



August 18, 2004
(revised August 24, 2004)

Dorothy Shimer
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Air Resources Board
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Re: Draft Report to the California Legislature: Indoor Air Pollution in California

Dear Ms. Shimer:

The American Solvents Council (Council) of the American Chemistry Council (ACC) is pleased to submit comments on the Air Resources Board's (ARB) *Draft for Public Review of the Report to the California Legislature: Indoor Air Pollution in California* as required by Assembly Bill 1173 (Keeley, 2002; Cal. Health & Safety Code § 39930) (hereafter "Draft Report").¹

STATEMENT OF INTEREST

The Solvents Council is part of the American Chemistry Council and represents major U.S. manufacturers of hydrocarbon and oxygenated organic solvents.² The Council was formed to address health, safety, and environmental issues that affect producers and users of hydrocarbon and oxygenated solvents. The Council has supported research pertaining to the role VOCs may play in ozone formation under different environmental conditions, and has worked with federal and state agencies on the development of effective policies and strategies for addressing tropospheric ozone-related problems. In particular, the Council has played an active role in the U.S. EPA's Reactivity Research Work Group, including its science and policy task groups, and ARB's Reactivity Research Advisory Committee.

Over the years, members of the Council also have sponsored numerous toxicological studies to support safety assessments for individual oxygenated and hydrocarbon solvents. Many of these studies have been designed and conducted in cooperation with the U.S.

¹ ARB's Draft Report to the California Legislature: Indoor Air Pollution in California circulated for public review in June 2004 and posted on ARB's website at: http://www.arb.ca.gov/research/indoor/ab1173/Report_06-30-04.htm

² The Solvents Council includes the following companies: The Dow Chemical Company; ExxonMobil Chemical Company; Shell Chemical LP; Eastman Chemical Company; Sasol North America, Incorporated; CITGO Petroleum Corporation; and Lyondell Chemical Company.

Environmental Protection Agency, and the results of studies are typically published in the peer-reviewed literature. Further, under ACC policy, final copies of toxicological studies sponsored under the ACC umbrella are provided as a matter of course to numerous federal agencies. Council members also have supported health assessments of numerous oxygenated and hydrocarbon solvents by federal and state agencies. Such assessments have included reviews of numerous compounds under the international OECD Screening Information Data Set (SIDS) program³, and sponsorship of several compounds under EPA's Voluntary Children's Chemical Evaluation Program (VCCEP).⁴ The OECD SIDS and VCCEP assessments have included information on potential exposures as well as hazard information.

Members of the American Solvents Council support the safe use of oxygenated and hydrocarbon solvents.

OVERVIEW OF COMMENTS

The Solvents Council appreciates the efforts that have been undertaken to prepare the Draft Report. The Table of References (35 pages) reflects the enormous scope of the project and extraordinary amount of information that had to be reviewed and evaluated to respond to the charge set forth in Assembly Bill 1173. The Council believes, however, that the Draft Report requires extensive revision to provide a balanced and objective assessment of potential health effects from indoor air exposures. The Council's comments make the following four points:

1. The discussion of "VOCs" (volatile organic compounds) throughout the Draft Report is overly simplistic and could easily be misleading. VOCs are not a single chemical category, but are comprised of literally tens of thousands of compounds with widely varying physical, chemical and toxicological properties. The vast majority of VOCs are present in indoor air at very low levels (if at all) and do not present any health concerns. The Draft Report, however, tends to lump all VOCs together and gives a very negative impression of VOCs as a whole. Most references to "VOCs" in the Draft Report should be replaced with references to specific compounds or groups of compounds for which hazard and exposure information support a concern.

2. The Draft Report fails to recognize that the estimate of excess cancer cases due to "VOCs" in indoor air is based on upper bound cancer potency estimates derived for individual compounds that by design overstate likely cancer risks (to be health protective). Actual excess cancer cases from this handful of compounds are likely to be far lower than upper bound estimates, and could be zero. Substantial revisions are necessary to this part of the Draft Report to avoid the misleading impression that is now created.

³ The SIDS process is part of an international program sponsored by the Organization for Economic Cooperation and Development for collecting and sharing health and environmental effects information for certain high production volume compounds.

⁴ 65 Federal Register 81700 (Dec. 26, 2000).

3. The discussion of indoor air concentrations of VOCs is incomplete and could be misleading. The Draft Report should be expanded to present available data on indoor air concentrations, and should compare those concentrations to relevant health benchmarks. Much attention is given to the fact that indoor air exposures for many compounds exceed outdoor air exposures, but this fact, while true, does not answer the key question: how do indoor air exposures compare to relevant health benchmarks? The Draft Report for the most part fails to present the information that is necessary to answer that question, even though a substantial amount of information is available in references cited in the Draft Report.

4. The prioritization schemes presented in the Draft Report need to be revised substantially. Environmental tobacco smoke clearly should be given a higher priority than is indicated in tables in the Draft Report, and much more attention should be given to biological agents, as well. "Organic chemicals" are inappropriately lumped into a single category of "pollutants," when of course organic chemicals are not a single category at all, and it is clearly not scientific to label all organic chemicals as "pollutants." Further, in the "prioritization of pollutant sources for mitigation," "building materials and furnishings" and "consumer products" are treated as single categories when they clearly represent a wide range of products that comprise literally hundreds of very different categories and subcategories. These overly broad categories should be subdivided into smaller categories of related products. Further, the prioritization scheme should distinguish between high, medium and low priorities, and no product or group of products should be in a "high priority" category without some demonstration that exposures exceed or can reasonably be anticipated to exceed relevant health benchmarks.

The Council urges the ARB to revise the Draft Report to provide a more balanced, objective and transparent discussion of potential health effects from indoor air exposures. The Draft Report contains many broad statements that appear justified for very few indoor air contaminants (if any). The final report should provide a more rigorous assessment of indoor exposures and potential health effects, and should focus attention on those indoor exposures for which available data demonstrate a reasonable basis for concern. In that way, the final report will provide a more balanced and credible assessment of indoor air quality, and will provide a sound basis for identifying further research needs and/or directing risk reduction measures to activities that truly present significant health concerns.

COMMENTS

I. THE DRAFT REPORT PROVIDES A MISLEADING IMPRESSION OF "VOCs"; MOST REFERENCES TO "VOCs" SHOULD BE REPLACED WITH REFERENCES TO SPECIFIC COMPOUNDS OR CATEGORIES OF COMPOUNDS FOR WHICH AVAILABLE DATA DEMONSTRATE A CONCERN

VOCs (volatile organic compounds) are not a single chemical category. VOCs are comprised of tens of thousands of compounds with widely varying physical, chemical and toxicological properties. The vast majority of VOCs are present in indoor air at very low levels

(if at all) and do not present any health concerns. The Draft Report, however, tends to lump all VOCs together and gives a very misleading and negative impression. Most references to “VOCs” in the Draft Report should be replaced with references to specific compounds or categories of compounds for which available hazard and exposure information demonstrate a concern. To the extent the final report includes any discussion of “VOCs,” it should explain clearly that the term encompasses tens of thousands of compounds having diverse physical, chemical and toxicological properties. Further, the final report should recognize that many VOCs are naturally present in the environment and in our food, and many VOCs used in consumer products have been demonstrated to have relatively low toxicity. It is misleading to make general statements about the potential health effects of “VOCs” as if they represent a single category of compounds. While many published studies refer to “VOCs,” they typically are talking about a relatively small number of compounds that have been studied in indoor air.

In the following paragraphs, we highlight specific references to “VOCs” that are overly broad and misleading and should be changed or removed. (The examples set forth below are not exhaustive. ARB is urged to review the entire Draft Report with this concern in mind.)

1. The Draft Report (p. 7) treats VOCs as a subset of toxic air contaminants. Most VOCs are not toxic air contaminants, and it is wrong to imply that they are. The reference to “VOCs” should be replaced with references to specific compounds or categories of compounds, to the extent supported by underlying data.

2. Table ES-2 (p. 10) under “Health End Point” lists “VOCs: cancer.” The table implies that all VOCs are carcinogens, which is not true. The table should refer to “Carcinogens.” The same comment applies to Table 3.2 (p. 81) and Table 3.3 (p. 85), and any other place in the Draft Report where cancer from “VOCs” is discussed (see, e.g., the misleading reference to “VOC-related cancer cases” on p. 82, and the inappropriate reference to “230 cancer cases due to VOCs” on the same page). The text should refer to “cancer cases attributable to chemicals classified as “known or probable carcinogens,” and should give examples of chemicals so classified. (See discussion in the next section of these comments concerning upper bound estimates of excess cancer cases.)

3. References to “VOCs” in table ES-3 (p. 17) are overly broad for reasons already explained. All these references should be eliminated and replaced by references to specific compounds or categories (when supported by data).

4. The statement that “many of the VOCs found in indoor air in California are carcinogenic” (p. 54) is inaccurate. The absolute number of known or suspected carcinogens is relatively small and represents only a tiny fraction of all VOCs. Further, the statement in the next sentence that “there is no level of exposure to these chemicals that is known to be absolutely safe” is perhaps true in a technical sense in that there is no such thing as “zero risk,” but from a risk assessment standpoint, it provides no guidance because even for substances that are “known” human carcinogens there is an exposure level below which risks are deemed insignificant. Thus, there are exposure levels for compounds classified as known, probable and

possible carcinogens that regulatory agencies consider effectively “safe” and not worthy of any regulatory response. The quoted sentence in the Draft Report should be deleted.

5. Other examples of overly broad references to “VOCs” are found on pages 4 (referring to “several links between asthma and volatile organic chemicals (‘VOCs’)”; page 30 (“VOCs” are identified as having “possible, but insufficient evidence” of a link to asthma); and page 49 (“Foremost among these pollutants [toxic air contaminants] are formaldehyde, VOCs, environmental tobacco smoke, radon . . .”).

II. THE DRAFT REPORT SHOULD EXPLAIN THAT ITS ESTIMATE OF EXCESS CANCER CASES FROM INDOOR AIR IS AN UPPER BOUND ESTIMATE; ACTUAL RISKS ARE LIKELY TO BE MUCH LOWER AND COULD BE ZERO

The Draft Report states that “about 230 excess cancer cases due to VOCs from indoor exposures are estimated to occur in California each year.” (p. 82) The Report estimates the cost of premature deaths from these excess cancer cases is \$730 million/year. The Report asserts these are “conservative” estimates because risks from exposure to radon and certain other compounds are not included. The Summary (p. 133) goes so far as to state, “At least 230 excess cancers per year are estimated to occur in California due to indoor carcinogens from residential and consumer sources . . .” Collectively, these statements are highly misleading.

In reality, ARB’s estimate of excess cancer risks is based on upper bound cancer potency estimates derived for individual compounds that by design overstate likely risks. Actual cancer risks are likely to be far below upper bound estimates, and could be zero, as has been recognized by ARB and EPA in connection with numerous cancer risk assessments for individual compounds. Because the Draft Report fails to disclose this important information, it gives the reader a very misleading picture. The discussion of potential cancer risks should be substantially revised to provide a more objective and transparent discussion of likely cancer risks from low level exposures to VOCs in indoor air.

A more balanced discussion would lead to the conclusion that any excess cancer risks are limited to a relatively small number of compounds, and even for these compounds, risks likely are far below upper bound estimates and could be zero. Such a conclusion would invite more focused research to determine whether cancer risks may indeed be elevated for some compounds based on current use information, and more focused risk reduction measures targeted specifically to those substances, if any, that are shown to pose significant risks.

The upper bound nature of cancer risks estimates is discussed at length in an article cited in the Draft Report by Lance Wallace of U.S. EPA’s Atmospheric Research and Exposure Assessment Laboratory (Wallace, 1991). Wallace calculated potential cancer risks from exposure to indoor and outdoor air. He identified 10 VOCs and 8 pesticides that were estimated to pose greater than a one-in-a-million excess cancer risk in indoor air (including some products that have been banned from consumer products or banned altogether). However, he expressly acknowledged that his risk calculations were based on upper bound potency estimates

derived from animal studies.⁵ Wallace described two studies that show that upper bound potency estimates typically are seven to ten-fold higher than mean potency estimates, and he therefore concluded that his upper bound estimates “may be divided by a factor of 7 or 10 to provide best estimates of risk . . .” (p. 9).

Further, Wallace expressly acknowledged, “For some of these chemicals, it is also possible to argue that the best estimate of risk is 0.” (*Id.*) Wallace provides a discussion of uncertainty that is missing in the Draft Report. Thus, he states:

Great uncertainty accompanies most risk estimates. The major uncertainties involved in potency calculations are well known: the extrapolation from animals to man and from high dose to low dose. These uncertainties are such that a given chemical may not cause human cancer at all; the actual cancer risk may be exactly 0. Even if the risk is not 0, the estimates could easily be wrong by factors of 10, 100, or more, depending on the shape of the dose-response curve, the possible existence of a threshold due to DNA repair or other mechanisms, and many other factors. [pp. 9-10]

The above quote from Wallace (1991) recognizes that cancer risk assessments based on mean cancer potencies are also conservative, because they assume animal-to-human relevance and high-to-low dose linearity. Thus, they also by design likely overstate actual human cancer risks, particularly from the low exposures typically found in indoor and outdoor air. True risks may be zero, and if not zero, could be 10 or 100-fold below mean estimates.

The Draft Report should include similar discussion of the uncertainties inherent in its estimates of potential excess cancers and associated costs. The upper bound nature of ARB’s estimates should be clearly disclosed. The Report should recognize that “best estimates” based on mean cancer potencies could be 7-to 10-fold lower, and true risks could be lower still and could be zero. Such revisions would give the Report much needed transparency and objectivity, and would provide the state legislature and other interested parties with a more credible and scientific basis for evaluating potential health concerns associated with indoor air.

⁵ Wallace notes that the benzene cancer risk assessment is based on human epidemiology data and hence supports a maximum likelihood estimate.

III. INFORMATION PRESENTED ON INDOOR AIR CONCENTRATIONS OF VOCs IS INCOMPLETE AND MISLEADING; AVAILABLE DATA INDICATE MOST COMPOUNDS ARE PRESENT AT VERY LOW LEVELS AND ARE UNLIKELY TO POSE SIGNIFICANT HEALTH RISKS

Assembly Bill 1173 calls upon ARB to present the best available empirical data on indoor air concentrations of substances that may pose health risks.⁶ The Draft Report falls short of this mandate with respect to most VOCs that are addressed. Very limited information on indoor air concentrations is presented, and the Draft Report in most cases fails to compare indoor air concentrations to relevant health benchmarks, so the reader is given no basis for assessing the health significance of reported concentrations. When specific references cited by ARB are consulted, it becomes apparent that most VOCs typically are detected in indoor air at low part per billion levels that are unlikely to pose significant health risks. Even these references may give a misleading impression of *current* indoor air levels, because many of the references are relatively old, and significant changes to many product formulations have occurred over the last ten years.

A handful of VOCs have been detected at median levels that might present a cancer risk above one in a million, but as noted previously, these assessments are based on upper bound estimates of potential cancer risks, and actual risks are likely to be much lower and could be zero. Thus, when available empirical data on indoor air concentrations are presented and compared to relevant health benchmarks, the assessment indicates that the vast majority of VOCs for which data are available are unlikely to pose significant health risks. The Draft Report should display this information so intended audiences can get a more complete and objective picture of the scope of potential concerns pertaining to VOCs that have been measured in indoor air.

The Council has not had an opportunity to review every reference cited in the Draft Report, but the following paragraphs should be sufficient to demonstrate that sections 2.3.2.2 (Sources and Emissions of VOCs) and 2.3.2.3 (Indoor Concentrations of VOCs) should be substantially rewritten to provide a more complete and objective report on indoor air concentrations of VOCs and their potential health significance.

1. The Draft Report (p. 55) discusses toluene use in consumer products and reports that in one study “Estimated maximum concentrations and daily doses were high, up to 4000 $\mu\text{g}/\text{day}$,” and that in another study of non-smokers’ homes toluene was detected at 24 $\mu\text{g}/\text{m}^3$ in homes with an attached garage, and 5 $\mu\text{g}/\text{m}^3$ in homes without an attached garage. No comparison is made to relevant health benchmarks. In fact, California OEHHA has promulgated a chronic reference exposure level (REL) for toluene of 300 $\mu\text{g}/\text{m}^3$. Since this value is intended to be protective for the general population assuming continuous exposure for a lifetime, the

⁶ See AB 1173, Section 2 (directing ARB to provide to the Legislature a report summarizing, among other information, “The best scientific information available including, but not limited to, the most recent empirical data, on indoor air pollution . . .”).

concentrations reported in the second study clearly are well below levels of concern. A comparison of the estimated maximum dose of 4000 $\mu\text{g}/\text{day}$ in the first study can be made to the chronic REL by assuming an inhalation rate of 1.3 m^3/hr for 24 hours, resulting in a estimated exposure of 9360 $\mu\text{g}/\text{day}$ (assuming exposure at the chronic REL level for 24 hours). This comparison shows that the maximum reported dose is in fact well below the safe level for chronic lifetime exposure calculated by OEHHA. Of course, one would not expect the maximum value reported in the article to be repeated daily for a lifetime. Further, in December 2003, the U.S. EPA proposed an inhalation reference concentration (RfC) for the EPA's Integrated Risk Information System (IRIS) database of 13,000 $\mu\text{g}/\text{m}^3$, which translates into 405,600 $\mu\text{g}/\text{day}$ using the above inhalation rate. This newly proposed RfC is based on an extensive database of human epidemiology and animal toxicology data and in setting the RfC EPA noted high confidence in the inhalation database for toluene. Thus, the information presented in this portion of the Draft Report is not indicative of any significant health risks and the report should be appropriately modified.

2. The Draft Report (p. 56) reports average chloroform concentrations during and immediately after a shower of 67 to 265 $\mu\text{g}/\text{m}^3$. The Report fails to disclose that CA OEHHA has promulgated a chronic REL of 300 $\mu\text{g}/\text{m}^3$. Further, the study cited by ARB (Kerger, *et al.*, 2000) calculates a total oral and inhalation dose of 2.65 $\mu\text{g}/\text{day}$, compared to an EPA IRIS oral reference dose (RfD) of 10 μg per kilogram of body weight per day. For a 70 kg adult, the RfD is more than 250-fold above the exposure estimated by the authors. Thus, the information presented by ARB is not indicative of a significant health risk.

3. The Draft Report in several places (e.g. pp. 58, 60) emphasizes that indoor air concentrations of VOCs (and other compounds) often exceed outdoor air concentrations. This conclusion seems well-supported by available data, and it supports the equally non-controversial conclusion that indoor air concentrations are attributable in part to indoor sources (and are not due solely to infiltration of outdoor air). However, the important questions are these: are indoor air concentrations above levels of concern for any VOCs, and if so, for which ones and by how much? A comparison to outdoor concentrations does not answer those questions, and thus does not provide any basis for assessing the need to take risk reduction measures with respect to sources of indoor air exposures to any VOCs

4. Another example of the need to put indoor exposure levels in context with recognized assessments of the degree of toxicity is butoxyethanol (BE). The Draft Report (at p. 57) notes indoor exposure assessments conducted by Zhu, *et al.*, based on emissions from use of BE-containing cleaning products measured in a field and laboratory emission cell. Zhu conducted these studies because of the paucity of actual indoor exposure monitoring. The highest average daily exposure level Zhu determined (many of the levels determined for other BE-containing products were much lower) was 0.186 mg/kg body weight/day (or 13.2 mg/day for a 71 kg person). Not mentioned in the Report is the large margin of safety between this maximum concentration level and exposure levels found not to pose appreciable risk by both U.S. EPA and California.

EPA has established an inhalation reference concentration (RfC) for BE of 13 mg/m³. This is the level EPA deems “without an appreciable risk of deleterious effects during a lifetime” even for sensitive subgroups. See: <http://www.epa.gov/iris/subst/0500.htm>. For a person breathing 1.3 m³/hour for 24 hours a day, that RfC translates to 405.6 mg/day.

Thus, the high-end exposure concentration mentioned in the California Draft Report is less than 1/30th (13.2 vs. 405.6) the level deemed not to pose appreciable risk. California currently does not have a chronic REL for BE; but, in 1998 OEHHA proposed a value of 10 mg/m³, which would be 23 times (13.2 vs. 302) the highest Zhu concentration level.

Combining exposure assessments for BE like that conducted by Zhu, *et al.*, with accepted toxicity assessments indicates indoor exposures to BE should not be of concern. The Draft Report should provide that perspective.

5. The Draft Report (p. 58) describes a study by Girman *et al.* (1999) of indoor air concentrations of many VOCs in typical office buildings. The Report summarizes frequency of detection information and lists the 12 VOCs with the highest median indoor air concentrations, but data on actual concentrations are not reported, even though extensive information is presented in the published article. Median indoor air concentrations in fact were below 10 µg/m³ in all but one case – acetone (29 µg/m³), which is not listed as a toxic air contaminant in California. The U.S. Agency for Toxic Substances and Disease Registry (ATSDR) has derived a chronic minimal risk level (MRL) for acetone of 13 ppm (31 mg/m³, or 31,000 µg/m³), which is more than 1000-fold above the median value reported by Girman. Even the high value reported for acetone (220 µg/m³) is more than 100-fold below the airborne concentration ATSDR considers to be without appreciable risk assuming continuous exposure for a lifetime. The median values reported by Girman for toluene and m- & p-xylenes, are 9 and 5.2 µg/m³, respectively, compared to CA OEHHA chronic REL values for these compounds of 300 and 700 µg/m³, respectively. The range of values reported for 2-butanone (methyl ethyl ketone, or MEK) was 0.7 to 18 µg/m³, compared to an IRIS inhalation RfC of 5,000 µg/m³. Indoor air levels for ethyl acetate ranged from 0.22 to 65 µg/m³; these values are trivial compared to chronic oral RfDs in IRIS of 0.9 mg/kg/day.⁷ Thus, at least for these oxygenated and hydrocarbon solvents, the report demonstrates that indoor air concentrations are well below levels that ATSDR, OEHHA or EPA would conclude might pose health concerns. It is important that this information be reported fully and objectively in the Draft Report, so that the reader can make a sound assessment of the nature and scope of any indoor air concerns.

6. Table 2.7 and Figure 2.5 in the Draft Report do present air concentration information, but no comparison to relevant health benchmarks is presented. In fact, for every compound for which a chronic REL is available, reported median indoor air concentrations are

⁷ For a 70 kg adult, an RfD of 0.9 mg/kg/day equates to a “safe” daily dose of 63 mg/day. A maximum indoor air concentration of 65 µg/m³ equates to a daily exposure of just over 2 mg/day, assuming inhalation of 1.3 m³/hour for 24 hours. As stated earlier with respect to toluene, one would not expect exposure to be repeated daily at the maximum measured level for a lifetime.

below that REL by at least a factor of 10, and sometimes by a factor greater than 100.⁸ Some of the compounds are classified as known, probable or possible carcinogens, and thus an additional assessment of potential cancer risks is necessary, but no such analysis is presented. As already noted, any such analysis should explicitly recognize the upper bound nature of the underlying cancer potency estimates. (See discussion of Wallace (1991) in section II of these comments).

7. Other studies described in the Draft Report provide additional data on indoor air concentrations of a wide variety of compounds (Brown *et al.*, 1994; Sheldon, *et al.*, 1992; Shield *et al.*, 1996), but the information is not included in the Draft Report. The studies paint a fairly consistent picture: median indoor air concentrations of measured VOCs typically are very low, in the single-digit $\mu\text{g}/\text{m}^3$ range. For the vast majority of compounds, there is no scientific basis for believing these low levels pose any measurable, significant human health hazards. Potential hazards may exist for a small subset of compounds classified as known or probable carcinogens, based on upper bound potency estimates but as stated previously, actual cancer risks likely are far below estimated risks, and could in fact be zero.

IV. THE PRIORITIZATION SCHEMES PRESENTED IN THE DRAFT REPORT SHOULD BE REVISED

The Council believes the prioritization schemes presented in the Draft Report need to be revised substantially to provide a more balanced and objective assessment of potential priorities for further research and/or risk reduction measures.

Environmental tobacco smoke clearly should be a higher priority than is indicated in tables in the Draft Report, and much more attention should be given to biological agents, as well. This comment pertains to Table ES-1 (p. 3), Table ES-3 (p. 17) and similar tables in the main text (e.g., Table 6.1, p. 124). "Organic chemicals" are inappropriately lumped into a single category of "pollutants" in Table ES-1, when of course organic chemicals are not a single category at all, and it is clearly not appropriate to label all organic chemicals as "pollutants." Further, in Table ES-3, which sets forth a "prioritization of pollutant sources for mitigation," "building materials and furnishings" and "consumer products" should not be treated as single categories when they clearly represent a wide range of products that comprise literally hundreds of very different categories and subcategories. These overly broad categories should be subdivided into smaller categories of related products.

Further, the prioritization scheme should distinguish between high, medium and low priorities, and no product or group of products should be in a "high priority" category without some demonstration that exposures exceed or can reasonably be anticipated to exceed

⁸ It is important in this context to understand that an occasional excursion above a chronic REL or IRIS RfC does not necessarily mean there is any health risk. These values are based on conservative methodology and are intended to represent exposures that can be continued for a lifetime without appreciable risk. While exposures below these levels are generally regarded to be safe, exposures above these levels may not pose any significant health risks, particularly if they occur infrequently or for short periods of time.

relevant health benchmarks. The Draft Report does not identify any criteria used to identify high priority sources, or to establish relative priorities among different sources of indoor air exposures. Such criteria should be made clear, and should be designed to incorporate information on hazard and exposure to support rigorous and credible risk characterizations.⁹

V. ADDITIONAL TECHNICAL COMMENTS

1. The statement that “indoor levels of volatile organic chemicals (VOCs) and some other pollutants are typically elevated” (p. 8) is not informative and should be corrected. Elevated compared to what? Similar statements appear elsewhere in the document.
2. Table ES-2: Costs pertaining to ETS dominate the table and should be presented separately.
3. The following statements are found on p. 18: “Consumer products, architectural coatings, and personal care products have been regulated to reduce emissions of reactive VOCs in order to reduce smog formation. Further restrictions to assure reduction of toxic air contaminants and nonreactive VOCs with potential health implications appear warranted.” The latter sweeping statement is overly broad and largely unsupported by the Draft Report. The text gives the impression that wholesale changes are required, but there is no data to support that suggestion. Sweeping generalizations should be replaced with statements that focus on specific products or chemicals, and that are supported by hard data about uses, exposures and comparisons to relevant health benchmarks.
4. Table 2.4 (Common Carcinogenic Indoor Air Pollutants) should not include compounds classified by EPA as “Group D, not classifiable.” It is equally inappropriate to list styrene in the table simply because it is “under consideration.” The information about DEHP needs correction (see separate comments submitted by the ACC Phthalate Esters Panel). If Group C compounds are to be included in the table, then the heading should be changed to “Chemicals Classified as Known, Probable or Possible Carcinogens.” The amount of information sufficient to classify a chemical as a “possible” carcinogen often is not sufficient to warrant regulation on that basis, and does not justify calling a compound a “common carcinogenic indoor air pollutant.”
5. The statement is made (p. 58) that “Four of the most abundant 12 VOCs [in the Girman *et al.* study] are oxygenated, which may indicate greater potential to cause irritant effects.” No support is provided for this statement, and we are aware of no scientific basis for implying that all oxygenated compounds have “greater potential to cause irritant effects.” Further, we are not aware of any evidence that irritation might be caused by exposures at the low levels reported in this study. Certainly available health benchmarks do not support this statement. For example, the AEGL-1 value for acetone is 200 ppm, more than 10,000-fold above the median air concentration for acetone reported by Girman *et al.*

⁹ The discussion of priorities for action to address concerns in schools is considerably more balanced and focused than other parts of the Draft Report.

6. Texanol® is a registered trademark of the Eastman Chemical Company for their brand of 2,2,4 trimethyl-1,3-pentanediol monoisobutyrate. All references to Texanol® should be corrected.

7. Page 57, 2nd paragraph discusses emissions of TACs from paints and notes that a number of compounds, including propylene glycol have been studied. Since propylene glycol is not a TAC it should be removed from the list of chemicals.

CONCLUSION

The Council appreciates the opportunity to submit these comments. As stated at the outset, the Council appreciates the extensive effort the ARB staff put into the development of the Draft Report. The Council recognizes the importance of the Report, and the importance of identifying any indoor air exposures that may be contributing to adverse health effects, particularly in schools. At the same time, it is important not to overstate the urgency of the issue or to paint with too broad a brush. Research and risk reduction measures should be directed at exposures that are a high priority based on reliable, current data demonstrating a significant health concern. The Council is submitting these comments to support that objective, and respectfully urges ARB to make the revisions to the Draft Report suggested herein.

If you require additional information or have questions concerning these comments, please contact me at (703) 741-5609 or by e-mail at:
Barbara_Francis@americanchemistry.com.

Sincerely,



Barbara O. Francis
Managing Director,
American Solvents Council

cc: Peggy Jenkins