HALOGENATED SOLVENTS INDUSTRY ALLIANCE, INC.

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August 27, 2004

Ms. Dorothy Shimer
Research Division
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Re: Comments on the Report to the California Legislature on Indoor Air Pollution in California, Draft for Public Review (June 2004)

Dear Ms. Shimer:

The Halogenated Solvents Industry Alliance, Inc. (HSIA) wishes to provide the enclosed comments on the June 2004 draft report on indoor air pollution in California. HSIA represents manufacturers of chlorinated solvents, including methylene chloride, perchloroethylene and trichloroethylene, which are discussed in the draft report.

HSIA appreciates the effort required to compile the large amount of reference material used to prepare the draft report to the Legislature. In general, we found that the report places an inappropriate emphasis on the control of pollutants from consumer and building products. We also believe that the report depends too heavily on the findings of single research projects of limited scope without providing the reader an opportunity to assess the validity of those findings. The cost estimates presented in the report, moreover, do not appear to provide an up-to-date picture of the impact of indoor air pollution. These estimates should either be updated or deleted.

Please do not hesitate to contact me if you have questions about the information provided in this comment.

Sincerely,

Stephen Risotto

Stephen P. Risotto
Executive Director

Enclosure

Comments of the
Halogenated Solvents Industry Alliance (HSIA)
on the
Report to the California Legislature
Indoor Air Pollution in California
Draft for Public Review
June 2004

Executive Summary

Page 2

These groups ~~are most~~ <u>may be more</u> *sensitive to the adverse effects of some pollutants, and spend most of their time indoors.*

> Although children do spend more time indoors and do have a higher breathing rate, their sensitivity to indoor pollutants is not as clear as this statement suggests.

Page 3, Table ES-1

> The information in Table ES-1 is not consistent with the discussion in the rest of the draft report. It fails to list ozone, lead, mercury, and asbestos as indoor pollutants, although they are discussed at some length in the body of the report. It includes pesticides within a category titled "endocrine disruptors," although the discussion of pesticides in the body of draft report is separate from the discussion of endocrine disruptors. In fact the only products discussed in the endocrine disruption section (Section 2.3.11) are the polybrominated diphenyl ethers (PDBEs).
>
> HSIA recommends deletion of endocrine disrupters as a pollutant category, since disruption of the endocrine system is still not well understood. To date, HSIA is not aware of a generally accepted protocol for assessing a chemical's potential to disrupt the human endocrine system. We suggest that PDBEs be listed as a pollutant in the table, instead, and that endocrine disruption be listed as one of the potential health effects.
>
> In addition, the basis for the order in which the pollutants are presented is unclear. If there is a basis for ordering the pollutants in the current fashion, it should be explicitly stated. If not the pollutants should be listed in alphabetical order or on some other logical basis.

Page 4

ARB staff estimate that about 230 excess cancer cases occur annually in California due to exposures from the limited number of indoor toxic air contaminants that can be quantified from residential and consumer sources.

> The Executive Summary should note that this estimate is based on data from 1994, as noted in Appendix II, and may not be reflective of current exposures.

As shown in Figure ES-2, this estimate is similar in magnitude to the estimated cancer burden from outdoor diesel exhaust (particles), which is responsible for much of the excess cancer burden associated with breathing ambient air in California.

> The MATES II study conducted in 1999 by the South Coast Air Quality Management District (SCAQMD) indicates that cancer risk from diesel particulate in the South Coast Air Basin alone is 1 in one thousand (71 % of a total average basin risk of 1414 per million). It is unclear why the state's estimate would be so much lower. Even considering adjustments for period of exposure, ARB's estimate for the total potential risk (state-wide) from diesel particulates is one-half that of SCAQMD's estimate for the South Coast Air Basin alone.

This indoor cancer estimate also equals about two-thirds of the total burden from excess cancer resulting from outdoor air pollutant emissions (diesel exhaust plus other outdoor sources).

> Without further clarification, the statement in the draft report is somewhat unclear.

Page 5

Exposure to environmental tobacco smoke (ETS) makes a significant contribution to the cancer burden from air pollution as well. Current exposure and risk estimates for ETS are not available; therefore estimates from the mid-1990s are used here. Those ETS risk levels are similar to the total outdoor burden; however, because workplace exposure has decreased to nearly zero since the mid-1990s, and the prevalence of smoking has decreased substantially as well, the current cancer burden from ETS is expected to be substantially lower than shown in this graphic. Nonetheless, the contribution of ETS will remain significant, because some individuals including some children, are still exposed to substantial levels of ETS.

As discussed elsewhere in the draft report, the contribution of ETS to the overall estimate of the costs of indoor air pollution is substantial ($25. 8 billion out of $35 billon, or 74 percent). It is essential that the report attempt to provide current estimates of ETS exposures and costs. If this is not possible, HSIA does not believe that the draft report should include an estimate of the costs of indoor air pollution. To do so based on data that ARB staff acknowledges is out of date is to present a flawed, and likely misleading, picture of the magnitude of the indoor air problem.

If ARB staff feel they must include cost estimates, it would be more appropriate to use the low cost estimates for ETS effects included in Table 3.2 rather than the average estimates currently used.

Page 7

Some of these chemicals also have reproductive, ~~or~~ developmental, and neurological *effects~~, and some can affect the nervous system~~ at very high levels encountered infrequently in ~~certain~~ non-industrial workplaces.*

Reproductive and developmental effects generally are also noted at workplace or elevated exposures

Page 10, *Table ES-2 – Estimated Annual Costs of Indoor Air Pollution in California*

If a current estimate for the contribution of ETS to the annual costs can not be developed, HSIA believes that it is inappropriate to present a quantification of the overall costs. Moreover, the table does not include estimates for the health effects from radon and lead exposure, despite the fact that the report appears to include sufficient information on which to base such estimates.

Page 14

The most effective approach is to remove or reduce indoor emissions by using building materials, consumer products, and appliances that emit little or no air pollution.

This conclusion is wholly inconsistent with the information presented in the report. Even using the lowest estimates for health effects from ETS exposure included in Table 3.2, emissions of volatile organic compounds (VOCs) are estimated to contribute only about 5 percent of the total cost of indoor air pollution.

Any prioritization of mitigation methods should be deleted from this section.

Page 17, *Table ES-3 – Prioritization of Pollutant Sources for Mitigation*

The prioritization scheme presented in the table is inappropriately skewed toward the control of emissions from consumer and building products. Based on the data presented in the report, it is inexplicable that ETS is not listed as the top priority. In addition, the table fails to include any discussion of sources of biological contaminations

Page 18

While regulatory action to reduce emissions and exposures would assure reduction of exposure and risk from key sources and be a major component of a new effort to address indoor air, other approaches including public education, product testing and labeling, and setting of maximum exposure guideline levels, should also be part of the mix.

This assessment of priorities is not consistent with the data presented in the report.

Page 20

Obvious mold in about 3 percent of classrooms, and water stains and other potential mold indicators in about one-third of classrooms, due to inadequate maintenance.

In light of the recommendation to make children's health a top priority on the state's indoor air pollution effort, it would seem that proper maintenance of HVAC systems in California schools should be given greater emphasis in the report.

Page 21

A program that stresses direct emission reductions is recommended, but education, ventilation, labeling, and advisory standards also should play a role. Building materials, furnishings, woodstoves and fireplaces, and indoor air cleaning devices are high priority sources.

This assessment of priorities is not consistent with the data presented in the report.

Introduction and Background

Page 23

One investigator has calculated that pollutants emitted indoors have a 1000-fold greater chance of being inhaled than do those emitted outdoors (Smith, 1988).

> This reference is cited more than once in the draft report as a basis for concern about exposure to indoor air pollutants, but the report provides the reader with no basis for assessing its accuracy. On face, it would appear to significantly overstate indoor exposures, as a whole. If it is true, however, it suggests that ARB may be significantly overstating exposures to outdoor pollutants.
>
> HSIA was unable to review the assumptions used in the original publication, and assumes that others will have similar difficulty in finding the original reference. We encourage ARB to include a discussion of the author's calculations as a footnote or, if warranted, as an appendix to the draft report.

Page 25

Additionally, younger children spend more time near indoor sources such as operating gas stoves, e.g., near the parent while cooking (Phillips et al., 1991), leading to higher exposures to nitrogen dioxide and other cooking emissions.

> It is neither accurate nor appropriate to extrapolate from the findings of one researcher to a generalization about the exposures of all younger children.

Special air-monitoring studies have been conducted in classrooms, homes, and at schools in communities located near industrial sources of pollution and/or heavy vehicular traffic. Preliminary results indicate pollutant levels in the selected communities are similar to levels in other communities.

> These findings appear to contradict statements made elsewhere in the draft report about exposure to indoor air pollutants within lower socioeconomic groups.

Page 26

Dust mites and cockroaches are important triggers for asthmatics that are more likely to be present in urban settings (IOM, 1999).

> Despite the stated importance of dust mites and cockroaches, the draft report does not discuss possible mitigation approaches. In fact, the report suggests control of pesticide products that may be effective in reducing insect populations.

In an effort to improve their environment, a higher percent of low-income individuals use room fresheners – products that may introduce additional toxic chemicals to the indoor environment (Wiley et al., 1991b).

> HSIA does not believe that it is appropriate to extrapolate from the findings of this one study to a suggestion that such behavior is generally true.

Chapter 2 - Health Impacts, Sources and Concentrations of Indoor Air Pollutants

Page 27

A number of indoor pollutants can cause or exacerbate asthma and chronic bronchitis. Indoor biological agents are clearly associated with these diseases; however, it is clear that biological agents alone cannot explain the tremendous increase in asthma over the last few decades. The recent rise in asthma incidence has been too rapid to be attributed to genetic factors and biological allergens alone: indoor and outdoor air pollution have been identified as potentially important contributors to the increase of asthma (Platts-Mills and Carter, 1997; Duhme et al., 1998; Karol, 2002).

> The conclusions reached in this paragraph appear to be those of ARB staff. HSIA does not believe that they are generally held by the medical community.

Page 28, *Table 1 – Sources and Potential Health Effects of Major Indoor Air Pollutants*

> HSIA recommends deletion of the "Endocrine Disrupters" category.

Page 29

Although the causes for the observed increase in asthma prevalence are unknown, indoor air pollution has been identified as a contributing factor.

> This statement appears to contradict statements made on page 27 (see above).

Page 36

Although these effects are not ~~necessarily as~~ serious as death, they affect a greater proportion of the population, and thus have a major impact on public health.

HSIA can not imagine a situation where non-fatal effects would be serious as death.

Page 49

Pesticides and endocrine disrupters are other pollutants that can be released indoors, or tracked indoors from outdoors. The health effects, indoor sources, and indoor air concentrations of these pollutants are discussed below.

HSIA suggests the replacement of the term "endocrine disruptors" with a more specific listing of the relevant pollutants.

Page 54

Many of the VOCs found in indoor air in California are carcinogenic.

As noted in Table 2.4 (Page 32), many of the VOCs included in the draft report are considered to be probable or possible human carcinogens.

Page 55

Levels of perchloroethylene, another chlorinated hydrocarbon, <u>can</u> *increase ~~astronomically~~ when dry-cleaned clothes are brought into a house. Levels in a home containing recently dry-cleaned clothes can be 100 to 150 times greater than outdoor levels of perchloroethylene (Wallace 2001). Levels of another chlorinated hydrocarbon, methylene chloride, have been greatly reduced in consumer products; however, it is still common in paint strippers. Short-term exposures can be significant for individuals who use paint strippers (Wallace 1991).*

The EPA research referenced by Wallace was conducted to investigate potential approaches to reducing off-gassing of perchloroethylene in indoor environments, not as a general assessment of perchloroethylene levels. The study was designed to maximize perchloroethylene levels by placing multiple drycleaned garments in a small enclosed space.

Page 60, *Figure 2.5 –Statewide Indoor and Outdoor Concentrations*

> According to these data, indoor and outdoor levels for perchloroethylene are about the same.

Page 69

Tracked-in and infiltrated lead dust can accumulate in carpets that can serve as a reservoir for lead-laden dust (U.S. EPA, 1997a).

> This is the only mention of the potential for carpets to serve as sinks for indoor air pollutants. HSIA believes that this phenomenon should receive greater attention in the report.

Page 70 & 71

Carpi and Chen (2001) estimated that 10% of U.S. homes may have indoor mercury levels that exceed the U.S. EPA Reference Concentration of 0.3 µg/m^3.

From June 2000 through March 2001, Carpi and Chen (2001) measured mercury concentrations in indoor air for nine residences and three businesses in the New York metropolitan area. Nearly all of the sites showed higher indoor levels than outdoor levels. The average indoor mercury concentration for all buildings was 69 ng/m^3, and was highly dependent on season.

> HSIA does not believe that it is appropriate to extrapolate from 9 residences in the New York metropolitan area to a general characterization of mercury levels in US homes.

Page 76, *Section 2.3.11 - Polybrominated Diphenyl Ethers ~~and Other Endocrine Disruptors~~*

> PDBEs are the only products discussed to any significant degree in the Section.

Page 78

~~*A recent study (Rudel et. al., 2003) found numerous endocrine disrupting compounds in indoor air and dust obtained from 120 homes in Cape Cod, Massachusetts. The most abundant compounds in air included bis(2-ethylhexyl) phthalates (DEHP)(a plasticizer used in children's toys, shower curtains, raincoats, shoes, and floor tiles); o-*~~

~~*phenylphenol (disinfectant); 4-nonylphenol (detergent metabolite); and 4-tert-butylphenol (adhesive).*~~

This paragraph represents the only discussion of these four pollutants and should be deleted.

Page 81, *Table 3.2 – Estimated Valuation of Mortality Attributed to Indoor Air Pollution in California*

As noted earlier, ETS costs dominate the total cost estimate, even using the lowest estimates.

Page 82

These are conservative estimates relative to the total cancer burden from indoor carcinogens, because they do not include:

- *The additional, significant cancer risks from radon.*
- *The risk from many other carcinogens also found in indoor air and house dust, such as acetaldehyde, PAHs other than B(a)P, phthalates other than DEHP, and asbestos.*

The pollutants that are identified as not being included in the estimate of total cancer burden are not VOCs.

Page 83

These costs of ETS-related health effects could be prevented if people smoked only outdoors or stopped smoking. However, to achieve these potential cost further efforts would be needed to change peoples' smoking behaviors in California.

Based on all of the cost data presented in the report, it is unclear why the report does not list efforts to change smoking behaviors as a top priority.

Page 88

Many dampness problems, probably a majority of serious problems, result from water leaks that could be prevented through better building maintenance and improved design and construction. These measures would also reduce the costs of dampness-caused mold contamination and degradation of building materials. Better ventilation and use of dehumidifiers could reduce dampness problems that result from high indoor humidity. Thus, with proper measures, it is probably feasible to eliminate at least 50% of the particle exposures that contribute to asthma exacerbation, and likely more.

Based on this estimate of the potential benefits of improved maintenance, it is unclear why efforts to encourage and/or require proper operation and maintenance are not considered a top priority.

Page 91

The actual total valuation of mortality is likely to be even higher because these estimates do not include other pollutants that can increase the risk of premature death. Examples of these other pollutants include: PM from wood smoke; other carcinogens emitted from materials and products; and radon.

The draft report should make an effort to quantify the potential health effects from particulate matter and radon, if ARB staff believe them to be significant. In the case of radon, a least, there appears to be sufficient data to develop such an estimate.

ARB staff should be specific in identifying the other "carcinogens" emitted from materials and products. If it can not do so, the reference to other pollutants should be deleted.

Chapter 4 – Existing Regulations, Guidelines, and Practices

Page 100

The CPSC has focused on regulations for safety more than for health. For example, a policy on methylene chloride led to labeling regulations rather than a ban on its use in household products (CPSC, 1987a).

The labeling requirements issued by CPSC are specifically designed to reduce exposures to methylene chloride during paint stripping. It is entirely inaccurate to state that CPSC focused on "safety more than health."

Chapter 5 – Methods to Prevent and Reduce Indoor Air Pollution

Page 120

People's choices and behavior have a major impact on their exposures to air pollution. Human activities are probably the most important factor in determining the condition of the indoor environment. Cooking, the use of various consumer products, cigarette smoking, and other activities can result in immediate, significant releases of pollutants indoors which are immediately inhaled (ARB, 1987). Thus, public education is a key step

for reducing Californians' exposures to indoor air pollution (NRC, 1981; ATS, 1997). People are often not aware of the risks associated with indoor pollution and what they can do to protect their health. Sometimes activity pattern changes are needed, e.g., people must use some types of consumer products properly in order to reduce their exposure and risk.

> This paragraph should include a reference to the contribution of biological pollutants in discussing people's choices and behaviors.

Page 123

Table 6.1 suggests a prioritization scheme for implementation of mitigation measures, by source categories, based generally on estimated exposure and risk, with the highest priority categories listed first. The primary criteria used in prioritizing the source categories included the extent of the population's exposure to the sources and their emissions, and the relative reduction in health impacts that could be achieved with action.

> The assessment of priorities presented in the table is not consistent with the data presented in the report. For example, there is no discussion of biological pollutants.

Chapter 7 – Options to Mitigate Indoor Air

Page 127

2. Authorize the appropriate state agencies to establish emission limits for building materials, furnishings, combustion appliances, air cleaners, and other indoor pollutant sources that pose excessive risks due to their indoor emissions.

3. Require emissions testing by manufacturers of building materials, furnishings, combustion appliances, consumer products, and other significant source categories, and labeling in language consumers can understand. Implementation of a required test program could prove to be an effective approach, at least in new buildings.

> This order of listing mitigation options suggests a prioritization that is not consistent with the data presented in the report.

Page 129

Inadequate ventilation with outdoor air during 40 percent of class hours, and seriously deficient ventilation 10 percent of the time. This is due largely to teachers turning off

HVAC (heating, ventilating, and air-conditioning) systems because of excessive noise and to other factors such as closed outdoor air dampers and inadequate HVAC capacity.

Temperature and humidity levels outside of professional standards for thermal comfort in about one-fourth of the classrooms.

Obvious mold in about 3 percent of classrooms; water stains, excess wall moisture, and other potential mold indicators in about one-third of classrooms; musty odors reported by 69 percent of teachers. These conditions are often attributable to inadequate maintenance.

> Humidity problems in 25 percent of classrooms, humidity levels outside of professional standards, mold indicators in 30 percent of classrooms, and "musty odors' reported by 69 percent of teachers indicate a serious problem in California schools that is not reflected in the recommendations of the draft report.

Chapter 8 – Summary

Page 133

Indoor pollution has repeatedly been ranked in the "High Risk" categories in both federal and state comparative risk projects. Some of the known risks in California include:

> Bullet points on ETS and biological pollutants should be added.

Indoor pollution is estimated to cost California's economy $35 billion each year due to medical costs, lost worker productivity, loss of life, and related factors. This estimate is derived from only partial costs of cancer, respiratory disease, cardiovascular disease, and sick building symptoms. This is believed to be an underestimate; the total cost is likely much higher.

> Based on the uncertainty about the costs associated with exposure to ETS, HSIA does not believe that it is appropriate to suggest that the total cost of indoor air pollution is "likely much higher."

Appendix II – Explanation of Indoor Cancer Risk Estimates

Page II-2

3. Although distributions were used to estimate risk, the resulting average individual risk was used to estimate annual cancer cases, and thus these may be conservative estimates, since the average does not necessarily fully capture those at very high risk.

> HSIA disagrees with this statement. Using the average of an exposure distribution overstates the potential risk for those at lower exposures as much as it understates the risk for those at higher exposures.

Page III-3

There are a number of additional carcinogens known to be emitted from indoor sources that were not included in the indicator *chemicals list for the Comp Risk Project due to a lack of sufficient indoor data to estimate an exposure level. For example, other PAHs and phthalates are carcinogenic and have been measured indoors and as emissions from products. Persistent chemicals such as PCBs have been found in house dust, and various toxic metals have been measured at higher levels in both indoor air and house dust. However, the data are not sufficient to estimate population exposure. Others like acrolein are just beginning to be studied in the indoor air.* ***Thus, the adjusted estimate above is assuredly an underestimate of the actual cancer risk posed by toxic chemicals emitted or produced by indoor sources.***

> The paragraph is rather confusing. HSIA does not believe that PCBs can be considered to be either emitted from products or produced by indoor sources.

Using the excess cancer cases per million per 70 years in Table 7 of ARB's October 2000 diesel risk reduction plan and the year 2000 California population of 34 million, ***current estimated ANNUAL excess cancer cases from diesel exhaust particles total 262*** *(540/million X 34 / 70), or about 260 excess cancers per year.*

> As noted previously, this estimate for cancer risk from diesel exhaust particles is significantly lower than the estimate developed for the South Coast Air Basin alone.