



August 27, 2004

Ms. Dorothy Shimer
Research Division, 5th Floor
California Air Resources Board
P. O. Box 2815
1001 I Street
Sacramento, CA 95812

Subject: Comments of the American Gas Association on the Draft Report, "Indoor Air Pollution in California", June 2004

Dear Ms. Shimer:

The American Gas Association (AGA) represents 191 local energy utility companies that deliver natural gas to more than 53 million homes, businesses and industries throughout the United States. Natural gas meets one-fourth of the United States' energy needs. AGA, its members, and its supporting technical organizations represent significant experience and expertise in indoor air quality issues attributed to combustion appliances using natural gas as a fuel.

The subject report has potentially serious technical deficiencies based on an initial review. One problem presented by the "stakeholder review" provided by the California Air Resources Board (ARB) is that many of the technical references cited in the sections pertaining to combustion issues are not readily available. Dependence upon the ARB's interpretation of conclusions from these sources without greater detail on the underlying research, including the research methodologies as well as results, would be imprudent. AGA will continue to seek obtaining copies of the technical references cited for later, more comprehensive comments to the State of California. However, the extensive dependence upon these sources for the report requires, as the ARB approach cites, a thorough peer review by a technical panel representing broad and independent technical expertise.

The following are some specific concerns:

- With respect to combustion sources and specific combustion pollutants (i.e., carbon monoxide and nitrogen dioxide), the report is woefully deficient in meeting the objective implicit in the report's title, "Indoor Air Pollution in California," of describing in a representative and robust fashion what the exposures of Californians are to these pollutants. Very few citations of actual exposure data are provided and, where it is provided, no attempt is made to describe the representativeness of the studies to the California citizenry in general.

- As a result of this lack of exposure data for Californians, it is impossible for ARB to justify aggressive actions on combustion sources relative to other indoor air quality concerns. It is unclear whether the ARB's focus on combustion sources are based on a rational prioritization of implied exposures and health effects or on simple and convenient approaches (e.g., banning products portrayed as sources) without regard to the relative contribution to indoor air quality.
- Indeed, ARB has done little to justify its associations of combustion applications as "sources" of indoor pollutant levels or indoor air quality problems. Specific source contributions of combustion appliances to indoor concentrations of carbon monoxide (CO) and nitrogen dioxide (NO₂) are not provided and, in some cases, monitoring data is indifferently applied to indoor sources without characterization of the contribution of outdoor levels. For example, in the citation of the study by Wilson, et. al. (1993), the measured concentrations are clearly driven by outdoor levels of contaminants, but little clarification of this is provided by ARB. While indoor combustion sources can provide incremental increases in concentrations of these contaminants (but do not necessarily do so), the perspective of ARB needs to properly focus on realistic apportionment of sources to have any meaningful responses.
- A related finding is that no analysis is provided that the ARB recommendations will actually address the issues raised. One would have expected that ARB would have, for a documented contaminant exposure, documented some calculated reductions of the contaminant concentrations resulting from its recommendations. In the case of banning products such as unvented domestic gas ranges, it is suggested that removal of this "source" might represent an obvious means of improving indoor air quality. However, even this recommendation is unjustified without sound data on emissions rates in actual installations and characterization of background concentrations due to outdoor air and other indoor sources. ARB simply has not connected its recommendations to projected changes in indoor air quality the might result.
- ARB's citation of the National Institute of Medicine's book, "Clearing the Air: Asthma and Indoor Air Exposures" illustrates a use of a major national reference without regard to the specifics of exposure and context of the reference itself. ARB glosses over the finding of the authoring committee that NO₂ is a "possible, but insufficient" cause for the development of asthma and, instead, focuses on NO₂ as a "trigger," without regard to the concentrations involved or the committee's caveats. The committee found that sufficient evidence exists for "an association" for the "exacerbation of asthma," but no concentration qualification is provided for this association. It would imprudent for ARB to take use this information without associating specific concentration information. ARB also states in its discussion of this source, "Exposure to NO₂ and airway responses occur at high levels of NO₂ (400 to 700 ppb), levels that can occur in poorly ventilated kitchens with gas appliances." No data cited in the book supports that these levels represent measured kitchen concentrations relevant to California. The book does point out a flaw present in ARB's evaluation of the literature on kitchens, gas ranges, and respiratory response: "Most epidemiological studies reviewed in this section have assessed NO₂ exposure based on the presence or absence of

gas appliances in the home, rather than on the basis of NO₂ measurements.”¹ It is also important to note that the committee provides recommendations for mitigation and prevention, but it did not recommend banning unvented gas cooking appliances. Finally, the book states, “the committee did not identify any studies that addressed whether lowering indoor NO₂ levels had an effect on asthma outcomes.”² ARB needs to take this finding into consideration with respect to NO₂ generally.

- In its discussion of CO, ARB errors in mixing CO issues associated with life safety with indoor air quality. CO fatalities and injuries (i.e., acute poisonings) are clearly associated with episodic events involving major failures of mechanical systems and/or misuse of these systems. Concentrations and outcomes are, as a result, abnormal conditions and involve intervention by first responders and prevention by public safety organizations. They do not represent issues of general public health or indoor environment since they are not associated with normative, anticipated conditions under which people live and work. Just as ARB would not focus on particulate matter and CO inhalation associated with house fire events as “indoor air quality” issues, CO incidents should not be covered in this report. All data justifications for consideration of CO based on such incidents should be deleted from the report.
- Many “CO advocates” have not made the distinction between incidents and air quality discussed above. For those who insist upon including acute poisonings in consideration of mitigation measure for indoor air quality, at least the data supporting action should be correct. The ARB data underlying its recommendations with respect to CO poisonings is not correct in that omits CO from automobiles (the largest source of CO fatalities in homes) and CO from portable equipment such as gasoline powered generators (the only appliance related CO source that represents a growing frequency of CO poisoning fatalities). Historically, CO fatalities from “pipeline gas” have been declining consistently since the 1940s. Significant declines are demonstrated in the data from the National Center for Health Statistics since the ARB cited data, which is no more recent than 1988. The ARB claim that no temporal trend in CO deaths in California can be discerned is incorrect. NCHS data is readily available for California and shows a declining trend in CO fatalities to 25 statewide and for all sources in 1998, the latest year analyzed. In contrast, statewide fatalities in 1978 were 53. AGA has sponsored extensive analysis of these data sources for presentations to its members and the U. S. Consumer Product Safety Commission (CPSC) and is prepared to exhaustively discuss this issue with ARB. Attribution of declining CO poisonings due to increased use of CO alarms and testing of combustion appliances is unfounded because any such affects cannot be discriminated from the consistently declining trend.
- The literature cited on CO health effects due to exposure includes a number of rather obscure articles that require thorough review. ARB’s specific use of some of these sources is questionable. For example, ARB’s interpretation of the study by Linn, et. al., (2000) states that “CO showed the most consistently significant

¹ Clearing the Air: Asthma and Indoor Air Exposures, National Institute of Medicine, National Academy Press, 2000, page 225.

² Ibid, page 233.

relationship among the pollutants considered, and [the authors] concluded that a wintertime increase in CO of 1.1 to 2.2 ppm predicted an increase of 4% in cardiovascular admissions (~20 extra admissions per day).” There are a number of problems with using this conclusion for further action. First, the relationship of CO and admissions as considered is purely correlative and does not postulate another quantitative relationship based on mechanisms in the subjects. Second, the stated CO concentrations are not exposures for the subjects in that they are ambient air quality measurements spatially removed from subjects, without information on other sources of exposure to pollutants, and stated without time durations. Third, discussion of critical markers of exposure, specifically carboxy-hemoglobin levels of the subjects, are not discussed. Fourth, the relationships of other pollutants, commonly known to accumulate under winter conditions, to admissions are not fully considered in terms of their mechanistic affects compared to CO and cumulative effects. As a result, ARB’s use of this information is ill advised without additional explanation or analysis.

- ARB’s discussion of guidelines and testing procedures for combustion appliance is selective, incomplete, and confusing. First, references to the U. S. Department of Energy Build America program provide no information on whether its recommendations are broadly used or technically supported. As a result, its recommendations have the same problems as recommendations from ARB: simple prescriptive requirements without regard for effectiveness and without sufficient definition of the problem to evaluate the recommendations. No discussion is provided of the national installation codes, which conflict with these recommendations. Second, the reference to AGA’s Fact Sheet on combustion emissions and gas ranges is out of context. The quoted statement, which is factually correct with respect to the national perspective, refers to evaluating ranges in the field, not design certification as the statements to follow regarding ANSI design certification would imply. Finally, the statement that “ANSI standards for gas stoves would allow excessive levels of indoor air pollution to build up in homes...” is unsupported and at odds with the published literature concerning normal operation of gas ranges and ovens from the gas industry and CPSC. Indeed, if ARB believes this, it is obliged to forward proposals for changes to the ANSI standards, with technical support.
- ARB appears to have been selective in its choice of literature, in spite of its claim that the report “summarizes the best scientific information available.” ARB’s criteria for selecting literature is unspecified, other than some unqualified statements about currency. Even with respect to age of technical sources, it is unclear why date of publication, in of itself, should be a basis for screening sources. Almost all of the gas industry literature with respect to combustion appliances and indoor air quality is omitted. This is particularly striking since many such sources are recognized and cited in the U. S. Environmental Protection Agency’s (EPA) “Criteria Documents” for CO and NO₂. These documents are peer reviewed having been considered and used in the EPA process. At the same time, ARB cites a large number of sources that are not peer reviewed. ARB needs to state specific criteria for its selection of sources.
- The larger issue raised with respect to the upcoming peer review within the ARB process is the role of the peer review committee. Is that committee also responsible for establishing the credibility of the cited sources that have not undergone

peer review (i.e., peer review the sources as well as the peer review of ARB's use of those sources)? This may be a daunting challenge based on AGA's experience with this report since it requires a thorough review of not only the report but the sources themselves. ARB needs to address this issue.

This concludes the comments of AGA. The use of this report, through the scheduled peer review and beyond, is unclear, suggesting that considerably more work is needed on the document if it is to serve potentially broad purposes in the State of California. Peer review, again, will be key to the credibility and utility of the document. ARB should make every effort to ensure that the peer review process includes broad technical representation and expertise.

Sincerely,

A handwritten signature in cursive script, appearing to read "Ned A. Williams".

Director, Codes, Standards
& Technical Support