the air from showers, baths, toilets, dishwashers, washing machines, and cooking; and risks from dermal absorption of contaminants while washing, bathing, and showering.

Studies indicate that exposure to volatile chemicals from routes other than direct ingestion may be "as large or larger than exposure from ingestion alone”.[75] [[75] McKone, "Human Exposure to Volatile Organic Compounds in Household Tap Water: The Indoor Inhalation Pathway", <u>Environmental Science and Technology</u>, Vol. 21, No. 12, p. 1194.] Indeed, indoor inhalation exposures alone can be between 1.5-6.0 times the exposure attributable to ingestion.[76] [[76] <u>Id.</u> at 1200.]

Since EPA never explains why inhalation or dermal risks were not considered, it is difficult to comment on possible rationales for this approach. Because dermal risks during bathing were included in the HWIR risk assessment proposed only ten months earlier, there is certainly no technical bar precluding similar consideration in the instant rulemaking. [77] [[77] 60 FR 66365 (December 21, 1995). See also Risk Assessment Guidance for Superfund, Volume 1, Part A, EPA Office of Emergency and Remedial Response, 1989, pp. 6-34 through 6-38.]

In the case of inhalation risks, EPA argued in the HWIR proposal that appropriate "chemical-specific" equations could not be found.[78] [[78] 60 FR 66365 (December 21, 1995).] Without addressing the merits of the Agency's position in the HWIR context, this rulemaking involves only a small fraction of the hazardous constituents addressed in HWIR.

Response: Direct inhalation was evaluated for tanks, surface impoundments and boilers (see Risk Assessment Background Document). In response to this comment, EPA assessed risks from other routes of exposure to the groundwater pathway. This assessment used the same methodology employed for the *Non-Groundwater Pathway Risk Assessment; Petroleum Process Waste Listing Determination Notice of Data Availability* (See NODA, April 8, 1997, 62 *FR* 16747).
Exposures are estimated for all indoor, household water uses. Exposures and risks are calculated for three house compartments separately. These compartments include a shower stall (includes both dermal and inhalation exposures from showering); a bathroom (inhalation exposure from all bathroom water uses); and the rest of the house (inhalation exposure from all other household water uses). It is assumed that all water uses for each household compartment occur while the individual is in that house compartment. Average air concentrations for each house compartment are calculated and used to assess exposure from inhalation. Dermal exposures are calculated based on the starting groundwater concentration. The results are presented below:

Constituent	CAS No.	Groundwater Concentration	Inhalation Hazard Quotient for Shower	Inhalation Hazard Quotient for Bathroom	Inhalation Hazard Quotient for Whole House	Summed Inhalation Hazard Quotient	Dermal Hazard Quotient
Acetonitrile (Tennessee Eastman)	75058	2.31E-03	6.0E-02	1.0E-02	7.0E-05	7.0E-02	3.8E-05
Acetonitrile (Rhone Poulenc)	75058	1.52E-03	4.0E-02	7.0E-03	5.0E-05	4.7E-02	2.5E-05
Acetonitrile (Lyondell Petroleum)	75058	5.91E-05	1.0E-03	3.0E-04	2.0E-06	1.3E-03	9.6E-07
Phenol (MOBIL Oil)	108952	2.88E-02	6.0E-02	1.0E-02	7.0E-05	7.0E-02	1.0E-04
Phenol (CITGO)	108952	2.40E-02	5.0E-02	9.0E-03	6.0E-05	5.9E-02	8.4E-05
cumene (Lyondell)	98828	4.67E-06	4.0E-03	2.0E-03	1.0E-05	6.0E-03	4.0E-06
furfural (CITGO)	98011	2.16E-04	7.0E-04	1.0E-04	7.0E-07	8.0E-04	2.6E-05
furfural (MOBIL Oil)	98011	3.49E-02	1.0E-01	2.0E-02	1.0E-04	1.2E-01	4.2E-03

In no case did the summed hazard quotients exceed the threshold value of one, even when combined with the hazard quotients from the direct exposures. These results confirm EPA’s conclusion that these solvents do not pose significant risk to human health.

Commenter: ETC
Comment: EPA has failed to consider, in its risk assessment, that many of the generators manage multiple solvents associated with this proposed rule. EPA has calculated the risk and hazard quotient for each solvent assuming that it is managed in isolation, without any of the other solvent constituents present. In addition, EPA has failed to consider that solvents, precisely because of their solvent properties, contain other hazardous constituents that must be evaluated in the risk assessment. A review of the engineering site visit reports in the RCRA Docket for this proposed rule indicates that many of the industries surveyed manage multiple solvents specific to this proposed rule, and that many of the solvents contain significant concentrations of other hazardous constituents. E.g. GMC (S0069), “Texaco LP” contains cumene, and is used as a paint stripper such that resulting sludge (which is land disposed) contains xylene, toluene, MEK, ethyl benzene, and other constituents.

For example, the high end hazard quotient for on-site accumulation of 2-ethoxyethanol acetate (2-EEA) in tanks is calculated by EPA to be 0.7 (see Table 10 of 61 FR 42339). However, the engineering reports indicate that 2EEA is managed with other solvents. For example, printed circuit board manufacturers utilize both 2-methoxyethanol and 2-EEA (see S0018 - Continental Circuits, S0033 - Hadco Corporation, and S0035 - Analog Devices Inc.). The combination of methoxyethanol together with 2-EEA would greatly exceed a hazard quotient of 1 for the on-site accumulation scenario (see Table 4 at 61 FR 42332). Likewise the engineering report for Stahl Industries (Docket No. S0020) indicates that the leather tanning industry uses both 2EEA and 2-methoxyethanol in combination.

Likewise, Hitachi (Docket #S0026) uses 2-EEA in combination with phenol. A review of Table 8 at 61 FR 42337 indicates that the sum of the HQ for phenol and 2-EEA would exceed 1 for the high end risk for the on-site accumulation scenario. Similarly, PPG industries uses cumene and isophorone in combination with 2-EEA in their manufacture of industrial coatings. A review of Table 14 at 61 FR 42342 for cumene, and Table 18 at 61 FR 42346, indicates that the high end HQ exceeds 1 for this combination of these 3 solvents for the on-site accumulation scenario.

In conclusion, EPA must consider the combined effect of the solvents as actually used based on the engineering site visits to calculate the true hazard quotients and risk. If this is done, then a decision to list must be made for 2EEA, 2-methoxyethanol, phenol, cumene, and isophorone, considering that all of these solvents are frequently used in combination. When used in combination, the hazard quotient of 1 is exceeded, making a listing determination mandatory consistent with EPA's criteria for listing at 59 FR 66076.

Response: The commenter misinterprets the purpose of the site visits. As the Agency has stated before, the site visits were used to familiarize Agency staff with the processes used at the facilities and assist the Agency in developing questionnaires, among other purposes. Facilities the Agency visited that used multiple chemicals as solvents also reported this fact on questionnaires, and the Agency took management of multiple solvents into account in the risk assessment in response to comment.

The comment cites examples where the hazard quotient would exceed 1 at facilities that use more than one solvent in combination. However, the commenter has cited facilities whose use of the chemicals does not meet the Agency's definition of solvent use. Although Continental Circuits, Hadco, and Analog Devices all use more than one chemical in combination, they all use them as components in formulations. Thus, no spent solvent is generated. Consequently the use of these chemicals would not be included in the risk assessment. Likewise, Stahl uses two chemicals in combination in a lacquer formulation. Only Stahl's use of 2-ME in tank cleaning constituents solvent use and is assessed in the risk assessment. PPG uses isophorone and 2-EEA as components in a coating formulation. Only PPG's use of cumene for equipment cleaning constituents solvent use and is assessed in the risk assessment.

Commenter: EDF
Comment: D. <u>No Background or Cumulative Exposures Considered</u>

As discussed above in Section III.A of these comments, 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 addition, EPA performed the risk assessment as if these solvent wastes represented the only toxic chemical exposure nearby residents would receive from the facilities generating the waste or from other sources. Therefore, EPA failed to consider the multiple and cumulative exposures actually experienced by human and environmental receptors, including but not limited to low income and minority populations. This failure to consider multiple and cumulative exposures violates Executive Order 12898.[79] [[79] The lip service devoted to Environmental Justice in the proposed listing determinations does not constitute compliance with the Executive Order. EPA simply concludes the no listing decisions will not impact low income or minority populations without any supporting evaluation other than the individual solvent assessments that assume no other chemical exposure. See 61 FR 42353 (August 14, 1996).] Significantly, EPA could take into account other toxic chemical exposure without extensive data collection on site-specific emissions by introducing a safety or apportionment factor into the risk evaluations.

Response: In response to this comment, EPA did conduct an assessment of the cumulative risks posed by exposure to multiple solvents. In this analysis (see *Assessment of Risks from the Management of Used Solvents: Supplemental Risk Assessment Background Document),* EPA assessed all cumulative solvents risks where multiple solvents were managed in one unit or different units at a facility; a total of 25 facilities fit this description.

This analysis used the same assumptions as EPA's prior assessments for the proposed rule. Wastestreams which were already managed as hazardous were not assessed, since there is no additional opportunity for 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, including the construction and operation of surface impoundments, meteorological conditions, and the proximity of hypothetical receptors. One particularly conservative assumption, storage of solvents in open-topped tanks permitting maximum volatilization, was highly unlikely since the wastes were being stored pending incineration. 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 made the highly conservative assumption that all of the non-carcinogens threatened similar health endpoints. Despite these conditions 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. EPA does not have any data on background or surrounding toxic exposures, nor any basis to create a "safety factor" as the commenter suggests to account for such hypothetical exposures. Nevertheless, these compounded conservative assumptions serve a similar function and confirm the unlikelihood of significant health impacts from these facilities.

In one facility (#152), a surface impoundment showed an increased cancer risk of 4.6×10^{-6} at a bounding level. Given the conservative nature of the bounding risk assessment EPA has concluded that this facility does not represent a significant risk to human health. Furthermore, this risk was due to the management of methyl chloride solvent wastes in the impoundment. EPA provides further discussion of its decision not to list these wastes in the preamble to the final rule.

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, including minority and low-income areas.

Commenter: EDF
Comment: G. No PICs from Combustion Considered

Emissions estimated from the combustion of solvent wastes in this rulemaking did not include products of incomplete combustion (PICs) resulting from combustion activities. Since many of the PICs are much more toxic than the original hazardous constituents that are burned (i.e., dioxin), PICs represent a substantial portion of the risk associated with combustion activities. Indeed, EPA recently proposed hazardous waste combustor emission standards for the dioxin PICs because of the toxicity of this class of chemicals.

In Table 1 of EPA's Draft Technical Support Document for the Hazardous Waste Combustion MACT Standards (Volume 2), the Agency compiled a long list of PICs and other organic contaminants releases from hazardous waste combustors. In the risk assessment for the WTI incinerator in Ohio, 143 non-dioxin PICs were evaluated, and still the peer review panel for the assessment remained concerned about the 60% of organic emissions that remained uncharacterized.[88] [[88] See Report on the EPA Technical Workshop on WTI Incinerator Risk Assessment Issues, EPA ORD, May 1996, p. 3-7.]

Since the industrial boiler modeled in the risk assessment for the instant rulemaking is much less efficient than a hazardous waste combustor (80% DRE), inclusion of PICs in the risk assessment for the instant rulemaking is even more important because of the greater potential for PIC releases. Without the consideration of PICS, EPA's risk assessment in the instant rulemaking ignores the most toxic part of the emission stream from the modeled combustion unit.[89] [[89] In the one instance where EPA even discussed the issue of PIC formation (methyl chloride wastes), EPA asserted PIC emissions were not cause for concern because the reported waste in question happened to be managed in a hazardous waste combustor. See 61 FR 42334 (August 14, 1996). Once again, EPA presumes without sufficient factual foundation that this one waste management practice reported is fully dispositive of all current and future combustion activities involving solvent wastes generally, and methyl chloride wastes-specifically.]

Response:

The used solvents risk assessment made two extremely conservative assumptions: (1) the wastes were sent to a boiler with only an 80% destruction/removal efficiency (DRE), and (2) the boiler had no air pollution control devices. Therefore, the modeling of incinerator emissions did not discount PIC formation. Based on the current state of the science, however, EPA cannot make definitive statements regarding PIC formation even when detailed information is available on the waste stream composition, the combustion units, and the combustion conditions. For this case, with only limited information available, EPA has little basis for making statements regarding PIC formation.

Nevertheless, in addition to the conservative assumptions indicated above, EPA did consider the possibility of PIC formation for incineration of methyl chloride wastes. Methyl chloride wastes were examined because formation of certain PICs (e.g., dioxins) have been associated with the chlorine content of the waste. As discussed to some extent 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). Furthermore, these wastes are already incinerated as hazardous waste, and therefore PICs are already limited to the extent possible. Similarly, 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 characterized as hazardous due to ignitability (i.e., high levels of hydrocarbons) and toxicity (i.e., presence of benzene), and therefore also are burned as hazardous wastes. These combustion units also are operated according to stringent air emission standards that limit PIC formation. Given these arguments, 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.

Commenter: ETC
Comment: L. The Risk Analysis Is Inadequate to Support the Non-Listing Determination

The quality of an output is only as good as the input. In the case of this proposal, the Risk Assessment is totally useless since EPA did not model any correct mismanagement scenarios. As stated above, EPA should have modeled plausible improper management scenarios like land disposal in unlined landfills, impoundments, and waste piles. Since EPA did not choose the correct plausible mismanagement scenarios, EPA did not model all of the critical exposure pathways. This is particularly true of non-wastewater forms of the waste, in which EPA only considered the inhalation pathway based on proper management scenarios of storage and combustion. Yet, if these non-wastewaters are dumped on the ground, or disposed of in landfills or impoundments, they present a risk to groundwater contamination. EPA must therefore also model groundwater and surface water pathways of exposure, including all direct and indirect pathways of human exposure.

The ETC does not agree with EPA's rationale on page 42323/2 for not evaluating population risk. The EPA concludes that since the management scenarios are not industry specific, that population risk cannot be assessed. Yet EPA had site-specific information from 156 generators that could have been used to evaluate population risk from such management scenarios as long term accumulation/storage and on-site disposal in land units.

EPA states as an uncertainty (page 42323/2) that the risk analysis relied on data provided from questionnaires, and that this is dependent on the quality of the data. The ETC agrees with this statement, and is concerned, as stated above, about the validity of using such surveys collected from parties with a potential bias to see that the waste is not listed under RCRA. At the very least, EPA should verify the information in some way, through select site visits, and a sampling and analysis program. For example, there is no verification by EPA that the wastes are not land disposed. EPA simply takes the survey responses as true and accurate, with no field verification. The quality of the entire risk assessment is suspect if it relies solely on industry survey responses.

Response: The listing criteria 262.11(a)(vii) requires that EPA consider "the plausible types of improper management to which the waste could be subject." Where land-based disposal was reported in the 3007 Survey, the Agency considered if "the waste is capable of posing a substantial present of potential hazard to human health or the environment." For those wastes that were managed in a land-based unit (e.g., landfill or impoundment), the groundwater pathway was determined not to pose a threat. The Agency determined that disposal in unlined landfills, impoundments, and waste piles are not a plausible mismanagement scenarios for high organic content or aqueous wastes resulting from the 14 solvents (See Section I.A, response to Environmental Defense Fund, for solvent-by solvent rationale.)

The Agency's reliance on data provided by industry through the 3007 Survey is not improper. First, EPA has no reason to believe that a 3007 respondent would falsify information. Second, where disposal in land-based units was reported, follow-up telephone contact was made with these facilities in order to verify data.

The Agency also rejects the suggestion that population risk should be assessed for this rulemaking. Where there is no risk of concern to the hypothetical "maximally exposed individual (MEI)," it is illogical to assess risk to actual populations, which can only be lower than the MEI risk.

Commenter: ETC
Comment: Because improper management scenarios were not considered, the risk analysis is grossly inadequate. The risk analysis only considered inhalation risks from combustion devices, storage tanks and wastewater treatment tanks (page 42325). For wastewater impoundments, EPA did model groundwater ingestion pathways for wastewater treatment surface impoundments, but no other groundwater pathways were modeled particularly for concentrated non-wastewater forms of the 10 solvent wastes. The ETC objects to these shortcomings and inadequacies in EPA's risk analysis.

The listing determination is also inadequate since it did not consider groundwater pathways for non-wastewater forms of the solvent waste that can plausibly be disposed of improperly in unlined landfills, impoundments, and waste piles. Non-wastewater forms include concentrated organic liquid and sludge matrices, as well as solid residues derived from use of these solvents. EPA naively assumes that no liquids would be land disposed improperly. Yet there is no regulatory incentive or mandate to prevent such improper land disposal unless EPA makes a determination to list wastes from these 10 solvent uses so that RCRA controls apply. Has EPA forgotten that RCRA is a preventive statute? The basic premise of RCRA cannot be that everyone operates perfectly all the time or leave waste management to an honor system.

Response: EPA did not choose to model disposal in an unlined landfill because all waste streams that were reported by the 3007 Survey to be sent to a nonhazardous landfill contained a negligible solvent loading. Even those waste streams sent to Subtitle C landfills contained very low or negligible solvent loadings. The Agency has concluded that sending high organic containing wastes to a landfill is not a plausible management scenario. All high organic containing waste streams were reported to be managed by some type of thermal treatment. Management in wastepile was not reported as a management practice by 3007 Survey respondents.

The commenter incorrectly suggests that there is no regulatory mandate to prevent improper land disposal of non-wastewaters in the absence of a listing determination. In fact, over 90% of these wastes are already regulated under Subtitle C of RCRA.

In response to this comment, EPA conducted an additional assessment of the scenario of disposal of solvent wastestreams in an unlined landfill. Although EPA that such disposal (a) is not happening, (b) is unlikely to happen, and (C) Therefore is not a plausible management scenario, the Agency does have evidence that one significant wastestream of acetonitrile had been disposed in a regulated subtitle C landfill in the past. Based on that, EPA modeled the groundwater risks that might stem from disposal of acetonitrile wastes in an unregulated, unlined Subtitle D landfill. In this scenario, EPA modeled the results if this wastestream were to be disposed in an unlined landfill, using both deterministic and probabilistic analyses. The analysis used similar assumptions to those used in landfill groundwater analyses for the 1995 HWIR risk assessment, but used the MMSOILS landfill model. EPA estimates a hazard quotient between 11 and 22 for this scenario, based upon ingestion of contaminated groundwater. This HQ is for a "worst-case" high-end set of conditions. A full description of the risk analysis appears in the risk assessment background document for this rulemaking.

As discussed further in response to specific comments on acetonitrile in Section VI.E of this document, this wastestream is currently being sent for fuel blending, in recognition of a high BTU value. For these results to represent actual risk, the firm would need to cease this management practice and dispose of this wastestream in an unlined landfill instead. EPA believes it unlikely that the firm would choose to waste the fuel value of this waste in order to switch to a more hazardous form of management than occurred in the past.

Commenter: ETC
Comment: The ETC also objects to the base assumption EPA used in modeling wastewater treatment in impoundments. On page 42325/2 EPA states that it assumed that the solvent wastewaters were already diluted by other wastewaters potentially managed in the impoundments, and that this dilution would already reduce the concentration of the solvent to below health based limits of concern. There is no basis for this assumption, and once again, EPA is assuming the ideal situation exists as its plausible management scenario. Many of the solvent wastewaters may be treated in isolation, or may dominate the wastewater mixture. Also, since when is it acceptable to assume that dilution is a proper management technique for a waste. EPA must redo the wastewater risk analysis assuming no dilution, particularly since there is no guarantee that this will always be the case.
Response:

EPA did not assume dilution of wastes in modeling, but rather used the highest actual concentration of wastewaters entering the wastewater treatment system. EPA has no realistic basis for assuming any other concentrations for modeling risks from managing wastewaters. The commenter also assumes that generators use other treatment alternatives for solvent wastewaters. EPA has no evidence that this is the case, and the commenter has not included any facts to support this assertion. Wastewater treatment systems, in general, cannot support high concentrations of organics, as the commenter suggests to be plausible. The likelihood of such alternatives is even lower, given the very limited number (6) of surface impoundments managing solvent wastewaters.

Finally, EPA points out that the solvent concentrations modeled were actually quite conservative. Because the concentrations used are the same as the concentrations entering the wastewater treatment system, EPA's modeling assumes that the wastewater treatment trains leading up to the surface impoundments are ineffective in reducing solvent concentration at all.

Commenter: ETC
Comment: In addition, the accumulation scenario modeled must assume long term storage, not a period of under 90 days. Extended on-site accumulation is a highly plausible mismanagement scenario, given that absent RCRA controls, a generator can accumulate such waste indefinitely. In fact, EPA's risk model should not assume a finite storage time of 90 days, but should assume at least a two year period of storage. This is the more likely scenario, since absent RCRA controls, there is no driving factor that will force a generator to have the waste treated or disposed. A generator will be more likely to stockpile the waste on site, and avoid the cost of management.
Response: 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.

Commenter: ETC
Comment: EPA discounted NAPL formation, on page 42325/3, because they conclude that the subject solvents are miscible with water. The ETC disagrees with this assumption for two reasons. First, not all of the constituents are totally miscible with water, and a substantial NAPL

phase can still exist. Secondly, if another organic phase is present, such as an oil, the solubility of many of these chemicals will be greater in the organic phase, making NAPL pathways plausible. It is inappropriate for EPA to disregard this pathway of migration.
Response: Given the limitation in the scope of analysis, EPA is only able to draw conclusions about the likelihood of solvents contributing to formation of NAPLs. To respond to this concern, EPA has conducted further analysis on the subject for this final rulemaking. Full details of this analysis are in the Supplemental Risk Assessment background document for this rulemaking. EPA examined NAPL formation in the solvents which posed some risk to the groundwater pathway: acetonitrile, phenol, furfural, and cumene. The Agency used the methodology that was used in the Characteristics Scoping Study for RCRA and in The Evaluation of NPL Sites. Full details of this analysis are in the Supplemental Risk Assessment document for this rulemaking.

The NAPL screening methodology used in the Scoping Study applied the concept that NAPL-forming chemicals generally have relatively low water solubilities (less than 5,000 mg/L) and are liquid at ambient temperature (melting point less than 7 C, boiling point greater than 30 C). Only cumene meets this definition.

Another evaluative factor is the concentration of the constituent in groundwater. 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 cumene (or any of these solvents) contributing to formation of NAPLs.

C. Quantities and Concentrations Modeled

Commenter: American Petroleum Institute (API)
Comment: II. In General, EPA's Regulatory Approach And Assessment Of The Evidence Are Based On Common Sense And Sound Public Policy.

In this rulemaking, EPA applies the listing criteria of 40 C.F.R. section 261.11(a)(3) to real-world data on the generation, characterization, and management of 14 solvent wastes gathered through a comprehensive industry survey. Following careful analysis, EPA concludes that none of the fourteen solvent wastes warrants listing as a hazardous waste.

The listing criteria in 40 C.F.R. section 261.11(a)(3) allow the Agency a certain amount of discretion in making listing decisions. In this case (as discussed in greater detail below), EPA has taken a particularly realistic and well-reasoned approach in its application of the listing criteria. EPA has appropriately defined the scope of the listing decision. It has focused its analysis on actual data, and has eschewed making decisions based on worst case, theoretical assumptions.

The Agency has also employed a reasonable iterative or "screening" approach to its evaluation of the risks, if any, posed by each solvent waste. It has employed qualitative risk characterization to certain management scenarios and exposure pathways to determine whether it is necessary to proceed to the next step, i.e., a quantitative bounding analysis. Where bounding analysis as to a particular management scenario or pathway does not rule out risk concerns, the Agency proceeds to a "high-end" risk assessment. Recognizing that modeled risk must yet be evaluated in light of a number of different factors, including the protections provided by existing regulatory requirements, EPA, in some instances, proceeds to a final level of screening that demonstrates that the modeled risk is, in fact, not realistic. [1] [[1] There is another step in risk characterization that proved to be unnecessary in the case of the 14 solvents at issue here. Specifically, EPA did not obtain or analyze any samples of the solvent wastes. EPA asserts, presumably with good reason, that obtaining representative samples of these solvents in their multiple waste forms would border on the impossible. 61 Fed. Reg. 42321. Based on the absence of significant risk disclosed through EPA's screening of the solvents using survey data, sampling would be unnecessary. However, were the Agency to determine, from analysis of the survey data, that any residual might warrant listing, sampling and analysis would be necessary as a corroborative step.]

EPA's overall approach reflects a policy of targeting hazardous waste listings at wastes that demonstrably pose significant risks, and avoiding wasting scarce regulatory resources on further evaluating or regulating wastes of low, or merely theoretical, risk. This approach is grounded in common sense and sound public policy.

Response: EPA appreciates the comments support. However, the Agency disagrees with the commenter’s statement that sampling and analysis would be necessary to list a wastes. As noted elsewhere in response to comments on the lack of sampling, EPA believes that sufficient data may be collected by the 3007 Survey and other means to complete a listing determination without necessarily sampling wastes (see Section IV.B).

Commenter: EDF

Comment: 3. Dilution and Surface Impoundment Mismanagement

For most solvent wastewaters, unless one of the 156 facilities receiving a final questionnaire reported management of a particular wastewater in surface impoundments, EPA concluded surface impoundment use is not a plausible mismanagement scenario for such wastewaters. As discussed above, the gross limitations associated with both the preliminary and final questionnaires preclude such sweeping generalizations for all current solvent uses, users, and waste generators; and potential changes in solvent uses and users over time preclude such sweeping generalizations as to potential uses, users, and waste generators.

Where EPA even considered the possibility surface impoundments would be used for solvent wastewaters, EPA generally discounted the mismanagement scenario due to dilution of the solvent wastewaters at the headworks of the wastewater treatment system. The dilution factors were derived from the site-specific information provided by the facilities reporting surface impoundment management in the final questionnaire.[50][[50] Listing Background Document at pp. 40-41.]

There are two glaring deficiencies associated with EPA's reliance on dilution in this manner. First, once again, the Agency's reliance on wastewater loading data reported by a total of nine facilities, to derive dilution factors, assumes the Agency has characterized the actual and potential universe of solvent wastewater surface impoundment mismanagement scenarios by reviewing data on this limited number of facilities. Given the quality of EPA's data base generally, this assumption is absurd.

Moreover, all nine facilities where the dilution analysis was performed are huge petrochemical or organic chemical facilities representing an extremely small SIC code segment of potential solvent users. Thus, many of the facilities within SIC codes identified by EPA as potential solvent users would not resemble these nine facilities in the slightest. The likelihood of substantially lower or no dilution factors at smaller facilities is of profound importance because of the high concentrations of contaminants in some solvent wastewaters. Even at the small number of petrochemical facilities evaluated by EPA, concentrations of phenol in wastewaters ranged up to 8% prior to dilution.[51] [[51] Listing Background Document, Table 3-2] Other facilities reported wastewaters containing up to 20% 2-methoxyethanol.[52] [[52] Listing Background Document, Appendix I.] As discussed below in Section III of the comments, EPA's failure to sample any solvent wastes, including solvent wastewaters, can result in a substantial underestimate of contaminant concentrations reported and an incomplete understanding of hazardous constituent concentrations in these wastes.

Response: EPA is not relying on data from only nine facilities. As described in methodology used to characterize the universe of solvent users, nearly 1,500 facilities were identified as potential solvent users and surveyed. Of the 156 facilities responding to the 3007 Survey, nine facilities reported sending solvent wastewaters to a surface impoundment. To model risks, EPA used concentrations of solvents in wastewaters entering the headworks of the wastewater treatment system. The wastewater stream containing 8% phenol is managed at a concentration of 9.58 ppm prior to entering the wastewater treatment system. As explained above, this is a conservative estimate of waste concentration, since the waste undergoes several steps of treatment before entering a surface impoundment. The wastewater stream containing 20% 2-ME was not sent to a surface impoundment. It is the solvent concentration entering the surface impoundment that the Agency is concerned with. Through this methodology, the Agency is confident that it has characterized actual and potential management scenarios (see solvent-by-solvent rationale in Section II.D of this document).

Through the 3007 Survey, EPA has captured both large and small facilities. Although the cutoff for a facility receiving a 3007 Survey was a combined solvent consumption of greater than 1200 kg per year, both smaller facilities, such as semiconductor manufacturers, and larger facilities, such as petroleum refineries, organic chemical manufacturers, and pharmaceutical industries, were survey respondents. Most facilities, large and small, are permitted by NPDES and must meet effluent discharge limits as regulated by the Clean Water Act. This prohibits facilities from sending large amounts of organic wastes that cannot be treated by a wastewater treatment system. Many of the smaller facilities do not have onsite wastewater treatment systems and send their wastewaters off-site.

The results of EPA's re-analysis of risks from management of wastewaters in surface impoundments appear in the risk assessment background document and are summarized in section V.B above.

Commenter: EDF
Comment: B. <u>Concentration of Waste Contaminants May Be Substantially Understated</u>

In addition, the solvent concentration inputs to the risk assessment for many of the solvents at issue in this rulemaking are based upon an extremely small number of facilities reporting data. For example, 2-EEA wastewater data (in tanks) are based upon two facilities, methyl chloride wastewater data are based upon one facility for tanks and one facility for surface impoundments, furfural wastewater data for surface impoundments are based upon two facilities and analogous data for tanks are based upon three facilities, and cumene wastewater data is based upon one facility for tanks and one facility for surface impoundments.[73] [[73] Listing Background Document, Appendix I.] Clearly, where data are available from only one facility, the high-end input reflects only this source as reported without verification or sampling, therefore no compensation for the uncertainty factor is provided.

Even relying on the larger of two or three numbers does not ensure the risk assessment inputs accurately reflect the true high-end concentrations of the various wastes, particularly in the case of wastewaters and other wastes where EPA relied upon allegedly "low" or "trace" concentrations to discount potential exposure pathways after performing bounding analyses or without performing any analyses at all. The truth of the matter is EPA hasn't a clue as to whether the risk assessment waste concentration inputs are within 1000 ppm of the correct levels, even though that level of precision or greater is typically required to accurately assess potential risks.
Response: The solvent concentration inputs to the risk assessment are based on actual data reported by facilities in the 3007 Survey using and managing one of the ten solvents. These data are based on surveys of hundreds of facilities, not just two or three. EPA has no new data nor any other reason to believe that concentrations for these wastestreams would be higher than those reported. See the solvent-by-solvent rationale in response to EDF's comment in Section II.D.

While few waste volumes were available for some wastes, EPA points out that this arises because the solvent uses of some chemicals are limited to very specific uses. The solvent uses of furfural and methyl chloride, for example, are essentially entirely due to their use in the petroleum or petrochemical industries. In cases of the wastewaters for these two chemicals, EPA assessed risks from the large volumes generated and found no significant risk. As discussed in Section III.A, EPA's focused its data collection on the large users of solvents. Thus, the loadings assessed reflect the high-end risks expected for these solvent uses.

EPA also notes that the conservative risk assessment methodology resulted in higher concentrations than suggested in the actual data. For example, waste concentrations were *not* based on the concentrations reported, but always on the concentrations achieved when the highest loading of waste was managed in a high-end unit. This meant that EPA was modeling concentrations higher than actually reported. In addition, EPA rounded data up where loading figures were imprecise in the data. For example, EPA assumed 454 kg of acetonitrile were managed in a landfill, because the facility reported "less than 1%" concentration of a 45,400 kg wastestream. In fact, the loading of acetonitrile is probably much lower. By rounding numbers upward in this fashion, EPA has provided some measure of compensation for uncertainties in the data. Finally, EPA points out that the solvent concentrations modeled were actually quite conservative. Because the concentrations used are the same as the concentrations entering the wastewater treatment system, EPA's modeling assumes that the wastewater treatment trains leading up to the surface impoundments are ineffective in reducing solvent concentration at all.
Commenter: EDF
Comment: EPA ignores the chemical content of the other wastewaters diluting the solvent wastewaters, and thus evaluates the mixture scenario as if the solvents are diluted by water only. However, the Agency is certainly aware that the headworks wastewaters contains a variety of other toxic chemicals through its work on the petroleum refinery listing and the development of effluent guidelines for these industries. Therefore, it is arbitrary and capricious for the Agency to consider dilution for the purpose of reducing the solvent concentrations entering the surface impoundments, but then not consider whether the resulting wastewater mixture poses a potential risk to human health and the environment.

This approach toward dilution also represents poor science and public policy. If the Agency only considers dilution in a piecemeal fashion without ever characterizing the wastewater mixtures in their entirety, EPA will never properly evaluate the risks posed by surface impoundments in large manufacturing sectors. EDF notes that EPA will be studying surface impoundments receiving characteristic wastewaters that are subsequently diluted, pursuant to recently passed legislation. However, the solvents at issue in this rulemaking are not covered under the existing toxicity characteristic, therefore the listing determination process provides the best and only vehicle to evaluate the risks posed by nonhazardous waste impoundments receiving such wastewaters.
Response: Given the variety of industries using these solvents, it would not have been possible to characterize overall waste streams to make listing determinations for them. Although EPA is aware that other toxic chemicals may be mixed with the solvent wastestreams in wastewater treatment systems, this listing determination was limited to assessing the risk from solvent

portions of those wastestreams in this listing determination. EPA discusses the issues of sampling and other constituents in Section IV.B.

Commenter: EDF
Comment: Significantly, errors as small as two percent in the mass balances can result in concentrations of waste solvents 20,000 ppm higher than EPA utilized in the risk assessment. While EPA attempts to minimize the importance of this huge uncertainty factor by assuming its reliance on high-end loading estimates can compensate for the uncertainty, the Agency offers no factual basis for this assumption.[71] [[71] EPA Risk Assessment at 52.]
Indeed, EPA's high-end risk estimates were based upon the facility reporting the maximum amount of used solvent contained in a particular waste stream, which may not be the facility generating the waste containing the highest concentrations of solvents depending upon the volume of wastes generated.[72] [[72] EPA Risk Assessment at 24.]
Response: The commenter appears to have misunderstood the risk assessment methodology. The high-end wastestream chosen for each scenario is the highest loading for that solvent in that management unit. Although the concentration of that constituent in that wastestream may not have been the highest, the concentration modeled involved that loading of constituent in a high-end management unit (tank, impoundment) which resulted in a higher concentration than the original wastestream. The Agency's risk modeling chose the wastestream/management unit combination to give the highest constituent loading because that represents the highest exposure scenario, and, therefore, the most conservative risk assessment.

In assessing the surface impoundments again for the final rule, EPA did not select high-end wastestreams. Instead, the Agency modeled all the solvent/impoundment scenarios in the database for this management unit, because very few facilities were shown to use surface impoundments as a waste management technology.

Commenter: EDF
Comment: As noted above, EPA did not conduct any waste sampling to support this rulemaking. Instead, EPA relies completely upon unverified mass balance and other estimates provided by the 156 facilities receiving the final questionnaire.[70] [[70] EPA Risk Assessment at 24.] Since mass balance estimates are often imprecise, and can miss the mark by a number of percentage points even under the best of conditions, all the inputs into EPA's risk assessments may substantially understate the concentration of contaminants in the waste. In addition, the lack of sampling data contributed to EPA's failure to consider all the hazardous constituents in the solvent wastes, since such information is best provided through waste sampling.

Response: The Agency determined that sampling and analysis was unnecessary to support the solvents listing determination. EPA discusses the issues of sampling and other constituents in Section IV.B.

The Agency relied on the data presented in the 3007 Survey by 156 facilities. The Agency has the authority to collect such data under RCRA. 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 their data in light of the substantial penalties for submitting false information. In instances where concentrations where unclear or unreported, telephone contact was made with the facility. The facilities provided ranges of concentration where concentrations within a waste stream varied. As a conservative approach, the Agency used the high end of concentration range in their risk assessment. The Agency does have reason to believe that the solvent concentrations reported are underestimated.

Commenter: ETC
Comment: Finally, it is apparent from the ETC's review of the questionnaire responses that EPA did not conduct adequate quality assurance / quality control of the data. In many instances, EPA's contractors prepared data compilations from the questionnaire responses which contain significant errors or are based on unverified and questionable data, and then EPA relied on these data summaries to justify important aspects of the non-listing determinations. For example, Appendix I (S0016) to the Listing Background Document contains detailed tables of reported solvent use, waste generation and management. This table indicates that the BF Goodrich facility in Henry, IL uses offside disposal in an industrial Subtitle D landfill for 4,181,818 kg of sludge that contains only "trace" levels of acetonitrile. However, the questionnaire response submitted by BF Goodrich (S0062) indicates that the company did not have any analytical data or other reliable information on the concentration of hazardous compounds in the sludge, but merely used the word "trace" to fill in the space on the questionnaire in the absence of real data. EPA did not in any way seek to verify the accuracy or even determine the meaning of this response. Yet EPA relied on this single ambiguous word -- "trace"-- in deciding that unlined landfill disposal was not a "plausible" mismanagement scenario that must be examined.

Likewise, Appendix I indicates that the Exxon facility in Baton Rouge, LA disposes of 6,550,000 kg of sludge/ash and spent desiccant containing methyl chloride in an offsite Subtitle D landfill, and again the word "trace" is used for the loading. However, the questionnaire response submitted by the Exxon facility (S0073) states that the physical and chemical properties of the sludge/ash are "unknown," and that the concentration of "miscellaneous hydrocarbons" is "trace." It is a gross error for EPA to report that methyl chloride levels in the sludge are "trace" based on this response, and further to conclude that disposal of such solvent sludge waste in an unlined landfill is not a plausible mismanagement scenario that should be considered. Indeed, EPA's contractor appears to have repeatedly equated the lack of information in the questionnaire responses on the concentration of solvent wastes as "trace" concentrations, making EPA's conclusions based on these reported findings arbitrary and capricious.

Similarly, Appendix I does not indicate that the Wyeth-Ayerst facility (S0117) disposes of substantial volumes of filter press sludge containing acetonitrile in an unlined landfill. However, EPA's site visit report indicates that such sludge disposal results from "biennial cleaning of equalization and aeration basins;" it just so happens that 1993 was the off-year for this biennial waste generation. For EPA to completely ignore this fact, and then to use this omission to support the agency's conclusion that landfill disposal is not a plausible mismanagement scenario, could well define the term arbitrary and capricious.

These examples are only a few of the serious QA/QC problems with the data compilations relied on by EPA, which then led the agency to draw faulty conclusions from the inaccurate, incomplete, and deficient documents. The ETC recognizes that EPA attempted to compile data from a broad range of industries related to a great variety of solvent uses and waste management practices. Indeed, we believe EPA's basic methodology was so flawed as to doom the results. Nevertheless, it is not unfair to say that the lack of adequate QA/QC means that the compiled data is so riddled with problems that it is largely worthless for the purposes for which it was used by EPA.

Response: EPA disagrees with the commenter's statements. QA/QC was performed on the data by the contractor. The commenter has failed to give an example of a significant error. In addition, much of the data in general, and all of the data related to land-based disposal, was verified through follow-up telephone contact with the facilities. The reporting of trace concentrations is not questionable data. Facilities reported trace concentrations if the concentration was insignificant or nondetectable, but the facility had reason to believe that it may be present at very low levels. EPA's RCRA 3007 Questionnaire is very clear regarding the reporting of data on constituents in process residuals [p.40, proposed rule Background Document, Appendix H]:

> *Question 5.6 List the compound which are known by analysis to be present in the spent solvent residual and specify the concentration of each. Include the unit of measure. Provide average concentrations, <u>not</u> ranges of concentrations. If you need more space for your response, please continue on a separate sheet of paper. PLEASE SUBMIT ANY AVAILABLE ANALYTICAL DATA CHARACTERIZING THE RESIDUAL. Submit both TCLP and total compositional data if available. If your company is voluntarily submitting associated QA/QC information, please submit this as well. Clearly mark any CBI attachments.*
>
> *Laboratory analysis is not required to respond to this question. If analytical data are available, please submit the results with the questionnaire. If analytical data are not available, leave Question 5.6 blank and answer Question 5.7.*

In the case of BF Goodrich, analytical data submitted in response to Question 5.6 (data that are known based on analysis) show that the concentration of acetonitrile in the wastewater treatment sludge is trace. Contrary to what the commenter implies, the location of BF Goodrich's response in Question 5.6, rather than Question 5.7, shows that the company did have some analytical data upon which they based this response. As EPA stated in the proposed rule Background

Document, in this particular process, biodegradation of the acetonitrile in the wastewater treatment system would result in the efficient destruction and removal of acetonitrile. Therefore, reporting of such a finding is not "questionable" nor does it constitute an "error" or a failure to perform QA/QC.

The waste generated at Exxon, Baton Rouge, LA, is a combined sludge/ash from a sludge treatment unit in a butyl rubber manufacturing facility. The sludge/ash is produced by combining a dissolved air flotation (DAF) sludge with a wastewater treatment tank sludge into the sludge treatment unit. The facility also reported trace levels of organics in these incoming streams. In the Solvents proposal (61 FR 42333), the Agency pointed out that the sludge treatment unit can achieve greater that 98.9% efficiency. In addition, some of these sludges are thermally treated, and the ash combined with the treated sludge. The Agency believes that the amount of the "trace" organics in the incoming streams to the sludge treatment unit that is comprised of methyl chloride is small compared with other organic chemicals (comprised of the chemicals in the butyl rubber product), and that further treatment, whether physical, biological, or thermal justify the "trace" designation for the methyl chloride in the waste stream that is land disposed. Therefore, the Agency is confident that it does not need to consider land disposal risks from this waste and considers this determination neither arbitrary nor capricious.

Contrary to what the commenter states, EPA's site visit report for Wyeth-Ayerst covered disposal of wastes generated in 1993. This did not include the equalization and aeration basin sludge. In this instance, the wastewater residual entering the headworks of the wastewater treatment system contains an annual total of 1.9 kilograms of acetonitrile. As is the case with BF Goodrich, biodegradation of the acetonitrile in the wastewater treatment system would result in the efficient destruction of the acetonitrile. After biological treatment, the wastewater passes to the equalization basin and then to discharge to a POTW. The discharged wastewater contains no acetonitrile. Wyeth-Ayerst submitted analytical data for the sludge residual in question, and no acetonitrile was shown to be present.

In evaluating waste streams, EPA tracked residuals through the entire management train and considered the full range of data supplied by the responding facilities. EPA was able to determine, as in the case of BF Goodrich, the likely effectiveness of treatment. This full range of data was supplied by the responding facilities and assessed by EPA to determine its accuracy.

D. Environmental Damage Incidents

Commenter: American Petroleum Institute (API)
Comment: Third, the current RCRA status of a given solvent is relevant in consideration of damage incidents. In its review of its Superfund Record of Decision database, EPA could find no evidence of environmental damage specifically traceable to the disposal of wastes resulting from the use of any of the solvents for their solvent properties. However, in considering whether new

Superfund sites might be created by the disposal of solvent wastes EPA appropriately considered the fact that several of the solvents, as hazardous wastes could not now be disposed of in the uncontrolled manner that could rise to Superfund sites. See 61 Fed. Reg. 42332 (2-ME), 42337 (phenol), 42339 (2-EEA), 42346 (isophorone), 42347 (2-methoxyethanol acetate).
Response: EPA appreciates the commenter's support.
Commenter: EDF
Comment: Two aspects of the Characteristics Scoping Study are particularly relevant to the solvents listing determinations. First, in the course of reviewing damage cases associated with nonhazardous waste management to prepare the scoping study, EPA found phenol was one of the most frequently detected groundwater contaminants at the damage sites, and at the majority of locations, was detected at concentrations exceeding applicable federal or state standards. See Exhibit 2-7.

Due to EPA's methodology for the Characteristics Scoping Study, these phenol releases originated <u>only</u> from nonhazardous waste management units, principally landfills and surface impoundments. See pp. 2-1, 2-11. By expressly excluding product "stringent selection criteria", EPA presents in the scoping study clear evidence of both the potential risks posed by the improper impoundments and landfills as plausible mismanagement scenarios for phenol and other solvent wastes. See p. 2-21. Indeed, in its review of the two principal sources of existing data on nonhazardous waste management practices, EPA indicates, "...the two sources generally agree that land-based treatment for aqueous wastes is the dominant management method for nonhazardous industrial wastes." See p. 8-24 (emphasis added).

Second, in the scoping study, EPA confirms the limitations of the existing ignitability characteristic discussed by EDF in its November 14 comments, including the lack of coverage for wastes and waste mixtures above a flash point of 140 F, and the regulatory ambiguities regarding non-liquids due to the absence of a testing procedure for such wastes. See pp. 3-8 through 3-12. Accordingly, it is not technically valid for EPA to presume most solvent wastes necessarily exhibit the ignitability characteristic and are therefore already regulated as hazardous.
Response: EPA responds to the specific comment on phenol elsewhere in this document (see Section VI.H).
In regard to the ignitability of wastes, EPA agrees with the commenter that it would not be technically valid to "presume most solvent wastes necessarily exhibit the ignitability characteristic and are therefore already regulated as hazardous." EPA has made no such assumptions. To the extent that the Agency regards certain wastes as ignitable, it is relying on the information provided in the 3007 survey by the facilities along with hazardous waste codes. The wastes in question are, in fact, being coded and handled as hazardous.

Commenter: ETC
Comment: J. Damage Cases Were Not Adequately Evaluated

EPA assumed there were no damage cases of concern for the 10 chemicals simply because the CERCLA database does not specifically identify the solvent use that caused the damage (61 FR 42326). The ETC strongly objects to the agency's completely arbitrary approach. The fact that environmental damage has been documented to have resulted from mismanagement of the chemical is sufficient to support a listing determination. Such data would support that the chemical has been shown to cause environmental damage, and therefore wastes from solvent use of this chemical must be controlled under RCRA. Again, RCRA is a preventive statute intended to protect against the potential for human health and environmental harm.

Attached hereto are lists of contaminated sites compiled from the ATSDR site contaminant database where these solvent chemicals have caused environmental damage. Since EPA has declined to obtain more detailed information, the agency has adopted the default assumption that all of these contaminated sites were caused by product uses of the chemical solvents. Obviously, that is ridiculous. Many of these site entries indicate that the contamination was caused by "waste materials," and it is probable and a reasonable assumption that many if not most of the site contamination was caused by waste solvents. EPA's failure to consider this overwhelming evidence that mismanagement of these solvent wastes has caused damage under 40 CFR 261.11 is totally unreasonable.

The ETC also objects to EPA screening out and ignoring damage cases from prior to 1980 (42326/2). EPA's rationale is simply that since RCRA is the law today, these past damage incidents could not happen again. EPA then uses this rationale as a basis for not listing these solvent wastes, which is the only legal mechanism for making certain that RCRA controls apply. Such a rationale is totally illogical, particularly because consideration of pre-1980 damage cases would clearly support a listing action.

Finally, EPA pointed to other limitations in the CERCLA database and limitations of RODs, and concludes that nothing further can be done to evaluate damage cases. The ETC strongly disagrees with this conclusion. EPA had information on over 500 users of these chemicals, and could have conducted further damage case evaluations at these facilities. A sub-set of the users should have been target for site visits to directly evaluate evidence of environmental damage, and incident reports. Also, EPA's 3007 letter could have required that all incident and/or spill reports on these chemicals be submitted, and could have directly inquired as to the presence of environmental impacts at the site. The damage case evaluation done by EPA is grossly deficient, and does not support EPA's decision not to list any of the 10 chemicals for solvent use derived wastes.

Response: EPA attempted to identify damage cases wherever possible to support its listing determination. However, mismanagement of the 14 chemicals resulting in contamination at Superfund sites, as identified in the damage incidents, could not be tied to use of these chemicals as solvents. EPA believes that the commenter has 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. Prior to RCRA regulations (the TC rule and the removal of many solvent-characteristic wastes from Subtitle D land disposal, as well as the other characteristic regulations) management practices occurred that are no longer legal or likely today.

Furthermore, as described in the proposed rule, there were many other reasons why the damage cases were not useful (see 61 *FR* at 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.

Damage case incidents were evaluated at 3007 respondent facilities. The questionnaire requested that any event of environmental damage be reported in section 7.5.3 and any information concerning RCRA corrective action procedures to be reported in section 8.1. If there had been any spill and/or release to groundwater, surface water, or any other environmental damage from use of the 14 solvents, the facility would have listed this information here.

Commenter: Amoco Corporation
Comment: Process discharges are routed to our onsite NPDES nonhazardous wastewater treatment facility. The wastewater treatment facility is an aerobic biological system consisting of tanks and surface impoundments. Wastewater treatment sludges (filtercake) were disposed on site in our hazardous waste landfill until the late 1980s. The landfill currently is in post-closure status and has a groundwater monitoring system. The surface impoundments were subject to RCRA requirements due to Toxicity Characteristics in 1990 and had a groundwater monitoring

system from 1992 until RCRA closure in 1994. As a result of the groundwater monitoring and closure activities at surface impoundments, we have developed data on groundwater and soil samples. ACN has not been detected in these sample data. Attached is a table of this data.
Response: The Agency appreciates the data provided by the commenter. The Agency has taken the data into consideration and determined that it does not add any new evidence that would affect the proposed rule. The residuals containing spent acetonitrile that were sent to a surface impoundment and considered in the risk assessment are listed on page 41 of the Background Document. Residuals from Amoco Corporation were not determined to contain spent acetonitrile being sent to a surface impoundment, and therefore, were not included in the risk assessment.

E. Spills, Leakage, and Overflows

Commenter: EDF

Comment: E. Tank Leaks Not Considered

Notwithstanding previous EPA findings that many tank systems can and do leak their contents into the land and groundwater due to equipment failure and operator error, and thereby pose potentially significant risks to human health and the environment,[80] [[80] See e.g., 51 FR 25426 (July 14, 1986).] EPA's risk assessment did not include an evaluation of human health and environmental risks posed by this mismanagement scenario.[81] [[81] See e.g., EPA Risk Assessment at 58.]Unlike the HWIR process waste rulemaking and other listing determinations, where EPA evaluated other groundwater contaminant migration scenarios and thus could arguably capture tank releases within such risk evaluations, the Agency failed to perform such groundwater risk evaluations in this rulemaking. As discussed above, EPA discounted land-based mismanagement scenarios based upon a variety of incorrect and inappropriate rationales. Therefore, the lack of a tank failure release scenario in this rulemaking is a glaring omission, since other risk evaluations performed cannot compensate for failing to evaluate tank releases to land and groundwater.

For wastewaters, EPA argues the concentration of solvents is "very low", and thus assessing the risks posed by tank leaks is not warranted.[82] [[82] EPA Risk Assessment at 43.] However, the data base identifies solvent wastewaters containing 9% 2-methoxyethanol, 8% phenol, 200 ppm 2EEA, 169 ppm methyl chloride, and 5,000 ppm furfural.[83] [[83] Listing Background Document, Appendix I.]

Furthermore, the "temporary" wastewater treatment unit exemption from RCRA promulgated by the Agency in 1980 does not justify ignoring the potential for solvent wastewater releases from tanks potentially subject to the exemption if the solvents are listed. Since the exemption was not adopted by the Agency after public notice and comment, was never intended as the Agency's final position on how to regulate wastewater treatment units, is not mandated by RCRA or grounded in relevant human health and environmental considerations, and the application of the exemption to solvent wastewater treatment units is a matter within the Agency's discretion, it would be inappropriate for EPA to rely upon the exemption to justify not evaluating potential risks from wastewater treatment unit releases to land and groundwater.[84] [[84] See 45 FR 76074 (November 17, 1980).]

Response: 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 V.B 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. 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.

Commenter: EDF
Comment: F. Impoundment Overtopping Not Considered

While EPA has recognized the potential for overflows and breaching at nonhazardous surface impoundments in other contexts,[85] [[85] See 60 FR 66360 (December 21, 1995).] no such scenarios were evaluated in the instant rulemaking.[86]
[[86] EPA Risk Assessment at 29.] The potential risks posed by these types of surface impoundment releases could be significant once EPA properly considers the potential use of surface impoundments for all the solvent wastewaters at issue in this rulemaking and eliminates the generous dilution credits provided in the proposed listing determinations, as discussed above. Moreover, insofar as EPA evaluated the potential risks from surface impoundments based upon assumed post-treatment wastewater concentrations,[87] [[87] See EPA Risk Assessment at 35.] such evaluations cannot be applied to overtopping releases since the releases may occur prior to any treatment in the impoundment.

Response: EPA has examined the possibility of spills from surface impoundments. The Agency does not have the data or the means available to 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 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 to even further levels. EPA has modeled the effects of release of these solvents from the impoundments , and found no significant risk to human health or ecological resources. Therefore, EPA concludes that overtopping from surface impoundments is not of significant concern.

Commenter: ETC
Comment: K. Impacts from Spills or Releases From Storage Not Modeled
EPA has not modeled spill and release scenarios. Even the storage scenario (on-site accumulation) did not model the impacts of outside storage, or impacts from leaks from defective containers or tanks. EPA only considered inhalation pathways from storage in tanks. Yet other pathways of exposure are highly plausible given the likelihood of releases from containers and tanks. 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.

On page 42325/3 EPA concludes that the risk from spills is insignificant. EPA's rationale is based on what the respondents to the questionnaire told them. EPA did not bother to verify the information. The basis for the low risk assumption from spills is that most of the streams are assumed to be wastewaters of low concentrations. The non-wastewater streams are assumed to be already captured as hazardous by being part of mixtures with other hazardous wastes or from exhibiting the characteristic of ignitability, and therefore are controlled by generators to minimize the potential of spills. Again, these are naive far-reaching assumptions, with no verification by site visits, review or analytical testing by EPA. Also, as stated above, it is not true that other hazardous waste listings or characteristics would already capture these 10 solvent wastes as hazardous. At a minimum, EPA should review spill incident reports at major users of these 10 chemicals before jumping to such a conclusion. Even with such data, EPA must still model release and spill scenarios, since if the waste are unregulated, there will be no storage and handling standards that will protect against such incidents for these wastes.
Response: EPA responds to essentially the same comment above. The commenter discusses "the likelihood of releases," but has not provided any data to help characterize that likelihood. The Agency, therefore, still does not have sufficient technical basis to assess such releases. The commenter assumes that there would be no standards for managing wastes in tanks. About 90% of nonwastewaters are already regulated under Subtitle C of RCRA. Spills from the RCRA units, therefore, are already covered under contingency planning and corrective action requirements. Subpart CC includes additional requirements for spill protection during transfer of wastes.

F. Comparison with HWIR

Commenter: ETC
Comment: The results of the used solvent risk assessment are not consistent with the results from the HWIR analysis (i.e., HWIR exit levels). Commenters noted that the HWIR exit levels

for acetonitrile, isophorone, methyl chloride, and phenol were lower than the concentrations of these constituents in waste streams that showed low risk in the solvents risk assessment.

Response: 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.

G. Comparison with *Air Characteristic Study*

Commenter: EDF
Comment: 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.
Response: 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.

EPA conducted a comparison analysis of the results reached in the *Air Characteristic Study* with the results of this risk assessment. This comparison confirms that the concentrations present in these solvent wastes do not pose a significant inhalation risk. However, in the process of conducting this comparison, 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.

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 repond to the above comment and 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 preamble and Table 3 of the final rule for comparison of risks and discussion of listing decisions). More details of the analyses are presented in the Supplemental Risk Assessment Background document.

The error was the principal reason for the apparent difference in risk estimates between the risk assessment for the proposed analysis and the *Air Characteristic Study* . 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 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. A full explanation of the methodology of this analysis appears in Section 4.5 of the Supplemental Risk Assessment background document.

The comparison analysis used the same aerated wastewater treatment tanks as the solvents analysis and the air characteristic analysis. Allanalyses modeled storage tanks based on the size of the waste streams being managed; see the Supplemental Risk Assessment for details on the sizing of these tanks.

The comparison analysis assumed sufficient biomass used in wastewater treatment tanks (0.2 kg/m3) to achieve biodegradation; and a minimum biomass (0.05 kg/m3) resident in the storage tanks. Biodegradation was not accounted for in the original solvents analysis, an overly conservative assumption. The comparison assessment emission rates were generated using CHEMDAT8 instead of CHEMDAT7.

The dispersion modeling for the solvents assessment was done using ISC2 for 2 meteorological locations, Raleigh-Durham (central tendency) and Phoenix (high end), at 2 distances from the site, 1,000 ft (305 m; central tendency) and 250 ft (76 m; high end). For the comparison assessment, dispersion factors developed for the Air Characteristic Study using ISCST3 were used. These were also at Raleigh-Durham and Phoenix, at distances of 150 m and 75 m. There was no distance directly comparable to the 1,000 ft (305 m) distance used in the solvents assessment. Dispersion coefficients from the Air Characteristic Study were only available for 2 tank sizes. These were the two sizes used to model aerated tanks here. Therefore, they were used directly for aerated tanks. However, for storage tanks, which could be a variety of sizes, the dispersion coefficients were interpolated from those available. There should be some difference in the results due to the difference in dispersion models, and a greater difference for the central tendency receptor location, since it is much closer to the source in the comparison assessment than in the solvents assessment.

The same exposure factors and health benchmarks used in the revised solvents assessment were used in the comparison assessment.

The results of the comparison assessment are presented in the following tables for aerated tanks and for storage tanks. The revised solvents results are also presented for ease of comparison.

Comparison Results for Aerated Tanks

	Emission Rate (g/m2-s)	Dispersion Coefficient ([ug/m3]/[g/m2/sec])		Air Concentration (mg/m3)		HQ/Risk		
Chemical	Both	Compar	Solvents	Compar	Solvents	Compar	Solvents	Ratio
Acetonitrile	1.7E-03	2.2E+04	5.2E+04	3.7E-02	8.8E-02	7.3E-01	1.8E+00	0.4
Acetonitrile*	1.9E-04	2.2E+04	5.2E+04	4.2E-03	1.0E-02	8.5E-02	2.0E-01	0.4
Cumene	2.6E-05	2.9E+03	3.7E+03	7.5E-05	9.5E-05	1.9E-04	2.4E-04	0.8
2-Ethoxyethanol acetate	8.3E-07	2.2E+04	5.2E+04	1.8E-05	4.3E-05	6.1E-05	1.4E-04	0.4
Furfural	6.2E-04	4.5E+04	7.2E+04	2.8E-02	4.4E-02	5.6E-01	8.9E-01	0.6
2-Methoxyethanol	1.2E-05	2.2E+04	5.2E+04	2.6E-04	6.2E-04	1.3E-02	3.1E-02	0.4
Methyl chloride	4.6E-04	1.4E+03	3.7E+03	6.5E-04	1.7E-03	4.8E-07	1.3E-06	0.4
Phenol	5.3E-07	2.2E+04	5.2E+04	1.2E-05	2.8E-05	1.9E-03	4.6E-03	0.4

* this is the second largest waste stream for acetonitrile; the maximum is extremely large and considered an outlier.

Comparison Results for Storage Tanks

	Emission Rate (g/m2-s)			Dispersion Coefficient ([ug/m3]/[g/m2/sec])			Air Concentration (mg/m3)			HQ/Risk		
Chemical	Compar	Solvents	Ratio	Compar	Solvents	Ratio	Compar	Solvents	Ratio	Compar	Solvents	Ratio
Acetonitrile	6.8E-01	2.2E+01	3.1E-02	6.7E+03	5.3E+02	1.3E+01	4.5E+00	1.1E+01	4.0E-01	9.E+01	2.E+02	0.4
Acetonitrile*	3.9E-03	2.7E-02	1.4E-01	2.9E+03	8.0E+02	3.7E+00	1.2E-02	2.2E-02	5.3E-01	2.E-01	4.E-01	5.3
Cumene	1.2E-02	6.1E-03	2.0E+00	2.1E+02	8.0E+02	2.6E-01	2.5E-03	4.9E-03	5.2E-01	6.E-03	1.E-02	0.5
Cyclohexanol	1.2E-04	2.9E-05	4.3E+00	1.3E+02	5.3E+02	2.4E-01	1.6E-05	1.5E-05	1.0E+00	9.E-01	8.E-01	1
2-Ethoxyethanol acetate	2.2E-01	9.1E-02	2.4E+00	7.0E+02	5.3E+02	1.3E+00	1.5E-01	4.8E-02	3.1E+00	5.E-01	2.E-01	3
Furfural	1.8E-07	9.4E-07	1.9E-01	1.5E+02	5.3E+02	2.8E-01	2.6E-08	5.0E-07	5.3E-02	5.E-07	1.E-05	0.05
Isophorone	3.4E-05	4.5E-03	7.6E-03	3.4E+03	5.3E+02	6.5E+00	1.2E-04	2.4E-03	4.9E-02	1.E-02	2.E-01	0.05
2-Methoxyethanol	3.5E-02	6.2E-01	5.7E-02	1.5E+03	5.3E+02	2.9E+00	5.4E-02	3.3E-01	1.6E-01	3.E+00	2.E+01	0.2
2-Methoxyethanol acetate	8.3E-03	4.3E-03	1.9E+00	2.8E+02	5.3E+02	5.2E-01	2.3E-03	2.3E-03	1.0E+00	9.E-05	9.E-05	1
Methyl chloride	3.9E-03	3.1E-02	1.2E-01	1.6E+03	5.3E+02	3.1E+00	6.3E-03	1.6E-02	3.8E-01	2.E-06	4.E-06	0.6
Phenol	2.7E-04	4.3E-03	6.2E-02	8.0E+02	5.3E+02	1.5E+00	2.2E-04	2.3E-03	9.4E-02	4.E-02	4.E-01	0.09

* this is the largest waste stream for acetonitrile that is not co-managed with a hazardous waste stream.

The methodology described here for the tank modeling 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 EPA's conclusion that these solvents do not pose significant inhalation risk managed in storage tanks or aerated wastewater treatment tanks.

VI. LISTING DETERMINATIONS

A. Listing Determination - General Comments

Commenter: Dow
Comment: NO ADDITION TO SOLVENTS LISTING.
The Dow Chemical Company (Dow) appreciates this opportunity to comment on this important Notice of Data Availability and respectfully submits these comments on the notice published in the August 14, 1996 *Federal Register* pages 42,318 – 42,354.

Dow fully supports EPA's decision not to extend the listing system at this time. Appropriate decisions were made on Acetonitrile, 2-Methoxyethanol, Methyl Chloride, Phenol, 2-Ethoxyethanol Acetate, Furfural, Cumene, Cyclohexanol, Isophorone, 2-Methoxyethanol Acetate, *p*-Dichlorobenzene, Benzyl Chloride, Epichlorohydrin and Ethylene Dibromide. The listings are a system which was developed to allow EPA to promptly regulate many materials when RCRA began. If the more precise hazardous waste definitions, such as TC encompass the waste in question, EPA is correct in not adding another layer of regulation on the use of these materials.
Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste.

Commenter: Exxon Chemical Americas (ECA)
Comment: Exxon Chemical Americas (ECA) appreciates the opportunity to submit comments on the Environmental Protection Agency's (EPA) August 14, 1996 proposed rule entitled "Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Solvents; CERCLA Hazardous Substance Designation and Reportable Quantities" (61 FR 42318). ECA is a major petrochemical producer with 15 manufacturing sites in the U.S.

ECA participated in the Solvents Survey which provided information to support EPA's listing determination. In its operations ECA employs 7 of the 14 solvents assessed, with methyl chloride and acetonitrile the primary solvents of interest.

To summarize:

> ECA agrees with EPA that the solvents assessed do not satisfy the criteria for listing in 40 CFR 261.11 based on EPA's risk assessments and current regulatory programs.
>
> At the ECA facilities, any waste stream containing the solvents is presently managed to protect human health and the environment. Where the potential exists for incorporation into wastewater streams, the wastewaters are managed in permitted biological treatment systems. Any resulting solid wastes are managed at regulated waste contractor facilities. Air emissions are subject to the various federal and state air regulations applicable to ECA facilities.

For these reasons, no rational basis exists to impose additional, unnecessary regulation on these solvent streams.
Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste. In reaching this determination, the Agency considered management practices and applicable existing regulations, such as those described by the commenter.

Commenter: The Confederated Salish and Kootenai Tribes of the Flathead Nation
Comment: The Confederated Salish & Kootenai Tribes of the Flathead Nation would like to take this opportunity to make the following comments relevant to "the proposed rule for de-listing various specific hazardous wastes published by EPA at 61 Federal Regulations 42318." At this time the Tribes do not object to EPA's conclusion that this proposed rule does not significantly on uniquely affect the Tribes.

However, based on the technical application of specific characteristic inherent in the listed chemicals and the method of dispensation it is important that the Tribes be granted the authority to provide comment on any action taken pertinent to the proposed delisted chemicals on this reservation or in our aboriginal territories."
Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste. The commenter should be aware that the Agency's determination in today's final rule does not constitute a "delisting" of chemicals. Rather, after extensive investigation and assessment of risks associated with management of the14 chemicals used as solvents, the Agency as determined that residuals (e.g., wastes) from the use of these chemicals should not be added to the list of hazardous wastes in 40 CFR Part 261. Furthermore, EPA notes that most of the wastes examined in this listing are already regulated as hazardous because they are characteristically hazardous or are mixed with other listed hazardous waste. Thus, such wastes must be handled as hazardous under current regulations.

Commenter: Department of Energy
Comment: I.B. <u>Existing Solvent Listings and the Regulatory Definition of Solvent</u>

1. <u>p. 42320, cols. 1 and 2</u> -- In the background section of the preamble, EPA explains that it has used the same approach in this listing determination as in previous solvent listings; as such, the Agency has retained the interpretations used in the past to define "solvent use" and "spent solvent" waste generation. Specifically, EPA defines the universe of wastes covered by the proposed rule to include only those wastes generated as a result of one or more of the 14 chemicals being used for its solvent properties and subsequently becoming "spent."

The Department concurs with the Agency's approach and believes that it is appropriate to consider (in this listing determination) only those solvents that are used for their solvent properties (i.e., to solubilize or mobilize other constituents). DOE appreciates EPA's effort to remain consistent with the established listing descriptions and regulations for spent solvents [40 CFR 261.31(a)] as indicated by the decision to eliminate from further evaluation those facilities whose major use of a solvent in question is not for its solvent properties, and those processes whose solvent use is limited to consumption as a reactant or ingredient in the formulation of a commercial chemical product (e.g., 2-ethoxyethanol acetate used in the formulation of photoresist).
Response: As the commenter notes, the Agency has a longstanding interpretation of "solvent" and "solvent use," which was consistently applied in this rulemaking. The Agency appreciates the commenter's support of the continued, consistent application of these definitions. The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste.

Commenter: Department of Energy
Comment: II.A. Summary of Today's Action

1. p. 42321, col. 1 -- In summarizing its proposal not to list as hazardous waste from solvent uses any of the 14 chemicals subject to the listing determination under the EDF consent decree, EPA explains that its decision not to list four of the chemicals (benzyl chloride, epichlorohydrin, ethylene dibromide, and p-dichlorobenzene) is because it is extremely unlikely that these chemicals would be used as solvents. EPA requests new information on solvent uses and states that if new data is received, the Agency may use these data to revise the risk assessment methodology and assumptions.

DOE requests that should the Agency receive comments indicating that solvent uses beyond those identified in the proposed rule exist, EPA: 1) make the new information available for viewing in the EPA RCRA Information Center; 2) issue a Notice of Data Availability in the Federal Register announcing the new information and its availability; and 3), if necessary, repropose those sections of this determination that may be modified based on the new information. Accomplishing these activities comport with the Administrative Procedures Act and ensure that stakeholders have an opportunity to evaluate the new information and comment on any proposed regulatory approaches.
Response: 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. Thus, the commenter's request for an opportunity to comment on any new data is moot.

Commenter: Department of Energy

Comment: 2. p. 42327, col. 1 -- In the discussion of risk assessment results, the preamble states that "if EPA receives relevant new information during the comment period . . . EPA may revise its individual listing determinations based on this information." The Agency continues by explaining that if comments are received that lead the Agency "to conclude that unregulated land disposal of concentrated wastestreams from the use of these solvents is likely, EPA will consider promulgating a listing to address those concerns."

Similar to the comment above in response to Section II.A., if new information is received which causes the Agency to revise its individual solvent listing determinations, DOE requests that EPA: 1) make the new information available for viewing in the EPA RCRA Information Center; 2) issue a Notice of Data Availability in the Federal Register announcing the new information and its availability; and 3), if necessary, repropose those sections of this determination that may be modified based on the new information.
Response: EPA did not receive any data during the public comment period that would cause the Agency to reexamine or repropose the listing determinations for the 14 chemicals used as solvents. As a result, the Agency is finalizing its determination that residuals from the 14 chemicals used as solvents not be listed as hazardous waste. Thus, the commenter's request for publication of new data in a Notice of Data Availability and a reproposal, if necessary, of pertinent sections of the hazardous waste listing determination rule are moot.

Commenter: Department of Energy
Comment: Some of the chemicals in question (cyclohexanol, 2-ethoxyethanol acetate, isophorone, 2-methoxyethanol, and 2-methoxyethanol acetate) are not currently identified in 40 CFR 261 (i.e., they do not appear in the F-, K-, P- or U-lists, or the list of hazardous constituents found in Appendix VIII to Part 261). DOE notes that in the February 25, 1986 Federal Register (51 FR 6537), EPA listed four additional spent solvent wastes and added two of the four newly listed spent solvent constituents to Appendix VIII (51 FR 6541, col. 3). Accordingly, it appears that listing as hazardous one or more of the wastes from the use of these 14 chemicals as solvents could also entail EPA amending Appendix VIII by adding certain newly listed hazardous constituents. Once listed as a hazardous spent solvent waste and/or incorporated into Appendix VIII, the release or suspected release of one or more of these chemicals at a permitted facility could subject that facility to corrective action. Although initiating corrective action to address releases or suspected releases of such constituents is prudent and appropriate, DOE is concerned that should EPA list certain new spent solvent constituents and incorporate the newly listed chemicals into Appendix VIII, facilities could be required to reevaluate ongoing/or previously completed corrective actions. For example, owners/operators could be required to prepare a revised RCRA facility investigation (RFI) workplan that incorporates specific sampling and analysis provisions for the newly listed hazardous constituents (assuming they were not previously addressed within the initial RFI workplan); regardless of whether these constituents are being/or were comanaged (in remediation wastes) with other hazardous wastes (e.g., F-listed solvents) and

are being or had been thoroughly addressed. As with permitted facilities, interim status facilities could be required to reevaluate ongoing or completed corrective action efforts.

Regarding waste management under the current regulatory scheme, as EPA states throughout the listing determination, the 3007 survey showed that solvent wastewaters (involving the 14 chemicals addressed by the proposed rule) are typically dilute, pose minimal risk, and are generally managed in wastewater treatment systems, whereas a high percentage of the nonwastewater residuals reported are classified as hazardous and are subject to RCRA Subtitle C regulation (61 FR 42319, col. 3; 42324, col. 1; 42326, col. 3). The preamble explains that the data EPA gathered regarding wastewaters indicate that these waters are diluted by the flow of other dilute wastewaters at the headworks of the treatment system (61 FR 42325, col. 2). EPA also states that "[solvent levels were generally found to be below the health-based levels (HBLs) at the headworks." Although the notice offers this information, the Agency does not elaborate on any of the regulatory implications associated with managing wastewaters containing such low constituent concentrations at the headworks. As an additional consideration, DOE suggests that EPA address the implications of listing one or more of the wastes generated from the use of the 14 chemicals as solvents relative to the mixture rule exemptions found in 40 CFR 261.3(a)(2)(iv).
Response: EPA has determined that none of the 14 target chemicals investigated warrant listing as hazardous waste. As described in detail in the proposed rule and today's final rule, the Agency determined that these chemicals, when used as solvents, did not pose a risk to human health and the environment. As a result, the commenter's concerns relative to the addition of chemicals to 40 CFR Part 261, Appendix VIII, management of dilute wastewaters, and revisions to the mixture rule at 40 CFR 261.3(a)(2)(iv) are moot.

Commenter: Department of Energy
Comment: In a November 17, 1981 notice (46 FR 56582), EPA recognized that the risks posed to human health and the environment from the management of certain wastewater mixtures were not substantial, and thus, the Agency revised the regulations under 40 CFR 261.3(a)(2) to exempt from being hazardous waste certain mixtures of solid waste (i.e., wastewater) and hazardous wastes. For the purpose of this rulemaking, the most relevant of these exemptions include mixtures of wastewater and listed spent solvents, as well as mixtures consisting of wastewater and wastes (including solvent wastes) that are generated by laboratory operations [40 CFR 261.3(a)(2)(iv)(A),(B) & (E), respectively]. Under these mixture rule exemptions, such mixtures are not presumed to be hazardous waste when generators can demonstrate that their mixture consists of:

> Wastewater managed in wastewater treatment systems whose discharge is subject to regulation under the Clean Water Act (CWA); AND
> One or more of the identified spent solvents provided the combined concentration in the resulting mixture is no greater than 1 ppm and/or 25 ppm at the headworks (depending on the specific solvent constituents), OR

> Laboratory wastewaters that contain or may contain listed hazardous wastes (e.g., spent solvents) provided the concentration of laboratory wastewater is less than one percent of the total wastewater flow into the headworks of the facility's wastewater treatment system.

Relevant to this listing determination, some of the solvent uses discussed in the preamble result in the generation of residuals that are managed in wastewater treatment units and are primarily wastewater [e.g., 99.6 percent phenolic wastewaters containing from 0.01% to almost 8 percent phenol (61 FR 42336, col. 2)]. Furthermore, as previously noted, EPA clarifies in its preamble discussion regarding the potential for groundwater risks posed by treatment in surface impoundments that "[solvent levels were generally found to be below the HBLs at the headworks." (61 FR 42325, col. 2). Water HBLs for many of the solvents addressed in this notice fall within the 1 ppm to 25 ppm range (e.g., acetonitrile, 0.2 mg/L; 2-methoxyethanol, 0.2mg/L; phenol, 20 mg/L; furfural, 0.1 mg/L) [1].[Milligrams per liter (mg/L) converts into parts per million (ppm) on approximately a one-to-one basis (i.e., 1 mg/L is approximately equivalent to 1 ppm)]. Taking this information into consideration, it appears that mixtures of wastewater and spent solvent waste (from the use of the 14 chemicals as solvents) would likely fall below the established mixture rule exemption thresholds in most cases. As such, this seems to offer some further support to the Agency's proposal not to add these solvent wastes to the lists of hazardous waste. Should EPA determine that listing one or more of the wastes from the use of the 14 chemicals as solvents is warranted, the Department requests that (at a minimum) EPA should clarify the relationship between any newly listed solvent waste(s) and the mixture rule exemptions. Moreover, DOE requests EPA consider amending the mixture rule exemptions to incorporate any such newly listed solvent waste(s).

Response: EPA has determined that none of the 14 target chemicals investigated warrant listing as hazardous waste. As described in detail in the proposed rule and today's final rule, the Agency determined that these chemicals, when used as solvents, did not pose a risk to human health and the environment. As a result, the commenter's concerns relative to revisions to the solvents and laboratory exemptions at 40 CFR 261.3(a)(2)(iv)(A),(B) & (E) and wastewater mixture provisions at 40 CFR 261.3(a)(2) are moot.

Commenter: Department of Energy

Comment: The Department of Energy (DOE) appreciates the opportunity to provide input in response to the proposed spent solvent listing determination and the Solvents Study. Based on the information provided in the NPRM, the Department generally supports EPA's proposal not to list as hazardous those wastes generated from the solvent use of the 14 specified chemicals. DOE believes that the methodology utilized for establishing the study universe is reasonable. Furthermore, the Department believes that it is appropriate for EPA to use the same approach in this listing determination as in the previous solvent listings, and concurs with EPA's retention of the interpretations used in the past to define "solvent use" and "spent solvent" waste generation.

Response: EPA appreciates the commenter's support of the methodology and definitions employed in the solvent listing determination.

Commenter: Utility Solid Waste Activities Group

Comment: The following comments in response to EPA's proposed rule on "Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Solvents; CERCLA Hazardous Substance Designation and Reportable Quantities" (61 Fed. Reg. 41398 (Aug. 14, 1996)) are submitted on behalf of the Utility Solid Waste Activities Group ("USWAG"). USWAG is an informal consortium of the Edison Electric Institute ("EEI"), the American Public Power Association ("APPA"), the National Rural Electric Cooperative Association ("NRECA"), and about 80 electric utilities located throughout the country. EEI is the principal national association of investor-owned electric power and light companies. APPA is the national association of publicly-owned electric utilities. NRECA is the national association of rural electric cooperatives. Together, USWAG members represent more than 85 percent of the total electric generating capacity of the United States, and service more than 95 percent of the nation's consumers of electricity.

USWAG'S INTEREST IN THE RULEMAKING

Since its formation in 1979, USWAG has participated in virtually every major rulemaking under the Resource Conservation and Recovery Act ("RCRA") to present its views on the need for the development of a cost-effective, practical and environmentally protective hazardous waste regulatory program. USWAG members generate a variety of waste streams, and certain members generate some of the 14 spent solvents that are the subject of this rulemaking, such as phenol, furfural, cyclohexanol, 2-methoxyethanol acetate, 2-ethoxyethanol acetate and acetonitrile. These wastes typically are generated by electric utilities in extremely small volumes as part of on-site laboratory operations and are managed under RCRA Subtitle C as characteristic hazardous waste.

EXECUTIVE SUMMARY

USWAG strongly supports EPA's proposal not to classify the 14 spent solvents as listed hazardous waste. Listing such wastes as hazardous is unnecessary to protect human health and the environment and would greatly complicate the future management of these waste streams. In particular, USWAG supports the no-listing proposal because EPA is legally authorized to consider plausible mismanagement scenarios in making listing determinations, the Agency properly identified the appropriate waste management scenarios and exposure pathways, and EPA correctly concluded that the 14 solvents at issue do not pose a risk to human health or the environment under the plausible mismanagement scenarios. Finally, by evaluating plausible mismanagement scenarios as part of the risk assessment decision-making process, the proposed rule would help establish an important precedent that would further promote EPA's efforts to develop a more risk-based approach to regulating hazardous waste.

Response: EPA appreciates the commenter's support of the methodology employed in the solvent listing determination and the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste

Commenter: Utility Solid Waste Activities Group
Comment: C. The 14 Solvents At Issue Do Not Pose A Risk To Human Health And The Environment Under Plausible Mismanagement Scenarios

Based on the identified plausible mismanagement scenarios and exposure pathways, EPA determined that none of the 14 solvents meet the hazardous waste listing criteria set forth in 40 C.F.R. § 261.11(a)(3). Id. at 42320. While the analysis varies somewhat for each solvent, EPA's fundamental reasoning for proposing not to list each of the solvents is the same: the solvent poses no significant hazard to human health or the environment. For example, EPA found that

> the air risks from phenol in wastewater treatment and storage tanks are below levels of concern, the Agency cannot identify a single instance of damage that could be tied to use of phenol as a solvent, and 92% of phenol nonwastewater residuals already are classified as hazardous (id. at 42337);
>
> a risk assessment of furfural (based on management in a surface impoundment, in a tank, or by incineration) reveals minimal risk, and the use of furfural as a solvent has not been linked to any environmental damage in EPA's Record of Decision or Hazard Ranking System databases (id. at 42341);
>
> there is a very limited use of cyclohexanol as a solvent, and nearly all of the cyclohexanol wastes are reportedly incinerated in a hazardous waste BIF (id. at 42344);
>
> use of 2-methoxyethanol acetate reflects consumption of stockpiled chemicals because production ceased in 1992, all waste generated are reportedly sent to a hazardous waste BIF, and the risk assessment indicates minimal risk through the relevant exposure pathways (id. at 42347);
>
> 99.8% of 2-ethoxyethanol waste currently are managed as hazardous waste, use of the solvent is declining rapidly, and the risk assessment indicates minimal risk through the relevant exposure pathways (id. at 42339); and
>
> nearly all of the nonwastewater acetonitrile residuals are either already being handled as hazardous or contain negligible amounts of the solvent, the potential risk from air releases of acetonitrile stored in open tanks is not significant, and it is implausible that these wastes will be managed in an unsafe manner (id. at 42330).

EPA's risk assessment indicates that certain of these waste streams are generated in extremely small volumes as a solvent in laboratory analyses. See e.g., id. at 42327, 35, 38, 40, 43 and 46.

As noted previously, some USWAG members generate such solvent wastes as part of their on-site laboratory operations. These wastes typically are managed under RCRA Subtitle C as characteristic hazardous waste. As a result, none of these 14 solvents poses a substantial risk or potential hazard to human health and the environment warranting their regulation as listed hazardous wastes.
Response: EPA appreciates the commenter’s support of the methodology employed in the solvent listing determination and the commenter’s support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste. In addition, EPA appreciates the commenter’s confirmation of EPA’s assessment of management practices for laboratory wastes and concurs with the commenter that such wastes are managed as RCRA Subtitle C waste.

Commenter: Utility Solid Waste Activities Group
Comment: CONCLUSION
USWAG appreciates the opportunity to submit comments supporting EPA's proposal not to classify the 14 spent solvents as listed hazardous waste. In particular, we agree with EPA's management-based approach whereby the Agency evaluates plausible mismanagement scenarios in making hazardous waste determinations. EPA's risk assessment demonstrates that none of the 14 spent solvents pose a risk to human health or the environment under plausible mismanagement scenarios. Adopting this approach in this rulemaking will help establish an important precedent and further the Agency's goal of developing a more effective, risk-based framework for regulating hazardous waste.
Response: EPA appreciates the commenter’s support of the methodology employed in the solvent listing determination and the commenter’s support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste

Commenter: Utility Solid Waste Activities Group
Comment: USWAG strongly supports EPA's proposal not to classify the 14 spent solvents as listed hazardous waste. Listing such wastes as hazardous is unnecessary to protect human health and the environment and would greatly complicate the future management of these waste streams. In particular, USWAG supports the no-listing proposal because EPA is legally authorized to consider plausible mismanagement scenarios in making listing determinations, the Agency properly identified the appropriate waste management scenarios and exposure pathways, and EPA correctly concluded that the 14 solvents at issue do not pose a risk to human health or the environment under the plausible mismanagement scenarios. Finally, by evaluating plausible mismanagement scenarios as part of the risk assessment decision-making process, the proposed rule would help establish an important precedent that would further promote EPA's efforts to develop a more risk-based approach to regulating hazardous waste.

Response: EPA appreciates the commenter's support of the methodology employed in the solvent listing determination and the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste

Commenter: Utility Solid Waste Activities Group
Comment: D. A Concentration-Based Listing Determination Is Not An Appropriate Or Necessary Alternative In This Rulemaking

EPA states that, depending upon the information received during the comment period, the Agency may consider listing only wastes with high concentrations of the specified solvents. Id. at 42327. Under certain circumstances, USWAG would support a concentration-based listing determination because such an approach would incorporate risk-based considerations into the hazardous waste identification process. This approach also would be consistent with the Agency's proposal to allow wastes with low constituent concentrations to exit from Subtitle C under the HWIR-process waste rule. See 60 Fed. Reg. 66344 (Dec. 21, 1995).

Nevertheless, a concentration-based listing determination is not justified based on the current record in this rulemaking. EPA's risk assessment shows that the 14 solvents do not pose a significant hazard to human health or the environment under any plausible mismanagement scenario. 61 Fed. Reg. at 42320. Further, the Agency has not conducted the necessary analyses to demonstrate that wastes mixed with or derived-from the 14 solvents satisfy the hazardous waste listing criteria set forth in 40 C.F.R. §261.11. EPA therefore correctly concluded that "it may be inappropriate to list the full range of wastes that might otherwise be brought under regulation through application of the mixture and derived-from rule to such waste." Id. at 42327. We note that, if new information prompts EPA to consider a concentration-based or any other fundamentally different approach to this rulemaking, the Agency would be required to provide an additional opportunity for public review and comment.2 [2 See e.g., Natural Resources Defense Council v. EPA, 824 F.2d1258, 1285 (1st Cir. 1987) (remanding groundwater protection requirements because EPA failed to give adequate notice that separate groundwater requirements were under consideration; Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 547 (D.C. Cir. 1983) (vacating portion of lead phase-down final rule because it was not a "logical out-growth" of the proposed rule);]

* * * * *

In short, the 14 solvent wastes will not plausibly be managed in a manner that poses a threat to human health and the environment. Therefore, USWAG agrees with EPA that the 14 spent solvents do not meet the criteria set forth in 40 C.F.R.§ 261.11(a)(3) and should not be classified as listed hazardous wastes.

Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste.

Commenter: Chemical Manufacturers Association

Comment: The Chemical Manufacturers Association (CMA) is pleased to submit the following comments on the Environmental Protection Agency's (EPA's) August 14, 1996 Federal Register notice proposing not to list additional wastes from solvent usage as hazardous waste under RCRA. 61 Fed. Reg. 42318.

CMA is a nonprofit trade association whose member companies represent more than 90 percent of the productive capacity for basic industrial chemicals in the United States. Incidental to manufacturing chemicals, which make possible a wide variety of beneficial products, CMA members utilize large quantities of various solvents in their manufacturing processes as carriers and reactants. Thus, CMA would be greatly affected by any decision to list additional hazardous wastes from solvent usage under RCRA Subtitle C.

CMA agrees with the Agency's proposed decision not to amend 40 C.F.R. § 261.31 to add wastes from nonspecific sources generated during the use of the 14 chemicals.[1] [[1] The 14 chemicals are acetonitrile, 2-ethoxyethanol acetate, 2-methoxyethanol, 2-methoxyethanol acetate, cyclohexanol, cumene, phenol, furfural, isophorone, methyl chloride, 1,4-dichlorobenzene, benzyl chloride, epichlorohydrin, ethylene dibromide.] As the Agency recognized in the proposal, "many of these wastes are already regulated as hazardous wastes because they exhibit a hazardous waste characteristic under 40 C.F.R. Part 261 Subpart B, and/or because they are mixed with other solvents that are, themselves, listed hazardous waste." 61 Fed. Reg. 42319. As a result, the solvents are not likely to be improperly managed. (Nor would duplicative listings add significant protections.) The Agency also found that four of the chemical were found unlikely to be used as solvents. 61 Fed. Reg. 42320. The Agency thus correctly concluded that the 14 chemicals do not meet the 40 C.F.R. § 261.11 listing criteria.

Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste

Commenter: Gossman Consulting, Inc.

Comment: One has to wonder if part of the rationale *not to list* these solvents is related to not providing an interim status opportunity. Another line of logic would be that EPA Administrator Carol Browner is attempting to take her anti-combustion strategy to a new extreme level. Obviously, if more and more organic compounds are not listed as hazardous wastes as part of EPA's "listing determination for solvent wastes" responsibility, then they are readily excluded from combustion as a logical disposal option. While this line of logic might normally be pretty far flung, USEPA Administrator Browner's anti-combustion passions are well known and documented. Perhaps only such far flung logic helps to explain this proposal *not to list* solvents that are similar in toxicity to other F code waste organic compounds.

Response: The commenter is mistaken in the assertion that the hazardous waste listing determination for residuals from use of the 14 chemical as solvents is in any way associated with the Agency's Combustion Strategy. In no way, either in the Background Document or in the preamble for the proposed rule, did EPA indicate that any part of the rationale for a determination not to list the spent solvents was based on “providing an interim status opportunity” or providing that spent solvents are “readily excluded from combustion as a logical disposal option” as the commenter contends. To the contrary, the Agency found, in fact, that 91% percent of all nonwastewater residual streams from the use of the 14 chemicals as solvents, on which listing determinations were made, are managed by thermal treatment, either through incineration, burning for energy recovery, or fuel blending for future use. Clearly, thermal treatment is the management option preferred by generators for those spent solvent residuals amenable to such management. Nothing in the proposed rule or today’s final rule precludes use of these management options. If fact, the Agency expects that thermal treatment management options, identified in the RCRA 3007 Survey by generators of spent solvent residuals, will continue to be utilized to manage these residuals. As to the commenter’s statement that the 14 target chemicals are similar in toxicity to other F code waste organics, the Agency disagrees that these solvents are similar to the other F-listed solvents. The F-listed solvents are commonly and widely used as solvents, their solvent uses are known and well characterized, and they are commonly used at a before use concentration of ten percent or more (by volume). The Agency’s assessment of the risks associated with plausible mismanagement indicate that residuals generated from the use of these chemicals for their solvent properties do not pose a risk to human health and the environment.

Commenter: Gossman Consulting, Inc.
Comment: Gossman Consulting, Inc. goes on record with these comments addressing the August 14, 1996 EPA Notice of Proposed Rulemaking *proposing not to list* various organic compounds, many of which are used as solvents, which seems contradictory to USEPA responsibilities to protect human health and the environment. Why these compounds would be singled out *not to list* as hazardous wastes, when they are similar in toxicity to other F code hazardous waste solvents, would appear to defy human health and safety protection logic.
Response: The Agency disagrees that these solvents are similar to the other F-listed solvents. The F-listed solvents are commonly and widely used as solvents, their solvent uses are known and well characterized, and they are commonly used at a before use concentration of ten percent or more (by volume). The Agency’s assessment of the risks associated with plausible mismanagement indicate that residuals generated from the use of these chemicals for their solvent properties do not pose a risk to human health and the environment.

Commenter: Ciba Specialty Chemicals Corporation
Comment: Ciba Specialty Chemicals Corporation (Ciba) is pleased to submit these comments on the U.S. Environmental Protection Agency's (EPA's) proposal not to list 14 used solvents as hazardous waste under the Resource Conservation and Recovery Act (RCRA). 61 Fed. Reg. 42318 (Aug. 24, 1996). Ceiba welcomes the opportunity to submit these comments. Ceiba also supports and incorporates by reference the comments submitted separately on this rule by the Chemical Manufacturers Association (CMA).

Ciba was recently formed from the Additives, Consumer Care, Textile Products, Pigments and Polymers divisions of Ciba-Geigy Corporation. In 1995, the total sales of these five divisions was $1.4 billion. Ceiba employs approximately 2,600 people in Alabama, California, Delaware, Louisiana, Michigan, New Jersey, New York, and North Carolina.

CIBA SUPPORTS EPA'S DECISION NOT TO LIST 14 USED SOLVENTS:

Ciba supports EPA's decision not to list these solvents. Ciba believes that EPA's approach to this rulemaking has allowed for a candid and full examination of the risks posed by the actual, or "real world", use of the 14 chemicals. EPA's willingness to apply this approach is both enlightened and refreshing. All too often, EPA has not heeded actual risks in establishing standards or regulatory frameworks. By applying this type of risk-based analysis the Agency has developed a proposed regulation that tailors regulatory requirements to the actual risk posed.
Response: The Agency appreciates the commenter's support of its determination that residuals from the 14 chemicals used as solvents do not meet the criteria for listing presented at 40 CFR §261.11(a)(3) and should not be listed as hazardous waste.

B. Sufficient Regulation of Solvents

Commenter: American Petroleum Institute (API)
Comment: B. EPA Has Assigned Appropriate Weight To The Fact That Many Of The Solvent Wastes Are Already Managed As Hazardous Wastes.

As EPA notes throughout the preamble, many of the solvent wastes under review (particularly in the nonwastewater form) are already managed as RCRA hazardous wastes, either because they exhibit a hazardous characteristic or because they are co-managed with listed hazardous wastes. EPA assigns appropriate weight to the current regulatory status of such wastes in assessing risks, and ultimately, in proposing its listing determinations.

The current RCRA-regulated status of several of the solvents is relevant in at least three stages of EPA's analysis. First, in deciding which of the plausible management scenarios for a given residual warrant quantitative risk assessment, it is appropriate to consider whether listing the residual would achieve any reduction in risk (assuming quantitative risk assessment were to demonstrate risks at all). EPA considered this in several instances. For example, deep well injection of acetonitrile wastes was reported to occur, and thus, was deemed a plausible mismanagement scenario. However, EPA reasonably determined, without conducting a quantitative risk assessment, that listing would do little or nothing to reduce risks, because all deep well injection units were reported to be Subtitle C units and nearly all wastes managed in deep well injection were reported to be hazardous (so they would have to be managed in Subtitle C units). 61 Fed. Reg. 42328.

Second, there were a limited number of instances where EPA's high-end risk analysis projected borderline or potentially significant risk as to a particular exposure pathway. In those instances, the Agency appropriately considered whether the modeled risk would be reduced based on the fact that the waste was already being managed as hazardous and the modeling exercise itself did not account for this fact. For example, EPA's model projected a high-end hazard quotient ("HQ") of 16 for the inhalation pathway from storage of 2-ME in open tanks. [3] [[3] Under EPA's listing determination policy, HQ's above one (1) are considered grounds for concern.] However, because all wastestreams managed under this scenario were already hazardous, EPA reasonably concluded that no risk reduction would be achieved by listing the wastes as hazardous. 61 Fed. Reg. 42331. Moreover, the Agency correctly observed that risks from the inhalation pathway would be addressed by the new RCRA volatile organic emission controls established at 59 Fed. Reg. 62896 (Dec. 6, 1994) and 61 Fed. Reg. 4903 (Feb. 9, 1996). 61 Fed. Reg. 42332.[4] [[4] The Agency dealt similarly with modeled risks from the inhalation pathways from the open-tank storage of acetonitrile, 61 Fed. Reg. 42329, and the treatment of methyl chloride-bearing wastewaters in a surface impoundment (where the bounding analysis had shown risks of 7 X 10-6), 61 Fed. Reg. 42334.]

Third, the current RCRA status of a given solvent is relevant in consideration of damage incidents. In its review of its Superfund Record of Decision database, EPA could find no evidence of environmental damage specifically traceable to the disposal of wastes resulting from the use of any of the solvents for their solvent properties. However, in considering whether new Superfund sites might be created by the disposal of solvent wastes EPA appropriately considered the fact that several of the solvents, as hazardous wastes could not now be disposed of in the uncontrolled manner that could rise to Superfund sites. See 61 Fed. Reg. 42332 (2-ME), 42337 (phenol), 42339 (2-EEA), 42346 (isophorone), 42347 (2-methoxyethanol acetate).

EPA's consideration of the current RCRA status of the solvent wastes is reasonable, and permissible under 40 C.F.R. § 261.11(a)(3)(xi), which requires EPA to consider "[such other factors as may be appropriate." Consideration of a waste's RCRA status avoids listing where little or no benefit is expected to be gained. This is consistent with the purpose of considering the risk-reducing effects of other regulatory programs under 40 C.F.R. § 261.11(a)(3)(x), discussed below.

Response: The Agency concurs with the commenter's assessment of the methodology employed in determining whether to list the 14 chemicals as hazardous waste when used for their solvent properties. As the commenter notes, EPA considered the protectiveness of current management practices (e.g., whether the residual or unit were regulated under Subtitle C), current regulatory status of the waste (i.e., Hazardous vs. Nonhazardous), the effects of current EPA regulations on the management of residuals, and the potential for management of residuals in different units in evaluating the risks presented by residuals generated from the use of the 14 chemicals as solvents. The Agency can assess these additional factors, as provided under 40 CFR §261.11(a)(3)(x) and (xi).

Commenter: American Petroleum Institute (API)
Comment: C. Consistent With The Listing Criteria, The Agency Has Also Given Due Consideration To The Existing Benefits Of Other Regulatory Programs.

Among the factors that EPA is required to consider under its listing criteria is "[action taken by other governmental agencies or regulatory programs based on the health or environmental hazard posed by the waste or waste constituent." 40 C.F.R. § 262.11(a)(3)(x).

In proposing not to list methyl chloride, for example, the Agency notes that most of the solvent waste is generated by butyl rubber manufacturers, and that air releases of methyl chloride from storage tanks and wastewater treatment systems in that industry will be controlled under the proposed national emission standard for hazardous air pollutants ("NESHAP") for Emissions from Process Units in the Elastomers Manufacturing Industry under the Clean Air Act. 61 Fed. Reg. 42335. Similarly, in discussing potential risks associated with management of phenol in wastewater treatment systems, EPA relies on the fact that effluent limitations under the Clean Water Act result in removal of phenol from the wastestream, thereby reducing phenol's availability to groundwater.[5] [[5] Petroleum refineries, the principal users of phenol as a solvent, are subject to BPT and BAT effluent limitations guidelines for phenolic compounds. See 40 C.F.R. Part 419.]

Additionally, in a more general fashion, EPA considers the risk-reducing potential of recent and ongoing regulatory initiatives under the Occupational Safety and Health Act (OSHA), the Emergency Planning and Community Right-to-Know Act, the Clean Air Act, and the Clean Water Act. 61 Fed Reg. 42350-51. While those initiatives are not controlling in EPA's listing decision, EPA appropriately considers their cumulative impacts as additional reasons that listings are not warranted in this proceeding.

Response: The Agency generally concurs with the commenter's assessment of the methodology employed in determining whether to list the 14 chemicals as hazardous waste when used for their solvent properties. However, while EPA did cite relevant air regulations as additional reasons why listing was not warranted for some solvents, the Agency's listing decisions did not directly rely in any substantive way on the OSHA or Right-to Know Act requirements. The section of the proposed rule cited by the commenter merely noted the relationship of the listing determinations to other regulatory programs, and was not the basis for any listing decisions.

Commenter: EDF

Comment: 6. Ignitable Solvent Wastes

Some of the solvent wastes reported by the 156 facilities receiving the final questionnaire are already regulated as hazardous, because they exhibit the ignitability hazardous waste characteristic. On this basis, EPA assumes analogous waste streams generated by all industry sectors using the particular solvent always generate an ignitable hazardous waste, and will continue to do so forever. This assumption is not sustainable given the gross limitations associated with the preliminary and final questionnaires, as explained above.

In addition, the solvent wastes generated in this rulemaking contain widely varying solvent concentrations, indicating it is possible to adjust solvent uses so that the resulting waste no longer exhibit a hazardous waste characteristic.[59] [[59] EPA claims solvent use, by necessity, requires very high concentration of the chemical. See 61 FR 42324 (August 14, 1996). However, the record indicates varying concentrations of solvent used. For example, phenol concentrations range from 1-100%, 2-EEA concentrations range from 3-100%, isophorone concentrations range from 5-100%, and cumene concentrations range from 1.7-100%. See Listing Background Document, Appendix I. In addition, even when higher concentrations of solvents are used, larger volumes of lower concentration wastes can be and are generated, as discussed above.] Significantly, the solvent concentrations in the wastes can be very high before exhibiting the ignitability characteristic.

Using Raoult's law, vapor pressure data, and the lower flammability limit (LFL) of the solvent obtained from National Safety Council and National Fire Protection Association references, it is possible to calculate the concentration of the solvent in a mixture that would produce an associated solvent air concentration just below the chemical's LFL. For four solvents that exhibit a flash point below the ignitability characteristic of 140 F in their pure form, the following concentration thresholds in solvent waste mixtures would not exhibit the characteristic of ignitability (the lower range assumes mixing with a 12 carbon chemical, and the higher range assumes mixing with water):

1.	Acetonitrile	16-63%
2.	Cumene	72.6%-93.5%
3.	2-EEA	81-96%
4.	2-Methoxyethanol	71-93%

Under these circumstances, the solvent wastes would pose a substantial risk to human health and the environment, but would not be subject to hazardous waste regulation.

Response: EPA disagrees with the commenter. No where does EPA *assume* that analogous wastestreams generated by all industry sectors using a particular solvent always generate an ignitable waste. EPA 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 and that present management practices are not likely to change. 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 the proposed rule and the Supplemental Risk Assessment document for more details.)

For the other six solvents mentioned by the commenter (phenol, cyclohexanol, furfural, cumene, 2EEA, isophorone) 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. Wastewaters that were managed in impoundments were evaluated in detail (see Risk section). 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.

In its final analysis (Phase III) for storage tanks, EPA did exclude concentrated acetonitrile and 2-methoxy ethanol wastes that were regulated as hazardous already. The Agency believes this is appropriate and reasonable given the form of the wastes and the relevant regulations. These wastes are spent solvents generated in relatively concentrated form with high organic content. Based on the data in the 3007 Survey, EPA has no basis to project such wastes would be either somehow generated in a different (nonhazardous) form, nor that these wastes could (or would) be managed in any different manner, except thermal treatment (or recycling). As noted below in response to related comments, EPA believes that facilities had ample incentive to alter processes to avoid generating hazardous waste, if that were possible. Therefore, the Agency does not believe it is plausible to assume that these hazardous wastes would be managed as envisioned in its original storage tank scenario (i.e., in uncovered and unregulated tanks).

Commenter: EDF
Comment: EPA should carefully consider the benefits associated with listing the solvent wastes in this rulemaking that may exhibit a hazardous waste characteristic or are sometimes comanaged with presently listed solvent wastes. As explained below, there are important benefits related to enforcement, jurisdiction over reclamation activities, HWIR for process wastes, and pollution prevention/waste minimization that outweigh the extremely limited costs associated with listing these solvent wastes.

7. Solvent Wastes Otherwise Regulated as Hazardous Still Warrant Listing
There are important legal and policy reasons for listing the solvent wastes at issue in this rulemaking, even though they exhibit a hazardous waste characteristic or are comanaged with other listed hazardous waste. Insofar as the wastes are managed in accordance with all hazardous waste regulations, the costs imposed by such listing are minimal while the following benefits are achieved.

In the case of characteristic solvent wastes, listing the respective wastes obviates the need for testing to determine whether the waste is hazardous. Listing also facilitates enforcement because inspectors need only compare the waste to the listing description to verify the applicability of hazardous waste requirements.[60] [[60] In the case of ignitability, the enforcement advantage offered by listing is significant given the lack of an objective test and the limited coverage applicable to ignitable solids. See 40 CFR 261.21 (a) (2).] These advantages to hazardous waste listings prompted the Agency to authorize a hazardous waste listing solely because the waste exhibits a hazardous waste characteristic.[61] [[61] See 40 CFR 261.11(a) (1); 45 FR.33106 (May 19, 1980).] Despite promulgating a regulation for this very purpose, EPA never addresses it in the instant rulemaking.

In addition, EPA never addresses the actual or potential reclamation of characteristic solvent sludges and byproducts, heretofore unregulated unless and until the solvents wastes are listed.[62] [[62] See 40 CFR 261.2, Table 1.]Notwithstanding EPA's pledge to consider the regulation of these materials as part of the listing process, EPA never considers the matter in the instant rulemaking.[63] [[63] 50 FR 619 (January 4, 1985). Similarly, the regulatory status of spent solvent reclamation/recovery residuals is different for listed solvent wastes. If the solvent wastes are listed, the residuals are regulated as hazardous, but if the spent solvent wastes are not listed, the residuals are not regulated unless they exhibit a hazardous waste characteristic.]

Third, where the solvent wastes in the instant rulemaking are comanaged with already listed solvent wastes, the HWIR process waste rulemaking may result in the deregulation of solvent waste mixtures irrespective of the concentration in such waste mixtures of many of the solvents at issue in this rulemaking. 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. By listing as hazardous the solvents in this rulemaking, EPA would be required to set exit levels for the solvents, thus ensuring the solvent concentrations in the mixtures are reduced to protective levels prior to leaving the Subtitle C regulatory system.

Fourth, 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. A hazardous waste listing can bring these solvent wastes under a variety of state and federal pollution prevention, waste - minimization, and reporting requirements, which could trigger careful scrutiny of the way the solvent wastes are generated and managed. Unfortunately, while it is incumbent upon EPA to consider the source reduction benefits of a hazardous waste listing as part of this rulemaking,[64] [[64] See Section 13103(b)(2) of the Pollution Prevention Act.] EPA simply lists waste minimization practices applicable to solvent wastes.[65] [[65] 61 FR 4.2351 (August 14, 1996)] This lackadaisical approach toward pollution prevention is particularly disappointing given EPA's waste minimization and combustion policies, where the Agency is purportedly working toward reduced reliance on combustion.

Finally, 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 instant rulemaking ate, at best, substantially incomplete and subject to change. In the damage case descriptions concerning these solvents summarized by EPA, the Agency distinguishes pre-1980 sites from post-RCRA sites, on the theory that existing hazardous waste regulations would prevent repetition of many of the pre-1980 mismanagement practices.[66] [[66] See e.g., Listing Background Document at 13. Such distinctions between pre-1980 and post-1980 operations are irrelevant in this rulemaking context, since the plausible mismanagement scenarios should be based upon nonhazardous waste management.] Given the limitations of EPA's data base in the instant rulemaking, the certainty provided by hazardous waste listings to ensure the mistakes of the past are not-repeated is both necessary and desirable.

Response: The Agency 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* at 42327 to 4332). 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 did not consider the actual or potential reclamation of characteristic solvent sludges and byproducts. The Agency disagrees. EPA examined all residuals generated, including those generated from on-site recycling operations. For example, in the Background Document, Table 4-3 presents the quantity of acetonitrile waste generated by waste type. Among the residuals listed are heavy ends, filtrates/decantates/distillates/mother liquors, organic/aqueous treated residuals, filter related media, and other solids. These residuals were, in part, generated from the recovery of spent solvents or the treatment on-site of spent solvent residuals. Similar tables appear in each section addressing the nine chemicals for which EPA found use as a solvent. While it is true that EPA did not consider residuals generated by off-site treatment, storage, and disposal (TSD) facilities, EPA explained in the Background Document (page 37) its basis for considering data from commercial TSD facilities to be suspect:

> *EPA noted that in the preliminary questionnaire responses and again in full questionnaire responses, TSDRs reported the management of greater quantities of some chemicals than were identified by industry respondents. Generally, EPA believes that this indicates the management of wastes generated from non-solvent uses. Since separation of wastes from solvent and non-solvent uses was not possible at TSDR facilities, EPA could not complete risk assessment for management of these wastes with sufficient confidence in the accuracy of the results.*

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. Given that EPA did not find risks from the solvent wastes examined, EPA has no reason to believe that treatment residuals would show risks of concern.

EPA has no data on the characteristics of such off-site residuals derived from solvent use, and in fact has no indication that many of the spent solvents at issue are sent for off-site reclamation, beyond thermal treatment. As noted above, meaningful data from TSDs could not be gathered. The Agency does not believe it is reasonable to attempt to list wastes in the absence of any indication of risk, because such action would likely result in over regulation where significant risk does not exist. 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 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.

Concerning pollution prevention/waste minimization, in the preamble (61 FR 42351) and again the Background Document (pages 169-174), EPA evaluated waste minimization and pollution prevention options. Moreover, the Agency discussed pollution prevention/waste minimization options with industry during engineering site visits (see IBM Federal Facilities, pg. 4, Lyondell Petrochemical, pg.3, PPG Industries, pg. 7, Stahl, pg. 12, and Carnegie-Mellon/Duquesne University, pg. 12). The Agency was made aware of:

the difficulties associated with solvent substitution within the pharmaceutical industry when FDA-approved drugs are manufactured, (Abbott Laboratories, pg.3, Eli Lilly Co., Shadeland, pg. 6 both claimed as CBI)
the research involved in finding substitutes for glycol ethers in the production of semiconductor chips (IBM Federal Facilities, pg.5, Shipley, pg.7),
the emphasis on solvent reuse and recovery in lube oil manufacturing (Mobil Oil Corp., pgs. 4, 9-10), and other voluntary efforts to reduce the use of solvents or the generation of residuals through process modifications (E-Systems, pgs. 8-9),
difficulty in recycling solvents in pharmaceutical (Wyeth-Ayerst Laboratories, pgs. 7-8), or semiconductor manufacturing (Hitachi Semiconductor, pg. 11) due to purity requirements and product QA concerns.

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. EPA has no reason to believe that listing these wastes would provide any further motivation for pollution prevention, however listing may lead to over regulation where risks do not warrant such action.

The Agency also has reason to believe that industry voluntarily assesses opportunities for pollution prevention. As stated in the Listing Background Document (page 17), all but three 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. These chemicals are used in industry only when their application is considered suitable. 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.

EPA has responded, at length, to the commenter’s contention that the Agency’s identification of the universe of solvent users is “incomplete.” The commenter is referred to the extensive responses elsewhere in this document. Responses to comments in damage cases are also addressed elsewhere in this document.
Commenter: ETC
Comment: C. EPA Has Wrongly Assumed that the 10 Solvent Waste are Already Captured as Hazardous by Other Listings or Characteristics

EPA's second safety-net assumption is that only the proper management scenarios are possible, since these 10 solvent wastes would always be associated with other waste streams already regulated as hazardous under RCRA. EPA assumes that all of these solvent wastes would always fail the characteristic of ignitability, and since they consist of solvent constituents, would always be associated with other concentrated organic wastes such as F001-F005 solvents. This is a very far reaching assumption, given that EPA has done no sampling and analysis to define the characteristics of the various waste streams from these 10 solvents (see page 42321). It is highly probable that these 10 solvent wastes would be generated independent of other F001-F005 solvent waste streams. It is also highly probable that these 10 solvent wastes can be generated in forms that do not exhibit the characteristic of ignitability.

Our member companies have seen many forms of F001 to F005 solvent wastes that do not exhibit the characteristic of ignitability. Considering the derived-from and mixture rules, and considering the 10% solvent criterion, and that these wastes are generated in large proportions as solids, it is ridiculous to assume that the characteristic of ignitability would always already capture these 10 solvent wastes as hazardous. As shown by experience with the F001 to F005 listing, many physical forms of wastes from solvent uses are generated, including debris, resins, sludges, absorbent, and other residues. The value of such a general non-specific source solvent listing is that it captures many physical forms of wastes that could cause environmental impact if improperly disposed. EPA must apply this same goal to these 10 solvents, to control the wide forms of waste that can be generated from solvent uses of these 10 chemicals.

Finally, it is not a universal truth that all solvents have low flash points. Of the 10 solvents under consideration, four have flash points that do no 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.

In addition, solvents in mixtures at concentrations that do not exhibit the ignitability characteristic may still be present at concentrations high enough for the waste to cause potential for harm, due to the toxicity of the solvent constituent. The concentration of the solvent in a mixture at which the solvent no longer exhibits the characteristic of ignitability can be calculated using Raoult's law, vapor pressure data, and the lower flammable limit of the solvent. The lower flammable limit (LFL) is the concentration of the vapor in air below which propagation of a flame does not occur on contact with a source of ignition . [1] [[1] Olishifski, J.B.,ed., "Fundamentals of Industrial Hygiene", 2nd edition. 1985, National Safety Council, Chicago, Illinois. Page 1125.]The lower flammable limit is present above the substance and is measured at or near the flash point. [2] [[2] Glasstone, S. "The Elements of Physical Chemistry". 1958, Van Nostrand Company, New York. Chapter IV. Mahan, B.H. "University Chemistry", 3rd edition. 1985, Adison Wesley, Reading, Massachusetts.] These fundamental concepts can be used to calculate the concentration of each solvent in a mixture below which the mixture will not exhibit a flash point, and therefore would not be an ignitable waste.

The methodology is as follows. First, the LFL in air on a percent volume basis is obtained from the National Safety Council reference below, or from NFPA 325M ("Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids", National Fire Protection Association, 1980). A concentration of the solvent in air is set at a point just below the LFL, since at this concentration or lower no flash point would be exhibited. Next, the air concentration is converted to the vapor pressure using the relationship from page 1125 of the National Safety Council publication cited below:

$$(P_v \text{ / Atmospheric pressure}) \text{ X } 1{,}000{,}000 = \text{ppm of constituent in air.}$$

The atmospheric pressure is assumed to be 760 mm Hg. The concentration of the solvent vapor in air just below the LFL is given in percent by volume. This is multiplied by 10,000 to convert to ppm in air. This allows one to calculate the vapor pressure, P_v,, of the solvent constituent in the mixture at the point just below the LFL.
Next, Raoult's Law [3] [Glasstone, S. “The Elements of Physical Chemistry”. 1958, Van Nostrand Company, New York. Chapter IV. Mahan, B.H. “University Chemistry”, 3rd edition. 1985, Adison Wesley, Reading, Massachusetts.] can be used to calculate the concentration of the solvent constituent in a solution, at a point just below the LFL. Raoult's law is given by the expression:

$$P_v = x_i P_v^o$$

Where P_v^o is the vapor pressure of the pure solvent, and x_i is the mole fraction of the solvent constituent in the mixture. The vapor pressure for the pure solvent is obtained from the National Safety Council reference cited above or from The Merck Index, 11th edition. Knowing the vapor pressure of the pure solvent, and the vapor pressure of the solvent mixture at a point below the LFL in air, allows one to calculate the concentration of the solvent in the mixture, which is essentially x_i. This is done below for each of the four solvents that exhibit a flash point for the pure solvent less than the ignitability characteristic level of 140 F.

Acetonitrile

The flash point of acetonitrile is 42 F, and the LFL in air is 4.4%. Setting the air concentration to 4.3%, just below the LFL, the concentration of the solvent in a mixture that would not exhibit the ignitability characteristic can be determined. A concentration of 4.3% is equal to 43,000 ppm in air. The vapor pressure of acetonitrile at this concentration is given by the following formula:

$$(P_v/760) \text{ x } 1{,}000{,}000 = 43{,}000 \text{ ppm}$$

Solving the above gives P_v equal to 32.68 mmHg. Plugging this vapor pressure into Raoult’s law, the concentration of acetonitrile in the mixture can be calculated. The vapor pressure of pure undiluted acetonitrile is 75 mmHg. This gives the mole fraction as follows:

$$x_i = 32.68/75 = 0.436$$

This mole fraction is equivalent to a concentration of anywhere from 63% (assuming a wastewater), to 16% (assuming the acetonitrile is mixed with a 12 carbon chemical such as a petroleum hydrocarbon constituent in a fuel oil). This concentration range represents a substantial level of acetonitrile in the waste, and would present a toxicological risk, even without the ignitability risk. Acetonitrile can be present in a waste mixture in a range of 16% to 63% without the mixture exhibiting the characteristic of ignitability.

<u>Cumene</u>
The vapor pressure of pure cumene is 10 mmHg. The Flash Point is 115 F, and the LFL is 0.9%. Using the above formulas and assumptions, waste mixtures with a mole fraction below 0.684 would not exhibit the ignitability characteristic. This mole fraction represents a range of 93.5% for a wastewater, to 72.6% for a 12 carbon chemical. In other words, cumene can be present in a waste mixture in a range up to 72.6% to 93.5% without exhibiting the characteristic of ignitability.

<u>2-Ethoxyethanol Acetate (EEA)</u>
The vapor pressure of pure EEA is 2 mmHg. The Flash Point is 120 F, and the LFL is 1.7%. Using the above formulas and assumptions, waste mixtures with a mole fraction below 0.76 would not exhibit the ignitability characteristic. This mole fraction represents a range of 96% for a wastewater, to 81% for a 12 carbon chemical. In other words, EEA can be present in a waste mixture in a range up to 81% to 96% without exhibiting the characteristic of ignitability.

<u>2-Methoxyethanol</u>
The vapor pressure of pure 2-methoxyethanol is 10 mmHg. The Flash Point is 110 F, and the LFL is 1.1%. Using the above formulas and assumptions, waste mixtures with a mole fraction below 0.76 would not exhibit the ignitability characteristic. This mole fraction represents a range of 93% for a wastewater, to 71% for a 12 carbon chemical. In other words, EEA can be present in a waste mixture in a range up to 71% to 93% without exhibiting the characteristic of ignitability.

The above calculations of range in concentrations of the solvent constituents at which the characteristic of ignitability is not exhibited are all based on the lower flammable limit (LFL) and not a Flash Point of 140 F. At the LFL, the material has no flash point by definition. For this reason, the concentration ranges are very conservative estimates, and higher concentrations of the solvents are possible without the mixture having a flashpoint below 140 F.
Response: EPA responds to this issue in the response to essentially the same comment earlier in this section of this document (Section IV.B).
Commenter: General Motors

Comment: The Agency could validate one conclusion it has drawn from those facilities identified as large generators of these solvents. This conclusion stated that there is no need to list these solvents in Subpart D because they are already regulated as a characteristic hazardous waste. This conclusion could be validated by surveying the Land Disposal Notification Forms for these characteristic waste streams to verify that the solvents in question have been identified as Underlying Hazardous Constituents (UHCs). Phenol, acetonitrile, methyl chloride, p-dichlorobenzene and ethylene dibromide are listed as UHCs in 40 CFR 268.48.

Response: The Agency appreciates the commenter's suggestion for validating the regulation of characteristic waste streams. However, EPA's decision for not listing these solvent wastes was not based solely on the conclusion that they are already regulated as a characteristic hazardous waste. While EPA has stated in the proposed FR notice that many of the solvents are currently being managed as hazardous due to a hazardous characteristic, or comanagement with a listed waste, the proposed listing decision was based on an extensive study of the 14 chemicals potentially used as solvents, characterization of the wastes generated from solvent uses, and a risk assessment evaluating plausible management scenarios for these wastes.

C. Comments Specific to Acetonitrile, 2-Ethoxyethanol Acetate, 2-Methoxyethanol, Isophorone, Methyl Chloride and Phenol

Commenter: EDF
Comment: Acetonitrile, 2-Ethoxyethanol Acetate, 2-Methoxyethanol, Isophorone, Methyl Chloride and Phenol
EPA proposed not to list any acetonitrile, and phenol wastes as hazardous. The rationales provided by EPA in support of its proposal are fundamentally flawed because:

1. Contrary to its assertions, the Agency has not collected sufficient data on current waste management practices from all the affected industry sectors to discount standard plausible land disposal mismanagement scenarios;

2. Contrary to the Agency's assertions, this solvent is used in a wide range of industries, and both use quantities and users have and will fluctuate from year to year. Therefore, EPA cannot discount the standard plausible land disposal mismanagement scenarios that can be employed by new users, and by existing users not covered by EPA's final survey who increase the quantities of solvents used;

3. For Acetonitrile and phenol, EPA improperly considered headworks dilution at a small number of facilities indicative of all current and potential wastewater mismanagement, and did not consider the chemical content of the materials used to dilute the solvent wastewaters for acetonitrile and phenol.

4. EPA inappropriately assumed that the solvent wastes currently comanaged with presently listed hazardous wastes, or exhibiting the ignitability characteristic, would continue to be generated and managed in that fashion forever, notwithstanding the lack of any technical bar to solvent switching or other adjustments that could substantially alter such use and waste management practices;

5. The Agency failed to sample for and/or consider the presence of other hazardous constituents in the solvent wastes, nor did the Agency consider the potential for comanagement of wastes containing this and other solvents at issue in this rulemaking;

6. The assumed solvent concentrations in the wastes were based upon unverified facility estimates that may substantially understate actual contaminant concentrations;

7. The risk evaluations failed to consider background and cumulative exposures from other sources;

8. The risk evaluations failed to consider tank releases into land or groundwater, and surface impoundment overtopping or breaches; and

9. EPA did not adequately consider the substantial benefits accrued from listing solvent wastes that are otherwise subject to Subtitle C controls through operation of the mixture rule or a hazardous waste characteristic.

These shortcomings are particularly dramatic in the case of acetonitrile since EPA admits its widely used, the Agency's information on waste management practices associated with laboratory uses is anecdotal, large quantities of solvent wastes are generated from even small quantities of solvent use, and substantial solvent use fluctuation on a facility basis is well documented.[94] [94 Despite the documented fluctuation, EPA eliminated at least 135 of 178 solvent users identified in the preliminary questionnaire solely because of the quantity of solvent used in 1992. See Listing Background Document at 45.]

Response: EPA disagrees with the commenter on all nine points listed. EPA responds to these comments in other Sections of this document, as noted below.

1. EPA responded in detail in, Section III.A of this document, to the commenter's statements regarding the adequacy of the identification of solvent users. EPA further responded in detail, in Section IV.C. of this document, to the commenter's statements regarding selection of plausible mismanagement scenarios.

2. EPA agrees that some of these solvents are used in a variety of different industries. However, the Agency continues to believe its data collection process was adequate. See Section III.A for a detailed response. Section IV.C discusses the issues related to plausible management.

In the specific case of methyl chloride solvent use, EPA does not agree the use was varied or widespread.. Fully 99.5% is used by one industry--butyl rubber manufacturing. The remaining 0.5% is used in research. The Agency fully characterized the waste management practices of all methyl chloride users, and use in the butyl rubber industry far out shadowed use in research.

3. EPA discusses its approach for impoundment modeling in Section V on risk assessment. In the specific case of acetonitrile, the 3007 Survey showed that impoundments were rarely used (3 out of 254 wastes), and that the loadings of acetonitrile in these cases were small. The updated risk analysis for surface impoundments confirms that these wastes present no significant risks. In the case of phenol, large volume wastewaters were generated from the specialized use of phenol in the extraction of lube oil at some petroleum refineries. EPA evaluated potential risks from this waste scenario in detail, as described in Section V and in the Supplemental Risk Document.

As noted in Section V, EPA examined the wastewater treatment systems to determine the system capacity and technical capability to treat waste waters containing the chemicals under investigation. The Agency assessed the technologies in use and their treatment efficiency as a means to determine the ultimate disposition of the chemical. Moreover, the Agency examined the chemical properties of the solvents to assess the likely pathway the chemical would follow in a wastewater treatment system (e.g., partitioning to air, water or sludge). EPA did not consider the chemical content of the materials used to dilute the solvent wastewaters because the Agency is concerned with the *solvents* themselves and with the resulting solvent concentration at the headworks due to commingling with other wastewater streams generated at the facility. EPA responds to the comment on other constituents in Section IV.B.

4. In Section VI.B, EPA responds to the comment on the adequacy of controls afforded by the existing regulations for solvent wastes that are hazardous due to a characteristic or mixing with listed wastes.
5. Responses to comments related to other constituents in the wastes are presented in Section IV.B. In response to comments related to cumulative risks posed by multiple solvents, the Agency performed additional analysis as described in Section V; no significant risks were found using this approach.

6. As described in response to comments on the lack of sampling given in Section IV.B, EPA believes that the data were adequately verified and appropriate for use in the listing determination.

7. As described in Section V, EPA has conducted an analysis of the cumulative risks from solvents at facilities where more than one solvent is managed (see Supplemental Risk Assessment document). EPA assessed all cumulative solvents risks when multiple solvents were managed in one unit or different units at a facility, and found that there were no significant cumulative risks being posed. As noted in responses to comments in Section IV, EPA focused its assessment on the solvents themselves, and not other sources and constituents.

8. As described in Section V, EPA has examined the possibility of spills from management units such as tanks or surface impoundments, and EPA concludes that spills of these wastes from tanks or overtopping from surface impoundments is not of significant concern.

9. EPA responds in general to comments related to the potential benefits to listing in Section IV.B. EPA did consider whether additional protection would be offered through the regulation of acetonitrile, 2-ethoxyethanol acetate, 2-methoxyethanol, isophorone, methyl chloride and phenol as hazardous waste. The vast majority of nonwastewaters from acetonitrile (90%), phenol (97%), and 2-ethoxyethanol acetate (97%) are hazardous waste under current regulations. All 2-methoxyethanol and isophorone nonwastewater residual streams are hazardous wastes; the same is true for all nonwastewater methyl chloride residuals having concentrations greater than trace amounts

Finally, EPA disagrees with the commenter on the adequacy of the universe of facilities surveyed. The Agency has addressed these comments in detail in Section I.A of this document.

D. Comments Specific to Ethylene Dibromide, *p*-Dichlorobenzene, Benzyl chloride and Epichlorohydrin

Commenter: ETC
Comment: The ETC does concur with EPA's decision that waste from solvent uses for epichlorohydrin, p-dichlorobenzene, benzyl chloride, and ethylene dibromide should not be listed. We agree that these 4 chemicals are not used as solvents and would not fit the description for such a listing.

Response: The EPA appreciates the commenters confirmation that ethylene dibromide, p-dichlorobenzene, benzyl chloride and epichlorohydrin are not commonly used as solvents and therefore do not meet the criteria for listing as hazardous wastes as presented in 40 CFR §261.11.

Commenter: Chlorobenzene Producers Association (CPA)
Comment: The Chlorobenzene Producers Association ("CPA") appreciates this opportunity to comment on the recently-published Proposal not to list certain wastes as hazardous solvent wastes subject to the Resource Conservation Recovery Act ("RCRA") and regulations promulgated thereunder, 40 C.F.R. Part 261. 61 Fed. Reg. 42318 (August 14, 1996). CPA submits these comments in support of EPA's Proposal not to list wastes containing *para*-dichlorobenzene ("*p*-DCB") as hazardous solvent wastes. [1] [[1] CPA is an industry association composed of the major North American producers of chlorobenzenes, including *p*-DCB. CPA is organized as an affiliate of the Synthetic Organic Chemical Manufacturers Association, and works in close coordination with the Chlorobenzenes Panel of the Chemical Manufacturers Association.]

CPA believes EPA's Proposal is well-supported for two primary reasons set forth in the Proposal:

> First, *p*-DCB wastes should not be classified as hazardous solvent waste because *p*-DCB does not have significant solvent uses.
>
> Second, *p*-DCB wastes need not be separately listed as solvent wastes because wastes containing *p*-DCB already are comprehensively regulated as hazardous waste under RCRA and 40 C.F.R. Part 261.

p-DCB Does Not Have Significant Solvent Uses

CPA's member companies are not aware of any significant solvent uses of *p*-DCB. As noted in the Proposal, EPA's comprehensive survey disclosed only a handful of facilities reporting solvent uses of *p*-DCB, each of which reported using a nominal amount of the compound, or an intent to phase out its use as a solvent. 61 Fed. Reg. at 42347-48.

The most significant current (and anticipated future) industrial use of *p*-DCB is its consumptive use as a chemically reactive feedstock in the production of polyphenylene sulfide ("PPS") resins. (Parts molded from PPS resins are used extensively in appliance and automotive manufacturing.) *p*-DCB also is used (and consumed) in the production of 1,2,4-trichlorobenzene, which is in turn used primarily as feedstock for the production of another compound used as a herbicide. Finally, *p*-DCB is the primary active ingredient in certain consumer and commercial products used as household moth control pesticides and air fresheners/space deodorants.

p-DCB is a crystalline solid at room temperature. It has a moderate vapor pressure (0.6 mm Hg at room temperature) and readily sublimes (i.e., vaporizes directly from solid to gas). The Proposal recognizes that those physical characteristics practically limit the compounds' utility as a general solvent. 61 Fed. Reg. at 42348.

p-DCB-Containing Wastes Already Are Subject To RCRA Controls

Chlorobenzene production wastes are listed hazardous wastes under RCRA (Waste Code K085). 40 C.F.R. Part 261.32. In addition, wastes containing more than 7.5 mg/L *p*-DCB are regulated as hazardous waste due to their characteristics (Waste Code D027). 40 C.F.R. §§ 261.24.

Industrial releases of *p*-DCB to the environment also are extensively regulated. Regulations promulgated under the Clean Water Act limit *p*-DCB releases to surface waters. 40 C.F.R. §§ 117.3, 401.15, 414.91, 414.101, 414.111. *p*-DCB air emissions are subject to Section 112 of the Clean Air Act and its implementing regulations. 42 U.S.C. § 7412; 40 C.F.R. Part 63, App. G, Table 9.

Conclusion

For the foregoing reasons, CPA supports the EPA Proposal not to list wastes containing *para*-dichlorobenzene as hazardous solvent wastes under 40 C.F.R. Part 261. CPA would welcome an opportunity to provide additional information in support of these comments, if requested.

Response: The Agency appreciates the commenters confirmation that p-dichlorobenzene is not typically used as a solvent in commercial application and that solvent releases are already subject to other RCRA regulations. The Agency concurs with the commenter that residuals from the use of p-dichlorobenzene as a solvent do not meet the criteria for listing as a hazardous waste as presented in 40 CFR §261.11.

Commenter: Monsanto Company

Comment: Monsanto manufactures both p-Dichlorobenzene and Benzyl Chloride. As we will discuss below, neither of these materials are suitable for use as a solvent and, to our knowledge, are not used as solvents except possibly in very limited applications.
Response: The Agency appreciates the commenters confirmation that both p-dichlorobenzene and benzyl chloride are not typically used as solvents in commercial application.

Commenter: Monsanto Company
Comment: p-Dichlorobenzene (PDCB)

Monsanto is not aware of any significant use of PDCB as a solvent. EPA's own survey on this question determined that only a very few facilities were using PDCB as a solvent. Where it was reported, the use was nominal, or the facility reported as intent to discontinue use.

PDCB is a solid at room temperature. Even the solid has a moderate vapor pressure (0.6 mm Hg at room temperature) so that is sublimes readily. The proposal, at 61 FR 42348, recognizes that these physical characteristics limit the practicality of any solvent use.

PDCB is used as a chemically reactive feedstock. This reactive property would also limit any solvent use. Much is used in the synthesis of polyphenylene sulfide resins and in the production of 1,2,4-trichlorobenzene. It is also used as the primary active ingredient in consumer products involved with moth control ("moth balls") and air fresheners/space deodorants.
Response: The Agency appreciates the commenters confirmation that p-dichlorobenzene does not have significant solvent uses in commercial application. Both the physical and chemical properties of p-dichlorobenzene limit its practicality as a solvent.

Commenter: Monsanto Company
Comment: Monsanto is a member of the Chlorobenzene Producers Association, which is also submitting comments on this proposal. Those comments will be submitted separately, but they are included here by reference, and should be considered to be the comments also of Monsanto Company.
Response: The Agency recognizes the comments to be those of Monsanto Co. The Agency appreciates the commenters confirmation that p-dichlorobenzene is not typically used as a solvent in commercial application and that solvent releases are already subject to other RCRA regulations. The Agency concurs with the commenter that residuals from the use of p-dichlorobenzene as a solvent do not meet the criteria for listing as a hazardous waste as presented in 40 CFR §261.11.

Commenter: PPG Industries, Inc.
Comment: PPG Industries, Inc. (PPG) is a diversified manufacturer of chemicals, coatings and resins, glass and fiber glass. In particular, PPG is a manufacturer of two of the chemicals addressed by the proposed rulemaking, i.e. p-dichlorobenzene and 1, 1-dichloroethylene. Regulation of these materials in the manner considered by the proposal could have a significant impact on PPG's business. Accordingly, PPG submits the following comments:

A. General

PPG is a member of the Chlorobenzene Producers Association which is submitting comments relative to the referenced proposal. PPG supports those comments and incorporates them herein, by reference.

B. Specific Comments

1. p-Dichlorobenzene

PPG supports EPA's decision to not add this chemical to the list of spent solvent wastes. As a producer of p-dichlorobenzene, PPG is not aware of any significant use of this chemical as a solvent. As EPA points out, p-dichlorobenzene is a solid at room temperature which makes it largely unsuitable for use as a solvent. PPG's sales of this material primarily go to customers that use it either as an intermediate in the production of polyphenylene sulfide (PPS) resins, or a an active ingredient in the manufacture of deodorant blocks.

In addition, any waste containing significant amounts of p-dichlorobenzene would be regulated as hazardous due to the characteristic of toxicity (D027) under the existing regulations. Therefore, even if there was some use of p-dichlorobenzene as a solvent, the addition of this chemical to the spent solvent list would be duplicative and unnecessary.

Response: The Agency appreciates the commenters confirmation that p-dichlorobenzene does not have significant solvent use and that its residuals are already classified and managed as hazardous waste. In addition, EPA concurs that p-dichlorobenzene’s physical properties further limit its practicality as a solvent.

Commenter: Monsanto Company

Comment: Monsanto manufactures both p-Dichlorobenzene and Benzyl Chloride. As we will discuss below, neither of these materials are suitable for use as a solvent and, to our knowledge, are not used as solvents except possibly in very limited applications.

Response: The Agency appreciates the commenters confirmation that both p-dichlorobenzene and benzyl chloride are not typically used as solvents in commercial application.

Commenter: Monsanto Company

Comment: Benzyl Chloride

In a letter to EPA dated February 19, 1993, Monsanto detailed several reasons why the listing of Benzyl Chloride as a spent solvent would be inappropriate. The Agency acknowledges that letter in the current proposal (61 FR 42348).

The facts have not changed in any material way since the 1993 assessment and letter. A copy of that letter is in the Docket for this rulemaking, but another copy is attached for the benefit of any reader of these comments.

Monsanto remains the only domestic producer of Benzyl Chloride and we remain convinced that there are no significant uses of benzyl chloride as a solvent. Less than 10% of the domestic use of Benzyl Chloride is imported. As noted in our earlier letter:

> Benzyl Chloride is a reactive chemical. This makes it an excellent chemical intermediate but detracts from its utility as a solvent.
>
> Benzyl Chloride is a lachrymator, so that concentrations as low as 5 ppm can cause tearing in individuals. As a result, the design of solvent containments systems would be inordinately expensive.
>
> Benzyl Chloride is relatively corrosive, generally is managed in nickel equipment because active metals (iron, copper, aluminum, etc) cause it to polymerize readily. Again, the design of solvent containment systems would be very costly.
>
> Benzyl Chloride, to the knowledge of Monsanto, has no unique solvent properties. It is not likely that processors or formulators would use it as a solvent - particularly given the properties that we discuss above.

Response: The Agency appreciates the commenters confirmation that benzyl chloride does not have significant solvent uses in commercial application. The physical and chemical properties of benzyl chloride limit its practicality as a solvent.

Commenter: Monsanto Company
Comment: Benzyl Chloride has been closely scrutinized and RCRA regulated by the Agency, even in the absence of this solvents issue. Spills and discard of the product would be regulated under the P028 listing and still bottoms from the distillation of Benzyl Chloride are regulated as K015 wastes. Additionally, new listings associated with Chlorotoluene manufacture (57 FR 47376, 10/15/92) list as K150 and K151 certain wastes that could be derived from the manufacture of Benzyl Chloride.
Response: The Agency appreciates the commenters confirmation that although benzyl chloride is not commonly used as a solvent, most benzyl chloride wastes are already managed as hazardous waste.

E. Comments Specific to Acetonitrile

Commenter: EDF
Comment: The solvent wastewaters are generated in concentrations many orders of magnitude higher than the proposed HWIR process waste exit level of 0.78 mg/L that is more reflective of standard plausible mismanagement scenarios. And 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.[96] [[96] Compare Listing Background Document, Appendix I to 40 CFR 268.48.]

Response: 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 V, 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.

As noted in the proposed rule, the few solvent wastes reported to go to landfills typically contained negligible levels of acetonitrile and were not of concern. However, 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. 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 wastes'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.[2]) Thus, EPA believes that such wastes will be sent for thermal treatment under the current regulatory structure. The

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[2] 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.

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.

Commenter: EDF
Comment: Therefore, large quantities of acetonitrile wastes are generated in concentrations well in excess of levels capable of posing a substantial risk to human health and the environment, and are managed in ways completely inconsistent with the Congressional directive to minimize the toxicity of mobility of wastes destined for land disposal.
Response: EPA disagrees with the commenter's conclusion that current management practices are inconsistent with Congressional directives to minimize the mobility and toxicity of wastes destined for land disposal. The majority of the acetonitrile waste, both by volume (98%) and by acetonitrile loading (99%), are not management in land-based units nor are they disposed in land-based units. Furthermore, the vast majority of acetonitrile wastes are already hazardous, and as such, must meet the Land Disposal Treatment standards prior to land disposal.

For example, the primary management practice for wastewater is treatment in a tank, a non-land-based management practice that captures 98.4% of wastewaters by volume and 78.8% of acetonitrile in wastewaters by loading. While two land based treatment units are employed, deep well injection and surface impoundment, EPA found no evidence to suggest that these practices posed any risk. Only three wastewater streams were discharged to treatment surface impoundments. Moreover, the acetonitrile loading was small, and the concentration of acetonitrile in all cases were below health-based levels after dilution at the headworks. Of the wastewaters discharged to deep well injection, nearly all were classified as hazardous waste and were discharged in appropriately permitted units. Only a total of 97 kg of wastes containing2 kg of solvent were reported to be nonhazardous; in any case even this nonhazardous waste was sent to a Subtitle C injection well.

The primary management practice for acetonitrile nonwastewaters is thermal treatment or energy recovery,. Such activities reduce the toxicity and mobility of acetonitrile through destruction. A relatively small portion of wastes with appreciable acetonitrile are managed in land-based units, including Subtitle C and D landfills. Three streams were managed in Subtitle C (hazardous) landfills. The largest such waste stream (454 kg.) is no longer managed in a landfill; the facility has informed EPA that it changed the management practice for this residual to energy recovery. As noted in the previous response, EPA assessed the risk associated with land disposal of this waste. One waste stream, a wastewater treatment sludge (4.2 million kg. containing "trace" concentration of acetonitrile), is managed in a nonhazardous landfill. Data on wastewater treatment system efficiency show that biodegradation can destroy greater than 98% of acetonitrile.

Commenter: Ciba Specialty Chemicals Corp.
Comment: Ciba would like to call particular attention to EPA's analyses associated with acetonitrile, one of the 14 chemicals EPA was examining. EPA applied solid scientific analysis of actual data regarding the use of acetonitrile and the management of acetonitrile waste. EPA properly noted that the vast majority of the residuals generated from processes using acetonitrile as solvent "are wastewaters usually containing low to negligible concentrations of acetonitrile." *Id.* at 42327. And as EPA noted, nearly all wastewater residuals from processes using acetonitrile are *managed in on-site wastewater treatment systems*. *Id.* at 42328. EPA also properly noted that some of the remaining residuals, which are nonwastewaters, usually have low to negligible solvent concentrations.
Response: The Agency appreciates the commenter's confirmation that the management practices and characterization of wastewater and nonwastewater residuals from the use of acetonitrile as a solvent have been properly identified.

Commenter: Amoco Corp.
Comment: Amoco Corporation (Amoco) appreciates the opportunity to provide comments on the Environmental Protection Agency's (EPA's) August 14, 1996 proposed rule entitled: "Hazardous Waste Management System; Identification and Listing of Hazardous Waste; solvents; CERCLA Hazardous Substance Designation and Reportable Quantities" 61 Fed. Reg. 42318. Enclosed with this original are two (2) copies of our comments.

Amoco's core businesses include exploration for, and production of, crude oil and natural gas; refining, distribution and marketing of oil products; and manufacture of a variety of commodity and specialty petrochemicals. We employ approximately 44,000 people domestically in about 50 major facilities and numerous smaller locations.

Amoco supports the Agency's decision not to amend 40 CFR 261.31 to add wastes from nonspecific sources generated from the solvent use of acetonitrile (ACN). ACN is used in our butadiene manufacturing process located at our Amoco Chemical Company's Chocolate Bayou Plant. The plant has been in operation since the late 1960s and produces olefins (i.e., ethylene, propylene, and butenes) and polypropylene.

The butadiene process utilizes a closed loop recycle step to recover and reuse the acetonitrile in the process. This recycle loop is an integral step in the process due to the financial incentive that results from the high cost of fresh solvent and supply concerns. ACN is of such value (especially when supply is low) that process residuals may be sent off site to a toll distiller to recover the ACN. The shipped material is manifested and managed as hazardous waste with the toll facility being a RCRA permitted TSD. The recovered ACN is returned to the process and the residuals from this tolling operation sent to fuel recovery. These recovery activities support the agency findings that residuals with high concentrations of ACN are managed as hazardous wastes and "were managed by some form of thermal treatment, including..." blending for fuel recovery. (FR page 42328)
Response: EPA appreciates the commenters confirmation regarding the management of residuals from the production of butadiene using acetonitrile as a solvent. The management practices described are consistent with the Agency's findings both through questionnaires and site visits.

Commenter: BP Chemicals
Comment: 1.BP Chemicals supports the Agency's decision not to list spent acetonitrile solvent as a hazardous waste.

BP Chemicals believes the Agency made the correct decision not to list spent acetonitrile solvent as a hazardous waste. We agree with the Agency's determination that acetonitrile does not satisfy the listing criteria contained in 40 CFR 261.11(a)(3).

We do not believe acetonitrile's toxicity and fate in the environment and other physicochemical properties warrant listing. Acetonitrile is considered nontoxic to invertebrates, freshwater organisms, bacteria, algae and benthic organisms. Acetonitrile is not expected to bioconcentrate in aquatic organisms due to it's low bioconcentration factor (BCF <1). With a K_{oc} value of 16, the sorption of acetonitrile onto sediments will not be important.

Through our customer technical support programs, we have gathered a good understanding of our customer generated spent solvent waste management practices. We believe they are using prudent waste management practices and the RCRA 3007 survey conducted by the EPA appears to closely reflect our experience. Most of our customers are currently managing nonwastewater solvent streams as a hazardous waste due to characteristic of ignitability. Acetonitrile's flash point is 42 F (TOC). Onsite recovery by distillation, off-site recycling, fuels blending and combustion in BIF's & incinerators are all used extensively.

The vast majority of wastewaters are managed in wastewater biological treatment plants or deep well injected in class 1 injection wells. A number of studies have shown that acetonitrile is readily biodegradable in sewage activated sludge.
Response: The Agency appreciates the commenter's confirmation of the management practices used for acetonitrile residuals.

Commenter: BP Chemicals
Comment: 2. The risk assessment conducted by EPA clearly supports the determination not to list spent acetonitrile solvents.

The risk assessment conducted by the Agency supports the proposed determination not to list acetonitrile spent solvents. The risk assessment on "plausible management practices" resulted in all central tendency and high end hazard quotients being below the level of concern (HQ=1). The one exception to this was the high end estimated hazard quotient for direct inhalation resulting from volatilization from on-site accumulation tanks. In the preamble, EPA acknowledges that this was a very conservative scenario because they assumed all solvent would volatilize from the tank. The preamble also points out that the vast majority of these tanks are managing characteristically hazardous wastes or wastes co-managed with listed wastes. Not only is the assumption that all wastes will volatilize from these tanks over stated but, as the Agency points out, the air emissions from many of these units will likely be controlled in the near future. In December of this year, the RCRA Subpart CC Air emissions rule will go into effect. Under this rule, all tanks (90-day or storage) managing hazardous wastes containing 500 ppm volatile organics will require some form of emission controls. This will serve to further reduce risks from these units.

3. The background document incorrectly lists the acetonitrile CERCLA RQ.

A very minor point but on page 66 of the background document the CERCLA reportable quantity for acetonitrile is listed as 100 lbs. We believe the correct reportable quantity is 5000 lbs.

Once again, BP Chemicals appreciates the opportunity to comment on the proposed Solvent Listing Determination rulemaking.
Response: EPA acknowledges the change to the RQ noted by the commenter is correct.

F. Comments Specific to 2-Methoxyethanol

Commenter: EDF
Comment: For both wastewaters and nonwastewaters, EPA completely failed to evaluate potential risks from groundwater contamination, notwithstanding three groundwater contamination incidents involving this solvent identified by EPA.[99] [[99] 61 FR 42332 (August 14, 1996).] In addition to ignoring risks from surface impoundments, EPA assumed tanks containing either-liquids or non-liquids never leak, and landfills would never be used even though two of the three groundwater contamination incidents involved landfills.
Response: As explained in the Solvents Listing Background Document and Federal Register Notice of the proposed rule, EPA considered disposal in a landfill and treatment in a surface impoundment and evaluated the risk from groundwater as a result of these management practices where appropriate. For 2-methoxyethanol, none of the wastestreams reported in the 3007 Survey were managed in a surface impoundment or a landfill. Essentially all of the nonwastewater residuals that contain spent 2-ME are thermally treated or recovered, and 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 and 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.

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.

Commenter: EDF
Comment: These shortcomings are extremely important in the case of 2-methoxyethanol since the wastewaters contain up to 9% solvent, many orders of magnitude higher than the levels

producing adverse health effects documented by EPA, yet are routinely managed as nonhazardous wastes.[97] [[97] EPA Risk Assessment, Appendix A at 20.] Significantly, EPA did not even evaluate the potential risks posed by surface impoundment management of these wastewaters.

With respect to nonwastewaters, 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.[98] [[98] 61 FR 42332, Table 4 (August 14, 1996).] Only by performing the completely misguided Phase III assessment was EPA able to arguably rationalize a no-list decision.

Response: As noted in the previous response, no residuals from the use of 2-methoxyethanol were managed in a surface impoundment, and EPA found no evidence that such a practice was plausible for these wastes.

As described in the proposed rule, EPA multiple phases of risk assessment for 2-ME nonwastewaters (see 61 *FR* at 42331). 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. 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 2-ME, only one showed significant risk when modeled under the Phase II high-end conditions, an uncovered storage tank (also called on-site accumulation in the proposal). The commenter refers to the hazard quotient of 16 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 2-ME 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, all 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, EPA does not view the HQ of 16 as significant.

G. Comments Specific to Methyl Chloride

Commenter: Methyl Chloride Industry Association
Comment: This letter is submitted on behalf of the Methyl Chloride Industry Association (MCIA) to support the EPA's proposed decision not to list methyl chloride as a hazardous waste solvent under the Resource Conservation and Recovery Act (RCRA). *See* 61 Fed. Reg. 42318 (August 14, 1996). This letter addresses those aspects of the proposed rule that relate specifically to methyl chloride.
Response: The Agency appreciates the commenter's support of the decision not to list methyl chloride.

Commenter: EDF
Comment: Nevertheless, on the basis of these seven facilities, the Agency discounts surface impoundment mismanagement, because the one impoundment used by these seven facilities happened to be a permitted hazardous waste unit.[100][[100] 61 FR 42334 (August 14, 1996).] Significantly, methyl chloride wastewaters contain up to 169 ppm, many orders of magnitude higher than the proposed HWIR exit level of 0.096 mg/L more reflective of standard plausible mismanagement practices. Similarly, EPA failed to consider PIC formation from the combustion of any methyl chloride wastes, simply because the waste burned by the one generator reporting the practice was sent to a hazardous waste combustor.[101] [[101] 61 FR 42334 (August 14, 1996).]

For both wastewaters and nonwastewaters, EPA completely failed to evaluate potential risks from groundwater contamination, notwithstanding three groundwater contamination incidents involving this solvent identified by EPA.[102] In addition to ignoring risks from surface impoundments, EPA assumed tanks containing either liquids or non-liquids never leak, and landfills would never be significantly used even though one of the three groundwater contamination incidents involved landfills. The Agency relies upon potential hydrolysis in groundwater to discount potential risks via that exposure pathway, but fails to explain how hydrolysis did not prevent groundwater contamination at the damage sites identified, and fails to address the nature and toxicity of the hydrolysis products.

In addition, the high-end risk analysis for storage of nonwastewaters in onsite accumulation tanks yielded a cancer risk of 4 X $10^{-6.}$ EPA contends this risk estimate is "very conservative", and is an inadequate justification for listing because it assumes all of the stored solvent would volatilize from the tank. However, since the risk assessment does not take into account any of the other hazardous constituents that may be present in the wastes or tank, or the cumulative exposures to toxic chemicals from other sources at the facility or nearby, the estimate is far from conservative.

Response: As discussed detail in the proposed rule (see 61 *FR* at 42334-42335), the Agency did evaluate the groundwater exposure pathway for 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.

EPA did not rely solely on the tendency of methyl chloride to hydrolyze to discount potential groundwater risks. The very limited solvent use of this chemical, and its unique characteristics (a gas at room temperature) led 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, methyl chloride is readily treated by biodegradation and volatilization in waste water treatment systems, making significant migration to the groundwater unlikely.

As noted in the proposed rule (see 61 *FR* at 42332) and the Listing Background Document (page 87), methyl chloride hydrolyzes in water to methanol relatively readily (half-life is reported to be 0.93 years). While methyl chloride was reported in groundwater in several damage case incidents, EPA does not believe these are directly relevant to this listing as noted in the proposal (see 61 *FR* at 42334). The reported presence of methyl chloride in the groundwater may be due to many reasons. Methyl chloride may be produced in the groundwater via degradation of other chlorinated aliphatics, such as those reported at one of the sites. Also, if releases occurred in a large NAPL plume such that the chemical was primarily dissolved in an organic or oil phase, hydrolysis would be correspondingly reduced. (EPA considered the potential for NAPL formation, and found this to be highly unlikely for any of the methyl chloride solvent wastes that were sent to land-based units; this is because methyl chloride was either present at only trace levels, or because the chemical was already dissolved in water, such as in the impoundment evaluated.) Other possible reasons for finding methyl chloride is that the groundwater measurements were taken very close to the source of release, or that the subsurface at a specific site allows relatively rapid transport of chemicals in groundwater due to fractures or karst terrain; in these cases, the hydrolysis of methyl chloride may not be complete. Finally, there is always the possibility of misreporting of analytical data (methyl chloride is sometimes reported in place of the common contaminant, methylene chloride). In any case, the Agency believes that the methyl chloride wastes from solvent use do not present significant risk via groundwater releases.

EPA has responded in general to the relevance of the HWIR levels to its evaluation of solvent wastes in Section V of this document. Specific to methyl chloride, the HWIR exit criteria of 0.096 mg/L cited was not based on risks from groundwater releases, as implied by the commenter, but was based on potential risks from air releases. EPA fully evaluated the specific wastes generated from use of methyl chloride as a solvent and found that potential air risks from storage tanks, wastewater treatment tanks, and surface impoundments were not significant.

EPA did, in fact, consider potential risks from products of incomplete combustion (PICs) resulting from incineration. The solvent uses of methyl chloride are very specialized, and the number of wastes sent to 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 61 *F* 17538, April 19, 1996 and 62*FR* 24212, 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

The high-end risks for storage tanks (4E-06 from the updated analysis and 2E-06 from the *Air Characteristic* approach, as discussed in Section V on Risk Assessment) are 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 highly unlikely for this waste because it is being stored expressly to send for thermal treatment. Furthermore, as noted above, this waste is already regulated as hazardous, and would be subject to RCRA regulations limiting air releases under 40 CFR Part 264 Subpart CC. Finally, potential air releases from the industry generating this waste 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 responds to general comments related to the presence of other constituents in Section IV.B, and cumulative risks in Section V.

H. Comments Specific to Phenol

Commenter: Chemical Manufacturers Association - Phenol Regulatory Task Group
Comment: The Phenol Regulatory Task Group of the Chemical Manufacturers Association (CMA) is submitting these comments on EPA's proposed Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Solvents; CERCLA Hazardous Substance Designation and Reportable Quantities. 61 Fed. Reg. 42318 (Aug. 14, 1996). The Phenol Regulatory Task Group is comprised of domestic manufacturers of phenol that represent approximately 95 percent of United States production.[1/] [1/ Task Group members are: Shell Chemical Company, Merichem Company, JLM Industries Inc., Georgia Gulf Corporation, Dakota Gasification Company, Aristech Chemical Corporation, GE Plastics, The Dow Chemical Company, Allied Signal Inc., Kalama Chemical,dd Inc., GIRSA, Inc., and Texaco Refining & Marketing.]

The Task Group supports and incorporates by reference the comments submitted separately by CMA on this proposed rule. In particular, the Task Group supports EPA's decision not to list wastes from solvent uses of phenol as hazardous wastes. The Task Group agrees with EPA that "phenol does not satisfy the criteria for listing in 40 C.F.R. 261.11(a)(3).”[2/] [2/ 61 Fed. Reg. 42337.]
Response: The Agency appreciates the commenter’s support on the decision not to list phenol and the confirmation that phenol does not satisfy the criteria for listing.

Commenter: Gossman Consulting, Inc.
Comment: As an example, phenol is currently used by itself (without being mixed with other F listed wastes) as an industrial solvent and with this decision “proposing not to list” phenol as a hazardous waste, it would seem to provide disposal option carte blanche for current users. Along this same vein, manufacturers who can modify their processes to use these solvents, which would no longer be considered hazardous wastes, would be prudent to do so thus potentially eliminating the problem of hazardous waste disposal.

Response: The Agency believes it unlikely that facilities would change their management practices based on the information collected in the Survey. The 3007 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.

In the case of phenol residuals that are characteristically hazardous the disposal of such residuals on land is regulated under the Land Disposal Restrictions at 40 CFR §268.48. Characteristic wastes destined for land disposal must be treated to remove the characteristic and any underlying hazardous constituent regulated at 40 CFR §268.48 Universal Treatment Standards.

Commenter: EDF
Comment: EPA also assumed tanks never leak, and landfills would never be used since none were reported by the 31 facilities receiving the final questionnaire. These 31 facilities do not represent any of the facilities in SIC Codes 1311; and account for 2.37% of the facilities in SIC Code 2833, 0.45% of the facilities in SIC Code 2865, 0.03% of the facilities in SIC Code 3471, 0.47% of the facilities in SIC Code 3672, and 1.58% of the facilities in SIC Code 3674.
Response: EPA did not consider the disposal of phenol containing wastestreams in a landfill to be a plausible management scenario. None of the 38 wastestreams containing spent phenol reported in the 3007 Survey to go to a landfill. One reason for this is that very few phenol wastes generated are solids. Only one solid wastestream, spent carbon, contained significant levels of phenol. This was sent to offsite regeneration or incineration. EPA has no reason to conclude that the practice of land filling will increase. Wastes with higher organic content are thermally treated, and most (92%) of the thermal treatment was in hazardous waste units or fuel blending. Therefore, none of the wastes with significant phenol concentration are likely to be placed in a landfill. EPA responded to the general issues of tanks and landfill disposal elsewhere in this document. EPA has responded to the commenter’s concern with regard to the representation of these SIC codes in detail in Section III.A of this document.

Commenter: EDF
Comment: 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 (13 different industrial sectors were identified as potential users according to the chemical abstracts), and its use is projected to increase by 700,000,000 pounds from 1993-1997.[103] [[103] Listing Background Document at 90.] Therefore, EPA lacks any objective basis for concluding it could possibly identify every current and potential use and user, and their associated waste management practices.

Indeed, the wide use of the solvent is confirmed by the huge number of damage cases associated with phenol. Notwithstanding these damage cases, however, EPA didn't evaluate any groundwater risks posed by phenol. EPA inappropriately discounted surface impoundment management based upon site-specific dilution factors at three facilities, as if these three facilities were the only facilities in the United States that could ever manage phenol wastewaters in surface impoundments. Significantly, wastewater concentrations up to 8% phenol were reported, many orders of magnitude higher than the 84 mg/L proposed HWIR process waste exit concentration more reflective of standard plausible mismanagement scenarios.

Response: 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 V. These analyses were based on the specific management scenarios found for these wastes, which EPA believes are entirely appropriate given that these large volume uses are limited to essentially one industry. These analyses did not find significant groundwater risks, and details are given in the Supplemental Risk Assessment document in the docket.

Commenter: EDF
Comment: Two aspects of the Characteristics Scoping Study are particularly relevant to the solvents listing determinations. First, in the course of reviewing damage cases associated with nonhazardous waste management to prepare the scoping study, EPA found phenol was one of the most frequently detected groundwater contaminants at the damage sites, and at the majority of locations, was detected at concentrations exceeding applicable federal or state standards. See Exhibit 2-7.

Due to EPA's methodology for the Characteristics Scoping Study, these phenol releases originated only from nonhazardous waste management units, principally landfills and surface impoundments. See pp. 2-1, 2-11. By expressly excluding product spills and accident releases as part of the damage case "stringent selection criteria", EPA presents in the scoping study clear evidence of both 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. See p. 2-21. Indeed, in its review of the two principal sources of existing data on nonhazardous waste management practices, EPA indicates, "...the wastes is the dominant management method for nonhazardous industrial wastes." See p. 8-24 (emphasis added).
Response: 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.

I. Comments Specific to 2-Ethoxyethanol Acetate

Commenter: EDF
Comment: In the case of 2-EEA, the record demonstrates it is widely used. EPA identified at least seven industrial sectors using the solvent through the literature search, and in the preliminary questionnaire, additional sectors reported using the solvent, including pharmaceuticals, automotive manufacturing, and a catchall category of "miscellaneous industries" responsible for 14% of all the solvent use reported.[107] [[107] Listing Background Document at 103, Appendix A] The breadth of 2-EEA utilization reflects its use for tank cleaning and other standard solvent applications.[108][[108] 61 FR 42338 (August 14, 1996).]

Notwithstanding the wide use of 2-EEA, EPA reached its plausible mismanagement decisions as if the 22 facilities receiving the final questionnaire represented the entire universe of potentially affected facilities and range of waste management practices. Consequently, EPA disregarded any potential use of nonhazardous surface impoundments or landfills, simply because such uses were not reported by these 22 facilities. EPA also assumed tanks storing wastewaters and non-wastewaters never leaked onto land or groundwater, therefore potential risks posed by the groundwater exposure pathway were not evaluated.

Response: EPA responded in detail, in Section III.A of this document to the commenter's statements regarding the adequacy of the identification of solvent users. EPA further responded in detail, in Section IV.C of this document, to the commenter's statements regarding selection of plausible mismanagement scenarios. The Agency has no evidence to suggest that the Questionnaires completed by these facilities failed to identify residual management practices used or that the management practices reported are atypical. EPA responds to general comments related to releases from tanks in Section V of this document.

Commenter: EDF
Comment: 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 comanaged with listed solvent wastes. The concentration of 2-EEA in wastewaters ranges from 200-20,000

ppm. These levels substantially exceed the concentrations associated with reproductive and development effects indicated in animal studies.[109][[109] EPA Risk Assessment, Appendix A at 26]

Significantly, despite all the severe shortcomings in EPA's risk assessment discussed above, EPA's high-end analysis of 2-EEA nonwastewaters stored in onsite accumulation tanks yielded an HQ of 0.7. Proper consideration of all the hazardous constituents in the nonwastewaters, and multiple and cumulative exposures, would likely produce an HQ greater than 1.0 typically triggering a hazardous waste listing.

Response: 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.

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 (Section V), EPA addressed the general comment of the impact of multiple solvents in some wastes by conducting an assessment of the potential for cumulative risks. EPA responds to the general comments concerning the impact of other constituents in Section IV.B.

J. Comments Specific to Cumene

Commenter: American Petroleum Institute
Comment: VI. The Agency Should Recognize That Most Cumene Residuals Are Not Solid Wastes.

While EPA has correctly concluded that cumene residuals do not warrant listing, EPA should add to its analysis the fact that most cumene residuals are not solid wastes, and thus are not subject to listing as hazardous wastes. According to the Agency's data, over 70 percent of the volume of cumene residuals "are collected as vapors and sent directly to on-site combustion." 61 Fed. Reg. 42341. Moreover, those vapors account for over 95 percent of the total constituent loadings for cumene residuals reported. Id.

The statutory definition of solid waste includes "contained gaseous material," and by implication excludes uncontained gaseous material. 42 U.S.C. § 60903(27). It is EPA's long-standing policy that gaseous industrial process emissions that are piped to an incinerator for destruction are not "contained gaseous material," and hence, are not solid wastes subject to RCRA regulation. See In Re: BP Chemicals America Inc., Lima, Ohio, RCRA Appeal No. 89-4 (Remand Order, Aug. 20, 1991), 1991 RCRA LEXIS 60; 47 Fed. Reg. 27530 (June 24, 1982). Thus, the vast majority of cumene residuals (which are collected as vapors and sent to incineration) are not solid wastes.
Response: EPA generally agrees with the commenter that gaseous emissions piped to an incinerator for destruction may not be solid wastes subject to RCRA regulations. However, the Agency wishes to clarify that the cumene vapors to which the commenter is referring to are condensed to a separator and stored prior to being sent to an onsite BIF. Such condensed material appears to meet the definition of solid waste. Thus, EPA evaluated potential risks from storage of cumene wastes at this site, as well as risks from combustion. EPA notes that the waste is reported to be stored and incinerated as hazardous wastes (see the Listing Background Document, 1996, p. 128). EPA found no significant risks for these wastes and is not listing wastes from the solvent use of cumene as hazardous.

Commenter: Chemical Manufacturers Association - Cumene Panel
Comment: The Cumene Panel (Panel) of the Chemical Manufacturers Association (CMA) submits this letter in response to EPA's proposed spent solvents listing determination. Panel members represent the major U.S. manufacturers and processors of cumene. [1] [[1] Panel members are: Allied Signal Inc., Ashland Chemical Company, Chevron Chemical Company, CITGO Refining & Chemicals, Inc., The Dow Chemical Company, Georgia Gulf Corporation, Koch Industries, Shell Chemical Company, Sun Company, Inc., and Texaco Chemical Company.]

The Panel supports comments filed separately by CMA on this proposed rule. The Panel is concerned specifically about the proposed listing of cumene as an "F" waste under the Resource Conservation and Recovery Act (RCRA). We are pleased that the risk assessment methodology described in the proposed rule resulted in the conclusion that cumene does not satisfy the listing criteria described in 40 CFR § 261.11(a)(3). [2] [[2] 61 Fed. Reg. 42343.]

The Panel's concerns about the Agency's proposed listing of cumene have been addressed in earlier correspondence. In our letter of June 6, 1996, we provided extensive toxicological information to support our assertion that cumene should not be added to 40 CFR §261, Appendix VIII. Studies referenced in our letter were sponsored by the Panel under a test rule promulgated under Section 4 of the Toxic Substances Control Act (TSCA), and include pharmacokinetics, subchronic toxicity, developmental toxicity and neurotoxicity testing via inhalation. Although all of these studies were completed and final reports submitted to the Agency in 1991, the Agency has not included this information in the Integrated Risk Information System (IRIS) database. We are pleased that the Agency will consider our submitted information in the context of this rulemaking. To assist in this evaluation, we are including our proposed calculations for the inhalation reference concentration (RfC) and the oral reference dose (RfD), derived from the TSCA test rule study data. We are confident that this information will confirm the Agency's proposed decision not to list cumene as an "F" waste. We are also hopeful that the Agency will subject this information to an external peer review, culminating in the use of updated human health-based numbers in future cumene risk assessments.

Response: The Agency appreciates the toxicological data provided by the commenter. 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/m^3 to 0.4 mg/m^3. 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 this revised "provisional RfC" for all the updated risk assessments involving this solvent 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 Section V. 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 this chemical examined still do not pose significant risks, and thus, these analyses confirm the proposed decisions not to list these wastes.

K. Comments Specific to Isophorone

Commenter: Chemical Manufacturers Association - Ketones Panel
Comment: The Panel supports EPA's decision not to list isophorone as a hazardous waste from solvent use under RCRA. EPA's finding that the chemical, as a solvent, does not pose a risk to human health and the environment under plausible mismanagement scenarios.
Response: EPA appreciates the commenters support of the decision not to list isophorone.

Commenter: EDF
Comment: EPA's proposed decisions regarding isophorone waste plausible mismanagement scenarios warrant particular attention. Although facilities within 15 different SIC codes reported using the solvent in the preliminary questionnaire, and non-solvent uses of the chemical are expanding, EPA contends management practices reported by only five facilities are dispositive of all current and future management practices.[104] These facilities represented 0.28% of SIC code 2821, and 0.94% of SIC Code 2879; two potentially affected sectors identified in Appendix C of the Listing Background Document.

As a result of the incorrect plausible mismanagement scenario decisions, EPA failed to evaluate potential risks via the groundwater pathway from any source, whether landfill, surface impoundment or tank.[105] This failure is even more troubling given the four documented isophorone groundwater contamination damage cases at facilities operating since 1980, including two landfills.[106] Significantly, EPA never mentions how many isophorone damage cases it identified at sites operating before 1986.
Response: Based on responses from the preliminary questionnaire, facilities within 15 different SIC codes reported solvent consumption of isophorone. However, after calls back to pre-questionnaire respondents, it was determined that 26 of the 45 facilities within the fifteen industries had reported solvent consumption that did not meet the regulatory definition of solvent use. Isophorone was either used as a component of a formulation and/or the before use concentration was much less than 10 percent. As a result of the information received from these follow-up calls, the Agency did not send these facilities a full questionnaire. Facilities within two industries responded as using isophorone as a solvent in the full questionnaire. The five facilities are representative of those two industries.

In the proposed rule (see 61 *FR* at 42346) EPA presented the reasons why the damage cases for isophorone were not relevant to the solvent listing determination. Based on a review of identified damage instances, no case was identified that could be tied to use of isophorone as a solvent. Most of these sites arose from disposal practices that occurred many years ago, prior to promulgation of the RCRA regulations. Of the four facilities identified with isophorone contamination that have operated since 1980, two were landfills, one a chemical waste storage and processing facility, and one a pesticide manufacturing facility. All four of these facilities have also been in operation for many years before 1980, and all sites were contaminated with a myriad of chemicals. For the landfills and chemical treatment facility, the use of the isophorone prior to being found at the site is impossible to ascertain. However, in the case of the pesticide manufacturer, isophorone has been used as a starting ingredient in the production of pesticides and insecticides, and isophorone becomes part of the final product. This would not be considered a solvent use. The solvent uses EPA identified for isophorone are limited to only two industry sectors -- agricultural chemicals and coating/printing operations; neither were represented by facilities identified as having isophorone contamination onsite. Given that the current use of isophorone appears to be very limited, and considering that all of the isophorone wastes reported in the 3007 survey were treated as hazardous, EPA does not believe that these damage cases are relevant to the listing determination.

Commenter: EDF
Comment: Concentrations of isophorone wastes range from 0.1-45%. This range of concentrations disproves EPA's hypothesis that isophorone wastes will always be managed as hazardous by virtue of the ignitability characteristic. The range does demonstrate, however, the substantial risks isophorone wastes present to human health and the environment, since the proposed HWIR exit level for isophorone non-wastewaters is 743 ppm. Moreover, the driving risk pathway for isophorone wastewaters in the HWIR rulemaking is the same groundwater pathway completely ignored in the instant rulemaking.
Response: EPA responds to general comments related to the ignitability characteristic in Section VI.B of this document. EPA has not assumed that isophorone wastes will always be managed as hazardous by virtue of the ignitability characteristic. Based on the data provided in the 3007 Survey, all of the isophorone wastes where reported to be hazardous, either due to the ignitability characteristic or co-management with a listed hazardous waste. EPA responds to the general comment related to the relevancy of the HWIR levels in Section V of this document.

VII. Economic Analysis

Commenter: DOE

Comment: DOE believes that listing as hazardous those wastes generated from use of the 14 chemicals as solvents could considerably burden (in terms of both time and resources) regulators and the regulated community, while resulting in little environmental benefit. The Department offers the following factors for consideration and in support of EPA's proposed listing determination (i.e., in addition to the fact that many of the solvent wastes addressed in the proposed rule are already regulated because they exhibit a hazardous waste characteristic, or because they are mixed with listed wastes):

> New spent solvent listings would require *permitted* facilities managing the newly listed wastes to submit permit modification requests to modify the following attachments to their permit, among others: 1) the list of wastes permitted to be managed by a facility; 2) waste analysis plans (e.g., may need to incorporate new test methods); 3) contingency plans to address potential releases of the newly listed wastes regardless of whether a facility's general emergency response plan already addresses those chemicals; 4) groundwater monitoring programs (e.g., revise the list of hazardous constituents to which the ground-water protection standard applies); and 5) closure plans to incorporate closure performance standards (i.e., target cleanup levels and/or criteria) for the newly listed constituents.
> In addition to submitting revised Part A applications that would identify the newly listed wastes and additional units [40 CFR 270.72(a)(1)], *interim status* facilities that are managing the newly listed spent solvents will be required to revise the same types of information as permitted facilities.

Response: The costs to the federal government, state governments, and regulated parties associated with listing would depend on the number of solvents be listed. Because EPA is not listing any of the solvent chemicals examined, there are no new costs due to this rulemaking.